Kingdom of Cambodia
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National Health Survey 1998

National Institute of Public Health
Ministry of Health

Phnom Penh, Cambodia
July 1999

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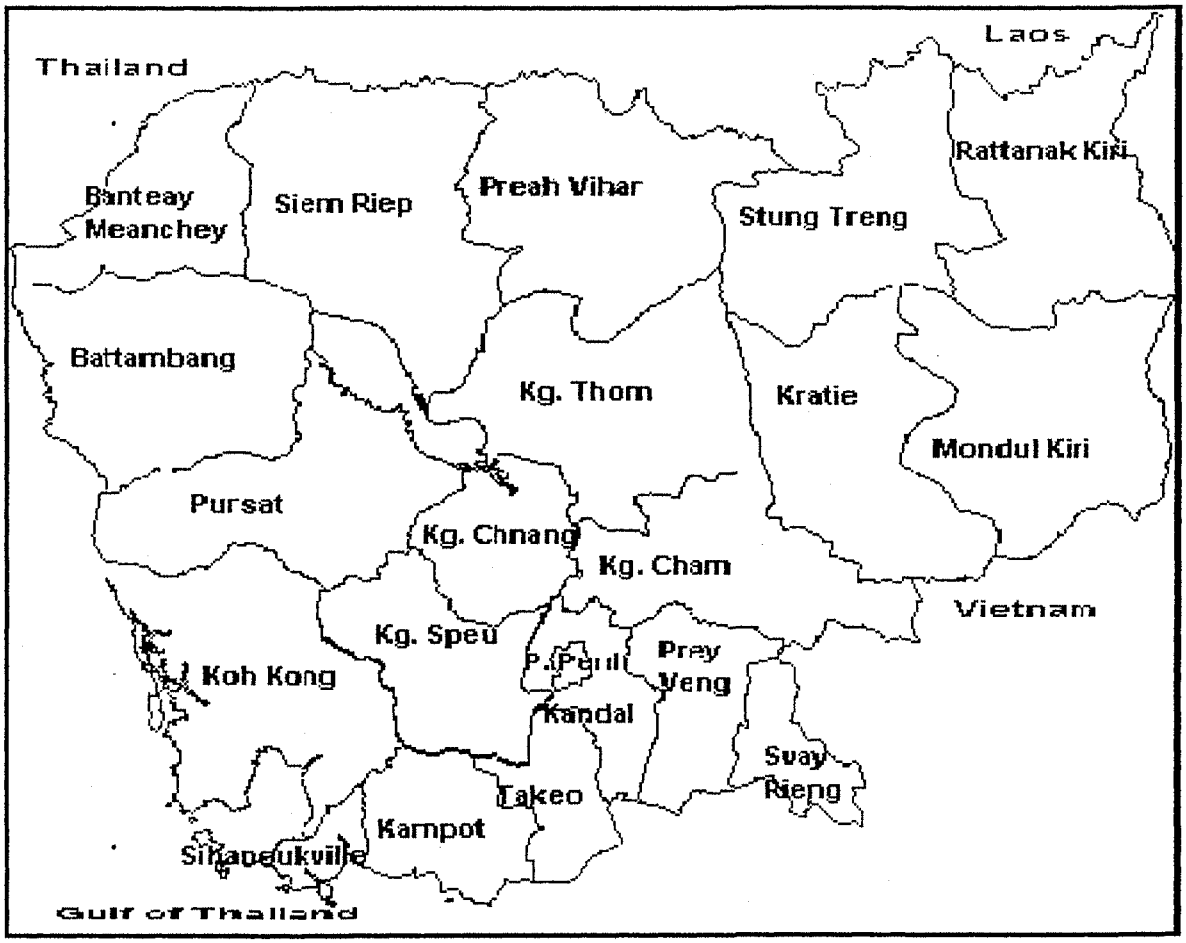
LIST OF ACRONYMS

ADB	Asian Development Bank
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ARI	Acute Respiratory Infection
BHSP	Basic Health Services Project
CBR	Crude Birth Rate
CDCP	Cambodia Disease Control and Health Development Project
CPR	Contraceptive Prevalence Rate
CEB	Children Ever Born
DHS	Demographic and Health Surveys
DK	Don't Know
DPT	Diphtheria, Pertussis, Tetanus
DSC	Demographic Survey of Cambodia
EPI	Expanded Program of Immunization
GFR	General Fertility Rate
GTZ	German Technical Cooperation
HIV	Human Immune Deficiency Virus
HRR	Household Response Rate
IUD	Intrauterine Device
KAP	Knowledge, Attitudes and Practices
IMR	Infant Mortality Rate
IRR	Individual Response Rate
ISSA	Integrated System for Survey Analysis
MOH	Ministry of Health
NGO	Non-governmental Organization
NHS	National Health Survey
NIPH	National Institute of Health
NMCHC	National Maternal and Child Health Center
NN	Neonatal Mortality
OPV	Oral Polio Vaccine
ORR	Overall Response Rate
ORT	Oral Rehydration Therapy
ORS	Oral Rehydration Salts
PCU	Project Coordination Unit
PNN	Post-neonatal
PSU	Primary Sampling Unit
SES	Socioeconomic Status
SPSS	Statistical Package
TBA	Traditional Birth Attendant
TFR	Total Fertility Rate
UNICEF	United Nationals Children's Fund
USAID	United States Agency for International Development
VAC	Vitamin A Capsule
WB	World Bank
WHO	World Health Organization

MAP OF CAMBODIA



EXECUTIVE SUMMARY

Introduction

The Cambodian National Health Survey (NHS) is a nationally representative survey of women age 15-49, funded by the Basic Health Services Project (financed by Asian Development Bank Loan No. 1447-CAM) and by the Cambodia-German Health Project (financed by a grant from Deutsche Gesellschaft für Technische Zusammenarbeit). Its primary objective is to provide the Kingdom of Cambodia Ministry of Health with reliable, population-based, nationally representative data on infant/child mortality, fertility, and related health service indicators.

5,938 households selected for the NHS sample were identified. 5,931 of these households were successfully interviewed, a **household response rate of 99.9 percent.** A total of **7,654 women** were identified as eligible to be interviewed. Questionnaires were completed for 7,630 of those women, an **individual response rate of 99.7 percent.**

Female Literacy And Age At Marriage

The majority of Cambodian women of reproductive age live in rural areas, have 3 or less years of schooling and are either illiterate or semi-literate. Rural women have less education than urban women, and this is especially so for women living in the more remote and isolated rural provinces. **Women in the more remote and isolated rural areas are three times more likely than women in Phnom Penh to have had no schooling at all.**

Education is closely related to both socioeconomic status and literacy, as one would expect. **However, it is interesting to note the overwhelming majority of women who are fully literate (as defined by able to read a simple sentence in Khmer) have had four or more years of schooling.** The majority of partially literate (able to read a simple sentence only with difficulty) women have had one to three years of schooling, and so have about 16% of completely illiterate women. This suggests that at least four years of basic education are required to achieve literacy in Khmer, an important point since less than half of all Cambodian women currently have that level of education

Although education ends quite early for most Cambodian girls, teen-age marriage is not very common; 85% of Cambodian women marry at age 20 or later.

Prevalence And Treatment Of Illnesses And Injuries

One of the priorities of this survey was obtaining a baseline measurement of access to curative medical care in general, and utilization of MOH health facilities in particular, for subsequent use in assessing the impact of the new MOH Health Coverage Plan.

13.5% of household members (a total sample of 32,176 persons) were reported to have been sick or injured in the 30 days prior to the day of interview.

In the particularly vulnerable group of children under age 5, one-fourth of children were reported to have been ill or injured in the past 30 days, and almost a fifth were moderately or severely so.

About 14% of all illnesses/injuries, and 10% of those which were moderate or serious in severity, received no treatment at all. The percentage of **non-treatment is twice as high among those living in isolated rural provinces in comparison to the country overall; and almost three times as high in comparison to the capital city**. There is also a noticeable **difference in receipt of treatment by socioeconomic group, with the poorest segment of the population being more than four times more likely than the most affluent to go without any treatment at all.**

When the poorest segment of the population do get treatment for a moderate/serious illness, only 59% of them see a trained health worker. For the highest socioeconomic group, the figure is 85%. Significantly higher percentages of the poor receive either only home remedy/traditional treatment or medicine bought without benefit of consultation with a trained health worker.

Self-treatment with medicines bought without consultation with a trained health worker is common, particularly for illnesses considered slight in severity. Disturbingly, it is also most **common in the management of illnesses and injuries among children under the age of five, the very group for which incorrect prescriptions are most dangerous**. In particular, **a very high percentage of children with acute respiratory infection (ARI) are treated with medicine bought without benefit of consultation with a trained health worker.**

Overall **the government sector** (as defined by trained health workers providing services either in a government facility or outreach location), **is currently utilized in only one-fifth of all illnesses and injuries. This percentage increases to one-third when the illness/injury is a serious one.** Trained health workers consulted at either a private facility or private home are utilized in over a third of all illnesses/injuries overall, with much greater utilization by the more affluent and urban segments of the population. **Of patients receiving treatment from a public source, almost half did so at a Provincial or Phnom Penh Government Hospital**. A smaller percentage reported treatment at District Hospitals, which is not surprising since not all of these have yet been rendered fully functional. A minimal percentage reported treatment at an actual Health Center – again, not surprising since the construction and development of Health Centers was a new undertaking just underway at the time of the survey.

There is a significant difference in use of hospitals according to socioeconomic status. **Over half of the treatment from trained health workers obtained by the highest socioeconomic group occurred in a hospital, compared with slightly less than a third for the lowest socioeconomic group.**

Women of reproductive age appear to be more likely to utilize a trained health worker for curative care than they are for pregnancy/delivery care. **In only one-third of births to Cambodian women over the past five years did the mother receive antenatal care from a medically trained person** The percentages are higher for urban women, educated/literate women, and women of higher socioeconomic status. **Among births to women living in remote or isolated rural areas, and among women who are poor and/or illiterate, less than one fifth receive antenatal care from a trained provider.**

Only a third of births in the last five years were attended by a medical person; the overwhelming majority were attended by traditional birth attendants. As with antenatal care and hospital delivery, the percentage is higher among higher women with higher socioeconomic status, educated/literate women, women in urban areas, and especially, women of any socioeconomic background living in Phnom Penh. Phnom Penh is also the only part of the country where delivery in a medical facility is common. Everywhere else, more than 90% of births take place at home.

Infant And Child Mortality

Under-five mortality for the period 0 to 4 years before the survey (the calendar years 1993-1998) **is 115 deaths per 1,000 live births.** At this level, more than one in nine Cambodian children will die before their fifth birthday.

Most of this mortality occurs during the first year of life. The infant mortality rate is 89 deaths per 1,000 live births, while mortality between the first and the fifth birthday is 28 deaths per 1,000 children surviving at the first birthday.

Mortality during the first month, or **neonatal mortality, is high (36 per 1,000), but postneonatal mortality** (between the first month and the first birthday) **is much higher than expected (54 per 1,000) and it accounts for 60 percent of infant mortality.**

All infant and child mortality rates were extremely high during the Khmer Rouge period and then dropped substantially. After that drop until present (i.e., from around 1980 – 1998), child and neonatal mortality have remained essentially unchanged. However, **there has been a recent and dramatic increase in post-neonatal mortality. During the most recent period 1993 - 1998, postneonatal mortality has increased from about 30 to 54 deaths per 1,000.**

Such an increase in post-neonatal deaths only, without a simultaneous change in neonatal or child deaths, usually indicates a change for the worse in the incidence and/or treatment of infectious diseases. Relevant findings in this report include:

- **Lack of exclusive breastfeeding**, even in very young infants.

- **High levels of infant diarrhea, dysentery and respiratory infection.** It is particularly noteworthy that there is a high rate of dysentery in infants, for whom it carries a high mortality risk. Dysentery is more commonly encountered in older

children, but the **early giving of supplemental food and fluid to very young infants deprives many Cambodian children of the protective effects of exclusive breastfeeding and exposes them to pathogens.**

- A relatively **low rate of appropriate treatment for common child illnesses, as defined by consultation with a trained health professional, and, for watery diarrhea, oral rehydration therapy.**

- A **tendency to treat illnesses in young infants with medicines bought directly from a shop, without the advice of a trained health worker.** The practice of buying medicine without trained consultation -- particularly dangerous for infants, where selection of correct drug and dosage requires specialized knowledge -- is actually *more* common in the case of infant illnesses than for older children or adults.

- **Low levels of immunization against childhood diseases and low coverage with Vitamin A prophylaxis,** especially in remote or isolated provinces and among families of lower socioeconomic status.

All of the above factors could contribute to high levels of post-neonatal mortality. However, none of them are new to Cambodia. Whether and why they might have worsened within the past five years is a matter of conjecture only.

Because the increase in post-neonatal mortality began around 1990-1993, it cannot be attributed to the recent onset of HIV/AIDs in Cambodia. However, it is possible that HIV/AIDS has contributed to post-neonatal deaths in the most recent 1-2 years, and it will certainly do so at an increasing rate in the coming years.

More research is urgently needed to determine the causes of rising post-neonatal mortality in Cambodia and to develop appropriate interventions.

Maternal And Child Health Services

The survey covered various aspects of maternal-child health care such as antenatal visits, child vaccinations, assistance during delivery, and mothers' knowledge and practice with regard to acute respiratory infection, diarrhea and dysentery.

Maternity Care

It was found that, for **the majority (54.5%) of live births in the last five years, the mother did not receive any antenatal care** at all. And, for the minority who do get care, most do so only late in pregnancy: the median stage of pregnancy at first antenatal visit is 6 months gestation.

The location where mothers live, their socioeconomic status, the number of years

of schooling they have had and their level of literacy all have a very strong relationship with the receipt of antenatal care in general and also (for those receiving antenatal care) with the type of provider.

In the capital city, 81.3% of births in the last five years had received antenatal care . By contrast, **among women living in remote or isolated provinces, less than 40% of births were preceded by any antenatal care – a more than two-fold difference .** There is an even greater gap when the comparison is limited to antenatal care by a medically trained person (doctor, nurse or trained midwife): 76.7% of births in the capital received antenatal care from a medically trained person compared to only 25.3% and 21.8% in the remote and isolated province groups respectively – a three fold difference.

71.8% of births to mothers in the highest socioeconomic group received antenatal care from a medically trained person (doctors 10.9%, nurses/midwives 60.9%). This rate decreases sharply with lower socioeconomic status; **only 19.3% in the lowest socioeconomic group obtained antenatal care from a trained provider – an almost four-fold difference**.

Findings with regard to maternal tetanus toxoid vaccination are similar to those for antenatal care overall. Of all live births in the last 5 years, **only 15.2% of the mothers had received the recommended minimum of two tetanus toxoid injections during pregnancy**, and only 5.6% had received the preferred three doses. **60.3% did not receive a single dose of tetanus toxoid vaccine during pregnancy.** The location where the mothers live, their socioeconomic status, the number of years of schooling and the literacy level all show a strong relationship with the number of tetanus toxoid injections received during pregnancy.

In the capital city 43.8% of births were preceded by two or more doses of tetanus toxoid during pregnancy, compared to less than 20% for those outside the capital – a more than two-fold difference. It is noteworthy, however, that even in the best-served part of the country (Phnom Penh), coverage is below 50%.

With regards to socioeconomic status, 40.4% of births to better off mothers had received two or more doses of tetanus toxoid during pregnancy, compared to only 13.6% in the poorest group – a threefold difference. **Maternal tetanus toxoid immunization coverage, like antenatal visits, drops sharply with declining socioeconomic status.**

Overall, **90% Cambodian births occur at home or in other non-medical facilities**. The one exception is for mothers living in the capital city . **Seventy percent of births to mothers living in the capital city occurred in a medical facility, versus about 5% for mothers living anywhere else: an almost fifteen-fold difference.** Any attempts to improve delivery conditions at medical facilities, which has been the focus of many recent initiatives, will therefore not benefit the majority of women unless it is accompanied by a change in the practice of delivering at home.

The majority of births are attended by Traditional Birth Attendants (TBAs), again with the sole exception of the capital city. For births to mothers staying in the **capital city, the percentage of medical assistance during pregnancy is 83%.** The remaining 16% rely on a TBA. **In all other parts of the country, the average is about 25% medical assistance versus 73% assistance from a TBA.**

There is also a large gap between socioeconomic groups. **75% of births to mothers in the highest socioeconomic group had medical assistance during delivery while amongst the poor, it is only about 20%.** Mothers of lower socioeconomic status depend primarily on TBAs for delivery assistance.

Breast-Feeding Practices

Although breast-feeding is nearly universal, its onset in Cambodia is typically delayed. **Virtually no infants start breast-feeding within an hour of birth, and half do not begin even within the first day**. This means that **the infant is not only denied the protective effects of colostrum, but also unnecessarily exposed to pathogens through consumption of other fluid.**

In addition to a delayed onset of breast-feeding, most infants in Cambodia are introduced to supplementary fluids and foods too early. **Among children aged 0 to 3 months** – an age group where breast milk is 100% sufficient for nutritional needs and other liquids/foods pose a threat of infection -- **only 15.6% are exclusively breast-fed**. The majority of children in this age group receive plain water or sugar water as a supplement to the breast-feeding and about a third also receive other fluids or foods.

Conversely, **introduction of food supplementation to children aged 6 months and over** -- for whom breast milk is no longer sufficient and supplementation is nutritionally necessary -- **is not as rapid and widespread as it should be to ensure adequate nutritional status. Over one-third of Cambodian children aged 6-7 months do not receive any solid or semi-solid foods at all. Even at age one year, about 15% of children are not receiving solid/semi-solid food supplementation**.

In summary, there are serious problems with the current patterns of both breast-feeding and introduction of food supplementation for Cambodian infants:

- **Lack of early onset of breast-feeding deprives infants of the protective effects of colostrum, and deprives mothers of the positive health effects of postpartum lactation;**

- **Non-exclusivity of breast-feeding with premature exposure to other liquids and foods puts young infants at avoidable risk for diarrhea, dysentery and other water or food borne illnesses;**

- **A significant percentage of infants over the age of six months are at risk of malnutrition due to delayed onset of food supplementation** at an age when breast milk is no longer sufficient for all the infant's nutritional needs.

There is an urgent need to educate Cambodian mothers about the need to start breast-feeding immediately after birth, maintain exclusive breast-feeding in the first few months of life, and then introduce solid/semi-solid food supplementation at an appropriate age (6-7 months).

Child Health Care

Childhood immunization rates were calculated based on immunizations received by children aged 12-23 months at the time of the survey. Both immunizations recorded on a vaccination card, and immunizations reported by the mother in the absence of a card, were taken into consideration. Overall, **less than 40% of children born during the 12 to 23 months prior to the survey had received all of the vaccines**. The **drop out rate** between first and third doses is **25% for DPT and 31% for polio**..

Since the immunization series should be completed by the end of the first year of life, immunization coverage by age 12 months was also calculated. This was done based on the recorded date of vaccination relative to the child's date of birth. For non-verified vaccinations (i.e., mother's recall, no card available) an assumption was made that the percentage receiving all doses by age 12 months would be the same as that for card-verified immunizations. **Only one third of children born in the previous 12-23 months were fully vaccinated by age one year** (34%). BCG, first and second doses of DPT, and first and second doses of polio have the highest levels, while coverage for the third doses of DPT and polio, and measles is significantly lower.

Immunization coverage rates show great variation by geographical location and socioeconomic status. The most profound association is with place of residence: **children in Phnom Penh have 78% immunization coverage compared to only 17% for those in the most isolated provinces --- a more than four-fold difference**. Receipt of prophylactic Vitamin A Capsules (VAC) is similar to that of immunization coverage. Overall, **less than half of Cambodian children under the age of five received a vitamin a capsule (VAC) in the twelve months prior to the survey, and most of those who did, received it only once.** There is a strong relationship between likelihood of VAC receipt and place of residence, identical to the pattern noted for immunization: **coverage is far higher in the capital city than elsewhere, and especially low in remote and isolated rural provinces.**

The survey also measured the two week prevalence of Acute Respiratory Infection (ARI), diarrhea, and dysentery among children under the age of five, and treatment given. The **two-week prevalence for ARI**, defined as cough accompanied by fast breathing, is **18% for all children under age 5**. It is highest in the youngest age

groups: **for infants aged 0-5 months, almost a quarter were reported to have had an ARI in the immediate two week period** – an extremely high prevalence rate in a very vulnerable age group.

While prevalence of ARI shows only slight variation by background characteristics, treatment rates are strongly influenced by place of residence and socioeconomic status. Children with ARI are much more likely to be taken to a health facility or provider in the capital city and accessible rural areas than those in the remote and isolated (57% versus 21%), probably due to greater accessibility of health care in those places. **Children from poor families have much lower treatment rates for ARI than those from better off families (20% against 52%)**, suggesting that financial access to care is also a significant barrier to treatment.

With respect to diarrhea and dysentery, **1 out of 6 children were reported as having had watery diarrhea (16%) and 1 in 10 children as having had dysentery (10 %) within the two week period before the survey.** Field work was done in the early rainy season which is not the peak period for such diseases.

The prevalence of watery diarrhea shows little variation by place of residence or socioeconomic traits. However, dysentery prevalence shows a strong relationship to place of residence and socioeconomic indicators. **Children in remote and isolated areas are more likely to suffer from dysentery than those in the capital city and accessible rural areas. Children of mothers with high socioeconomic status are less likely to be affected by dysentery than those of poorer mothers.**

It is noteworthy that **very young infants – 0 to 5 months of age – had a two week prevalence of 14.1% for watery diarrhea and 6.3% for dysentery. Dysentery is not usually seen in children so young and, when it does occur in that age group, poses a very high mortality risk. These high rates in very young infants almost certainly reflect the lack of exclusive breastfeeding practice**, as previously described.

The overall rate of children suffering from diarrhea or dysentery who were taken to a health facility or provider is 30%. The total **Oral Rehydration Therapy (ORT) treatment rate** (defined as administration of either oral rehydration salts or recommended home solution) is **about 21% for both watery diarrhea and dysentery**. Most of these received the commercially prepared Oral Rehydration Solution (ORS) packets; only 3.3% of children received the recommended home solution.

Less than half of Cambodian women of reproductive age have heard of ORS. Knowledge about ORS is higher in urban vs. rural areas overall, and higher in the capital city and accessible provinces than in more remote and isolated areas. **Knowledge of ORS s strongly associated with maternal education and literacy**. It is almost twice as high among educated women than for women with no education.

68% of the children who had diarrhea or dysentery **were given oral medicine, while 12% received injections and 4% received an intravenous fluid or medication.** When diarrhea and dysentery are examined separately, there is little difference in the frequency of medication use. **Children with simple watery diarrhea are just as likely to receive pills, injections or IVs as children with dysentery**. Use of antibiotics and other medications for watery diarrhea is usually an unnecessary and potentially harmful practice.

Fertility Trends and Birth-Spacing

An examination of age-specific fertility rates for the five year period immediately preceding the survey shows a **decline in fertility among all age groups. The decline has been recent and significant, and has occurred predominantly in the 25-29, 30-34 and 35-39 age groups.**

There has also been a dramatic increase in use of contraception during this same interval. This is the primary reason for the fertility decline.

The total **Contraceptive Prevalence Rate (CPR) for modern and traditional methods combined, is currently 21.8% -- more than a fifth of all currently married women. For women with two or more living children, the CPR is 25% (all methods). The modern method-only CPR is 16.1%, and over one-quarter (26.1%) of currently married women have used a modern method of birth-spacing at some point in time.**

Comparing current rates to those measured in 1994/5, it is evident that **the use of modern methods of birth-spacing has more than doubled in the space of only 3 years in Cambodia** --- a remarkably fast increase by international standards.

Today, the average Cambodian woman begins childbearing around the age of 20, and, if current age specific fertility rates remain unchanged, she will have 4.1 children during her lifetime. **The national Total Fertility Rate (TFR) is 4.1. In urban areas, the TFR is 3.3 births per woman, one child lower than the rate in rural areas (4.3 births per woman).**

For the period 1995-98, the crude birth rate was 29 births per thousand members of the population. The **lowest rates are found in urban Cambodia, where the CBR is 25 births per thousand population. By contrast, in rural areas where the rates are highest, the CBR was estimated to be 29 births per thousand population.**

The **median birth interval is 32.0 months**. However, although the majority are appropriately spaced, 24 percent of second order and higher births are born too soon (i.e., less than 24 months) after a prior birth. Overall, the median age at first birth is 21.8 years.

32% of the births in the five-year period before the survey were in at least one high-risk category such as too short a birth interval, high birth order, or maternal age under 18 years or over 34 years. 23% faced two or more risk factors. **A short birth interval and high birth order were the most common risk factors.**

Knowledge of birth-spacing methods and where to obtain them has improved greatly over the past three years in Cambodia, but there is still a significant percentage of women who do not have knowledge of even one modern method and its source. **Approximately one-third of women do not know the source for obtaining any modern method of birth-spacing, either because they have never heard of any method, or because they have heard of method(s) but do not know where to get them.**

In addition, **sixty-nine percent of currently married women, if they were to become pregnant right now, would deliver a child with an elevated mortality risk. In the majority of cases the risk would be due to a short birth interval and can be avoided by delaying the pregnancy. However, less than one-quarter of these high risk women are currently using a method of birth-spacing.**

CHAPTER 1

INTRODUCTION

1.1 Background

Cambodia is a primarily rural agricultural country located in Southeast Asia. For the past three decades, it has been beset by civil conflict including the infamous genocidal rule of the Khmer Rouge from 1975-1979. It emerged from the latter with all basic infrastructures shattered and the human resource base of the country decimated. Over the following decade, efforts were made to reconstruct a health care system, starting with the training of new health personnel. However, activities were constrained by ongoing civil war and insecurity, and international isolation and lack of resources.

Only in 1993, following the signing of a peace accord and an internationally recognized election, did significant amounts of donor assistance become available to the health sector. With support from a number of agencies, particularly the World Health Organization (WHO), the Ministry of Health embarked on a three year planning exercise which cumulated in a Health Coverage Plan which systematically laid out how and where health services were to be delivered and managed throughout the country. It was decided that a network of static Health Centers, serving catchment areas of approximately 10,000, would be developed to provide a priority package of preventive and basic curative care. Management structures would be created at district level to oversee Health Center activities as well as operate a Referral Hospital. The Health Coverage Plan was completed in mid -1996, followed by another two years of work in development of operational guidelines and related training of national, provincial and district personnel.

Two major donor projects were approved in late 1996 providing resources in support of this endeavor: the World Bank-financed Cambodia Disease Control and Health Development Project (CDCP) and the Asian Development Bank (ADB) – financed Basic Health Services Project (BHSP). The CDCP covers 11 specific provinces including development of their planned Health Centers and Referral Hospitals, while the BHSP does the same in five different provinces. Between them, the two projects support 16 provinces containing about 80% of the country's population. Throughout 1997, the BHSP and CDCP concentrated on the establishment of project management structures and policies. Implementation of most field activities commenced in 1998.

Hence, 1998 marked the onset of actual implementation of the new Health Coverage Plan and two major donor projects supporting it. There was an urgent need for reliable baseline information on the country's health situation overall, and on the specific Project catchment areas, in order to guide implementation and permit subsequent evaluation of impact. Moreover, there had never been a population based survey of infant and child mortality, or of fertility, in Cambodia. One survey in 1995 did measure fertility, but due to the security situation at that time, it was unable to be nationally representative in its sample. Several more recent surveys had measured health service indicators, but no one had yet measured infant and child mortality directly – the key measures of health status.

1.2 Objectives of the Survey

The primary objective of the Cambodia National Health Survey is to provide the Ministry of Health with reliable, population-based, nationally representative data on infant/child mortality, fertility, and related health service indicators.

A secondary objective was to provide the ADB-financed Basic Health Services Project (BHSP) and the World Bank-financed Cambodia Disease Control and Health Development Project (CDCP) with baseline information about their respective Project areas, against which project impact could later be assessed.

1.3 Organization and Survey Methodology

The Cambodian National Health Survey (NHS) is a nationally representative survey[1] of women age 15-49. Funding for the survey was primarily provided by the ADB Basic Health Services Project, loan number 1447-CAM. Additional support, particularly for field data collection in provinces not included in the ADB and World Bank financed projects, was provided by the Cambodia-German Health Project funded by Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ.)

The NHS was conducted under the auspices of the Ministry of Health National Institute of Public Health (NIPH). A Technical Steering Committee was formed by the NIPH, with MOH approval, to oversee all technical aspects of the undertaking. It was composed of representatives from the MOH, NIPH, and technical experts from various donor agencies involved in the health sector, including WHO, UNICEF, the ADB, the World Bank, GTZ, USAID and UNFPA.

Technical assistance in the sample design, survey methodology, interviewer training, data processing and analysis was provided by Macro International under contract with the Ministry of Health. Field data collection was carried out in 15 Provinces by an NGO, SAWA-Cambodia, under contract with the Ministry of Health. Data collection in the country's remaining Provinces was carried out directly by the NIPH. Training of both NIPH and SAWA-Cambodia field staff (interviewers, supervisors, etc) was conducted jointly to ensure uniformity of procedures.

Sample Design and Selection

The NHS sample was designed to provide estimates of key health indicators including infant/ child mortality rates and fertility rates for the country as a whole, for urban and rural residence, and for the two project catchment areas (the Basic Health Services Project and the Cambodia Disease Control and Health Development Project). In addition, the design allows for estimates of most key variables (but not for the vaccination coverage of children, fertility rates, or mortality rates) for 14

[1] Preah Vihear Province, as well as any areas considered by the National Institute of Statistics to be inaccessible (in most cases for security reasons) were excluded from the sampling frame. It is estimated that the population of the excluded areas represents less than 3 percent of the total population of Cambodia.

Provinces[1]. In the other Provinces, the sample size is not sufficiently large to allow for province-level estimates. In order to provide sufficient cases to meet the survey objectives, the number of households selected in the NHS sample from each Province was disproportional to the size of the population in the Province. The above arrangements imply stratification into 40 strata, with 40 different sampling fractions. These strata are 20 Provinces, each divided into an urban and a rural sector. As a result, the NHS sample is self-weighting within strata; weights are only necessary when making estimates across more than one stratum.

For a more complete description of the NHS sample design, see Appendix A. Estimations of the sampling error for key variables may be found in Appendix B.

Although the NHS data allows for province-level estimates for many variables, most of the tables to follow do not give breakdown by province as this would render the tabulations lengthy and difficult to present on a single page. In addition, many of the provinces most likely to be under-served are not among those for which province-level estimates can be obtained, due to insufficient sample size. Instead, for the purpose of concisely presenting meaningful information about geographical variation, provinces have been grouped together in the data analysis as follows:

1. Capital City = Phnom Penh

2. Accessible = Provinces which are comparatively accessible from the capital and have been receiving Ministry of Health services for a significant time period. These include: Battambang, Kampong Cham, Kampong Chhnang, Kampong Som, Kampong Speu, Kandal, Prey Veng, Pursat, Siem Reap, Svay Rieng, Takeo.

3. Remote = Provinces which are less accessible than the above, and have a shorter history of coverage by the central government. These include: Kampot, Kampong Thom and Koh Kong.

4. Isolated = Provinces that, by reason either of geographical isolation or recent civil strife, are the least accessible and contain significant areas which are underserved or only recently served. These include: Banteay Meanchey, Kratie, Mondulkiri, Rattanakiri and Stung Treng.

With respect to the last category, it should be noted that Kratie, Mondulkiri, Rattanakiri and Stung Treng are similar in being isolated by reason of geography. Banteay Meanchey, on the other hand, is geographically accessible but significant parts of the province have been war affected and insecure until quite recent times. This plus a need to have an adequate sample size in each category accounts for its inclusion in the "Isolated" grouping. However it is somewhat atypical in that, while isolated and war-affected, it has also been the target of greater than average intensity of NGO assistance in the health sector, especially with regard to establishment of new Health Centers.

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[1] These provinces include: Kampong Chhnang, Kampong Cham, Prey Veng, Svay Rieng, Takeo, Battambang, Kampong Speu, Kampot/ Kaep, Kandal, Kompong Thom, Phnom Penh, Pursat, Siem Reap, and Banteay Meanchey.

The NHS sample was selected in three stages:

(1) 270 primary sampling units (PSUs) (59 urban and 211 rural) were selected with probability proportional to size in the 40 strata from a listing of provinces, districts and villages obtained from the Population Census Office. This listing had been recently updated in February 1997 in preparation for the 1998 census, and included population size and number of households for each village. In the case of urban areas, similar information was provided for groups within each commune. Only areas designated as fully accessible and having a full household count were eligible for selection.

(2) Between December 1997 and February 1998, 12 teams of listers visited 269 of the 270 selected units and obtained current lists of households. One select unit was not visited because of security concerns. Since about one third of the selected units contained more than 300 households, it was decided to divide all large units selected into segments, with a view to selecting one segment for the survey. This additional stage of segmentation was done in order to avoid an excessive amount of listing work. The segmentation was performed in the field by the listers teams.

(3) Based on these household lists, a systematic random sample of households was selected: 25 households in every cluster in rural area and 15 in each urban cluster, for a final sample of 6,219 households.

Survey Instruments

The NHS involved two types of questionnaires: a household questionnaire and an individual questionnaire. The household questionnaire was administered to all selected households; the individual questionnaire was administered to all women aged 15-49 identified in the household questionnaire as either usual residents of the household or visitors who stayed there on the night before the day of interview. These questionnaires were developed to measure the desired indicators identified by the MOH and Technical Steering Committee. Wording and structure of the questionnaires, where applicable, was based on the model survey instruments Macro International has used in similar surveys worldwide.

The household questionnaire consisted of three parts: (1) a household schedule giving demographic details of all usual household members and overnight visitors; (2) a series of questions relating to the utilization of health services for any household members who had been ill or injured in the past 30 days; and (3) questions about wall and roof materials of the home and household possessions, which in turn were used to compose a measure of overall household socioeconomic status.

The individual questionnaire administered to women aged 15-49 gathered detailed information about the woman's reproductive history, and maternal and child health-related knowledge and practices. Questions specific to child health practices were limited to children born after January 1993. (i.e., children under age 5).

The questionnaire was developed in English, translated into Khmer, then back-translated and corrected. Following this, a three day pretest covering 100 households was conducted in Phnom Penh and rural Kandal Province by twenty interviewers after an initial two week training. The questionnaires were finalized following the pretest.

Trainer comments as well as interviewer and supervisor comments were reviewed during the process of modifying the questionnaires and manuals. The final English version was approved by the Technical Steering Committee, and the Khmer translation was extensively reviewed and approved by a committee containing Khmer members of the MOH, NIPH, and SAWA training team. An English version of the final questionnaire is included in Appendix D.

Following this, a three week interviewer training based on the revised, pre-tested questionnaire was conducted in April-May 1998. All interviewers received a detailed interviewer manual in Khmer which included general guidelines for conducting an interview and specific instructions for particular questions. In addition, charts to convert dates from the Khmer calendar to the Gregorian calendar were provided to all field workers. One hundred persons (including interviewers, field editors, supervisors, and data entry keyers) participated in the training which included:

- General lectures related to basic interview techniques and to specific survey topics (i.e., maternal and child health, birth-spacing and fertility);
- Specific sessions on how to fill out the questionnaire;
- Opportunities for role playing and mock interviews;
- Two days of field practice in areas not covered in the survey;
- Five quizzes.

Trainees who failed to show interest in the survey, did not attend the training program on a regular basis, or failed in the tests were terminated immediately.

Special manuals describing the duties of the team supervisor and the rules for field editing were also prepared and distributed to supervisors and editors, and a special training program for them was conducted during a two-day period following the main fieldwork training.

Data Collection and Processing

The fieldwork for the NHS began in mid-May and was completed by mid-July 1998. The field staff was divided into 15 teams (two from NIPH and 13 from SAWA); each team had a supervisor, a female field editor, and four female interviewers. Four fieldwork coordinators supervised the teams.

Data processing was conducted by NIPH with technical assistance from Macro International. The NIPH central office collected questionnaires from supervisors as soon as a cluster was completed. Office editors reviewed questionnaires for consistency and completeness. The data from the questionnaires were then entered and edited on microcomputers using the Integrated System for Survey Analysis (ISSA), a software package developed especially for such surveys by Macro International. During the machine entry, all questionnaires were reentered for verification. Entry and editing of data began one week after the fieldwork started and was completed by the beginning of August 1998.

To provide feedback for the field teams, quality tables were produced every two weeks during the fieldwork. These tables were designed to identify major systematic errors in data collection (e.g. age displacement). The fieldwork coordinators reviewed these tables and, if they found a problem, notified and advised all teams of the steps to

be taken to avoid these problems in the future.

A summary of the outcome of the fieldwork for the survey is presented in Table 1.1, broken down by place of residence and project area. During the main fieldwork, **5,938 households** selected for the NHS sample were identified. 5,931 of these households were successfully interviewed, a **response rate of 99.9 percent**

Table 1.1 Results of the Household and Individual Interviews

Result	Project Areas[1]		Residence		Total[2]
	CDCP	BHSP	Urban	Rural	
HOUSEHOLD INTERVIEWS					
Number of households sampled	3,491	2,116	903	5,316	6,219
Number of households identified	3,317	2,042	837	5,101	5,938
Number of households interviewed	3,314	2,041	837	5,094	5,931
Household response rate (%)	99.9	100.0	100.0	99.9	99.9
INDIVIDUAL INTERVIEWS					
Number of eligible women	4,366	2,601	1,209	6,445	7,654
Number of eligible women interviewed	4,362	2,592	1,206	6,424	7,630
Individual response rate (%)	99.9	99.7	99.8	99.7	99.7

[1]The The **BHSP** (Basic Health Services Project) area contains: Kampong Chhnang, Kampong Chan, Prey veng, Svay Rieng and Takeo; The **CDCP** (Cambodia Disease Control and Health Development Project) area contains: Battambang, Kampong Speu, Kampot, Krong Kaep, Kandal, Kompong Thom, Kratie, Phnom Penh, Pursat, Rattanakiri,and Siem Reap.

[2] The Total includes Project areas BHSP and CDCP and the following Provinces: Banteay Meanchey/ Pailin, Koh Kong, Mondulkiri, Sihanouk Ville and Stung Treng.

A total of **7,654 women** were identified as eligible to be interviewed. Questionnaires were completed for 7,630 of those women, a **response rate of 99.7 percent.** There is little difference between the household and individual response rates in urban and rural areas. The same is true for the two project areas.

Data Analysis

A tabulation plan was developed prior to data processing and reviewed and approved by the Technical Steering Committee. Upon completion of data entry and editing, a clean data file was imported into SPSS and a set of preliminary tabulations produced. These were reviewed and discussed by the NIPH Technical Steering Committee and, where necessary, additional tabulations were made to clarify the preliminary findings.

Analysis of the tables and drafting of the survey report was done by the NIPH, Macro International and the ADB Unit of the MOH Project Coordination Unit. The draft report was reviewed by the Technical Steering Committee prior to submission to the Ministry of Health.

CHAPTER 2

CHARACTERISTICS OF THE HOUSEHOLD POPULATION

Aside from the indicators of primary interest, the information collected in the NHS household questionnaire also provides general socioeconomic and demographic information about Cambodian households .

The questionnaire for the 1998 NHS distinguished between persons who usually live in the selected household and persons who spent the night before the interview in the household, whether usual household members or not. The differences between these two populations are small. Past surveys and censuses were based on persons who had spent the previous night in the household (the "de facto" population) and the data presented in this chapter does the same except where otherwise specifically stated.

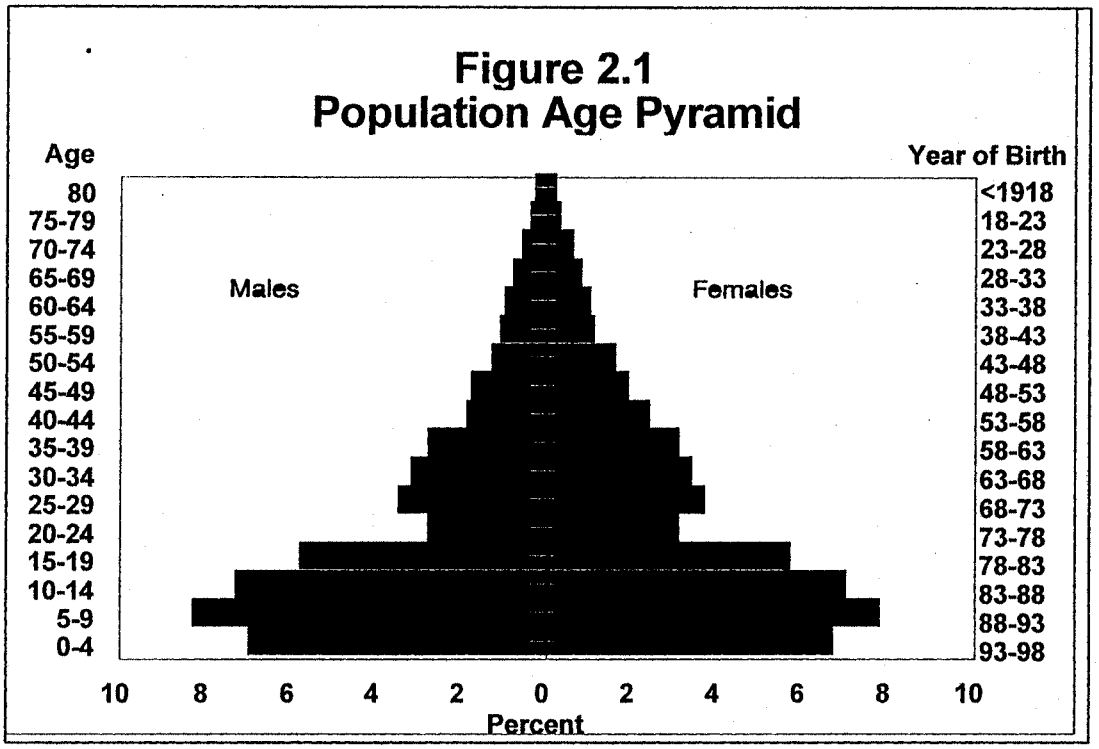
2.1 Household Population by Age and Sex

In the household schedule, the NHS collected information on age in completed years for each household member. When the age was not known interviewers were instructed to obtain the date of birth using the Khmer calendar and/or the Gregorian calendar. The age was then calculated using conversion charts. Interviewers were urged to take great care in recording ages and were warned against omission, especially for infants and young children.

Table 2.1 Household Population by Age and Sex

Age	Urban			Rural			Total		
Group	Males	Females	Total	Males	Females	Total	Males	Females	Total
0-4	12.9	11.4	12.1	14.6	13.4	14.0	14.4	13.2	13.8
5-9	16.1	13.6	14.8	17.2	15.4	16.3	17.0	15.1	16.1
10-14	14.7	13.6	14.1	15.0	13.7	14.3	15.0	13.6	14.3
15-19	12.7	12.5	12.6	11.7	10.9	11.3	11.9	11.1	11.5
20-24	5.3	5.3	5.3	5.7	6.3	6.0	5.6	6.2	5.9
25-29	6.8	7.8	7.3	7.1	7.3	7.2	7.0	7.4	7.2
30-34	7.2	7.4	7.3	6.4	6.6	6.5	6.5	6.7	6.6
35-39	6.9	6.5	6.7	5.5	6.0	5.8	5.7	6.1	5.9
40-44	4.0	5.6	4.8	3.7	4.7	4.2	3.7	4.8	4.3
45-49	4.1	4.2	4.1	3.4	3.8	3.6	3.5	3.8	3.7
50-54	3.2	3.8	3.5	2.5	3.2	2.8	2.6	3.2	2.9
55-59	2.5	2.1	2.3	2.0	2.4	2.2	2.1	2.4	2.2
60-64	1.5	2.2	1.8	1.8	2.1	2.0	1.8	2.1	2.0
65-69	1.1	1.8	1.4	1.4	1.6	1.5	1.4	1.6	1.5
70-74	0.5	1.5	1.0	1.0	1.3	1.1	1.0	1.3	1.1
75-79	0.4	0.4	0.4	0.6	0.8	0.7	0.5	0.8	0.7
80 +	0.2	0.4	0.3	0.4	0.5	0.5	0.4	0.5	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	2,058	2,274	4,332	13,431	14,413	27,844	15,489	16,687	32,176

The sex and age composition of a population is the result of the interaction of fertility, mortality, and migration. A population that has had no significant international migration and relatively high and constant fertility and mortality in the past will have a regularly decreasing pyramid, with each age group smaller than the preceding one.



As can be seen from figure 2.1 above, the population pyramid for Cambodia has a wide base, with a large proportion (44 percent) of the population less than 15 years of age. This pattern is typical of countries that have experienced high fertility in the recent past. Above the age of 25, the pyramid likewise follows a usual pattern with decreasing numbers as age progresses. As a consequence of the high levels of male mortality in the 1970s, the male:female ratio is lower than usual above the age of 35 years.

However, there is an unusual gap in the pyramid structure for the age group 20 to 24 years old. It is much lower than the age groups both above and below it. This represents the cohort born between May/July 1973 and May/July 1978, the period of escalating civil war and Khmer Rouge rule when there were few births and unusually high infant and child mortality for those children who were born.

Following the end of the Khmer Rouge rule, a large increase in births is observed and continues up until the most recent four year period, when there is a decrease. This recent decrease primarily reflects the fact that there has been a recent and significant decline in fertility, as discussed in Chapter 8. To a lesser extent, it may also a recent increase in infant mortality (see Chapter 4). Part of this decline may also be due to the cascade effect of the above-mentioned gap in the age cohort 20-24 years. The unusually small number of women in that part of the reproductive age group in turn means fewer children are born to mothers aged 20-24 than would be the case if there were more woman of that age. Table 2.1 also shows the age structure according to urban-rural residence. Both urban and rural areas show the same pattern, but the rural

population is younger than the urban population; the population less than 15 years of age accounts for 45 percent of the total population in rural areas versus 41 percent in urban areas. As will be discussed in Chapter 8, fertility levels are lower in urban areas than in rural areas.

In general these findings are similar to those of the 1998 Census with the exception of the male:female ratio in urban areas. The 1998 Census found a sex ratio of 96.0 in the urban population versus 92.6 in the rural population. The rural sex ratio estimated by the NHS (93.2) is close to the Census value, but the urban sex ratio estimated by the NHS (90.5) is lower. A possible reason for this is that the NHS is a survey of regular households; persons living in institutional households (e.g. military camps, prisons, dormitories or boarding houses), households that are predominantly male, were not covered.

2.2 Household Composition

Overall about one-fifth of Cambodian households are female headed, but there are marked geographical differences. Female-headed households are most common in the capital, and least common in isolated rural provinces. This may reflect both selective migration of widows to urban areas and the fact that adult male mortality under the Khmer Rouge disproportionately affected urban males.

Table 2.2 Household Composition by Residence: Percent Distribution of households by sex of head of household, size, and presence of orphaned children .

Household Composition	Residence		Province Group				
	Urban	Rural	Capital	Accessible	Remote	Isolated	Total[1]
Sex of Household Head							
Male	74.1	78.8	73.2	77.7	78.2	86.0	78.2
Female	25.9	21.2	26.8	22.3	21.8	14.0	21.8
Number of Usual Members							
1	1.0	1.2	1.5	1.3	0.4	0.8	1.1
2	5.0	5.9	4.3	6.3	4.3	4.8	5.8
3	9.6	12.0	12.8	11.6	11.4	12.1	11.7
4	16.1	17.4	13.2	17.8	16.3	16.9	17.3
5	17.7	18.0	16.5	18.0	20.4	16.3	18.0
6	15.6	16.1	15.1	15.9	17.2	16.8	16.1
7	15.9	11.9	14.1	12.0	14.1	12.8	12.5
8	7.8	8.2	8.6	8.2	6.9	9.8	8.2
9 +	11.4	9.2	14.0	9.1	8.9	9.7	9.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean size	5.7	5.5	5.8	5.4	5.5	5.6	5.5
Percent with orphan children [2]	2.6	1.8	1.8	1.7	2.5	3.3	1.9

1 This table is based on de jure members, i.e., usual residents.

2 Children with both mother and father dead.

The average household size is 5-6 persons, with the largest size seen in the capital city, where housing is more scarce and expensive. It should be noted that average household size in this sample (5.5) is larger than that found in the 1998 census, where the national average household size was 5.2. As with the sex ratio, one possible explanation for this difference is that the NHS sample was limited to households whereas the census counted all persons, including persons living in non-household situations (hospitals, prisons, military compounds, jail etc). Although the absolute number of mean persons per household is lower in the census, than in the NHS, the finding of a higher household size in the capital city is common to both.

Although approximately 2% of all Cambodian families are caring for one or more orphaned children, the prevalence of orphanhood as a percentage of all children is less than one percent:

Table 2.3 Orphanhood: Percent Distribution of children by survival status of parents

Age	Both Parents Living	One Parent Living	Both Parents Dead	Total	Number
0-2 years	97.4	2.5	0.1	100.0	2,437
3-5 years	94.2	5.5	0.4	100.0	3,114
6-9 years	91.5	7.7	0.7	100.0	4,071
10-14 years	86.1	12.4	1.6	100.0	4,613
All Ages	91.3	7.9	0.8	100.0	14,236

2.3 Socioeconomic Status

Socioeconomic status was measured using a socioeconomic status index based on two variables that reflect the physical characteristics of a household (i.e., the main materials of the walls and the roof) and eight variables that reflect its possession of selected assets. The eight assets used were electricity, a wardrobe, a sewing machine/loom, a television, a radio/tape recorder, a cyclo and/or a boat without a motor, a motorcycle and/or a motor boat, and a car (1). For wall and roofing material, a value of 0-2 was assigned for each based on the quality of the material. Walls of plastic, mud or other makeshift arrangements had a value of 0; thatch/bamboo/palm walls had a value of 1; and walls of wood, tiles or cement had a value of 2. Roofs of plastic or other makeshift material had a value of 0; roofs of thatch/palm had a value of 1, and roofs of corrugated iron, tile or cement had a value of 2. The coding of the eight asset variables was more complex. Households that did not possess a particular asset were assigned a value of 0 for that asset. Households that did possess that asset were assigned the value of the natural log of the inverse of the proportion of households that possessed the asset. This transformation weighted assets so that the scarcer the asset was, the higher its value.

The rounded sums of the ten variables described above were then coded into one of four groups: poor (values 0 to 2), below average (3 to 4), above average (5 to 7), or better off (8 through the highest values). The cutoffs for the groups were set based on

1 It was decided to treat cyclos and boats without motors as equivalent forms of transportation. If the household possessed either (or both) they were considered to posses this asset (i.e., this form of transportation). Motorcycles and motor boats were also considered equivalent forms of transportation and were handled in the same way.

two concerns: the need for groups to be of broadly similar size (to ensure sufficient cases in tabulations) and the need to identify the poorest 50% of households. The resultant groups are all large enough to include in later tabulations and the **poor and below average households make up the poorest 53% of households**. More importantly, the index seems to be reasonable. Urban areas are better off than rural areas, male headed households are better off than female headed households, and Phnom Penh has the highest standard of living .

The following table shows the distribution of household socioeconomic status by selected background characteristics.

Table 2.4 Socioeconomic Status: Percent distribution of households by socioeconomic status, according to province group, project area, and sex of household head.

Background Characteristics	Socioeconomic status				Total	Number of House-holds
	Poor	Below Average	Above Average	Better Off		
Residence						
Urban	9.5	19.4	18.7	52.4	100.0	764
Rural	20.3	36.3	27.3	16.0	100.0	5,167
Project Area						
CDCP	20.6	30.3	25.5	23.6	100.0	3,031
BHSP	16.3	38.3	27.6	17.8	100.0	2,430
Province Group						
Isolated	31.1	37.0	19.8	12.1	100.0	525
Remote	24.1	36.5	28.1	11.2	100.0	687
Accessible	18.4	36.2	28.2	17.3	100.0	4303
Phnom Penh	1.0	5.4	10.9	82.7	100.0	416
Sex of Household Head						
Male	16.8	34.4	27.3	21.6	100.0	4,636
Female	26.7	33.3	22.4	17.6	100.0	1,295
All households 1	18.9	34.1	26.2	20.7	100.0	5,931

1 The total includes all Provinces in the sample.

As is true in most developing countries, urban areas are better off than rural areas, male headed households are better off than female headed households, and the capital city has the highest standard of living. It should be remembered that a single national measure of socioeconomic status was used, designed for a country that is predominately rural. No attempt was made to measure relative socioeconomic status within urban areas. The very high percentage of persons classified as "better off" in Phnom Penh are described as such relative to the general, mostly rural, population of the country.

CHAPTER 3

CHARACTERISTICS OF WOMEN OF REPRODUCTIVE AGE

The NHS identified and interviewed all women of reproductive age (15 – 49 years) living in the selected households. The following tables describe background characteristics – age, place of residence, education, marital status, literacy and socioeconomic status – of this random sample of Cambodian women of reproductive age.

It should be noted that, in this survey, literacy was measured by asking the respondent to read a simple sentence aloud. This yielded three possible results: able to read easily, able to read with difficulty, and unable to read altogether. (In addition, a small number could not be assessed due to blindness).

Respondents able to read easily can be considered to be literate; those unable to read at all are illiterate; and those able to read with difficulty are referred to in this report as partially literate. With regard to the "partially literate" category it should be remembered that these women had difficulty reading a single, very simple sentence and therefore have a very low level of literacy, although they are not completely illiterate. As Table 3.2 shows, most of these partially literate women had between 1 to 3 years of schooling, while the majority of literate women had 4 or more years.

Since these results were based on actual observed reading ability, they cannot be compared to the data on self-reported literacy from other surveys. In particular, the "partially literate" women -- 26.6% of the total -- could be expected to give varying responses if asked whether or not they were literate.

As shown in Table 3.1, the majority of Cambodian women of reproductive age live in rural areas, have 3 or less years of schooling and are either illiterate or semi-literate. However, there are marked differences in education and literacy by age group and place of residence. Rural women have less education than urban women, and this is especially so for women living in the more remote and isolated rural provinces. **Women in the more remote and isolated rural areas are three times more likely than women in Phnom Penh to have had no schooling at all.**

Education is closely related to both socioeconomic status and literacy, as one would expect. **However, it is interesting to note the majority of women who are fully literate (as defined by able to read a simple sentence in Khmer) have had four or more years of schooling.** The majority of partially literate (able to read a simple sentence only with difficulty) women have had one to three years of schooling, and so have about 16% of completely illiterate women. This suggests that at least four years of basic education are required to achieve literacy in Khmer, an important point since less than half of all Cambodian women currently have that level of schooling (Table 3.2). Education insufficient to achieve basic literacy is unlikely to confer much benefit.

The breakdown of education by age group, however, shows that **this situation is steadily improving. Among the youngest age group of women (15-19 years), more than half have had four or more years of schooling, compared to less than a**

fourth of women in the oldest age group.

Table 3.1 Background Characteristics of Respondents: Percent distribution of women by age, marital status, urban-rural residence, socioeconomic status, level of education, literacy, and province group.

Background Characteristics	Weighted Percent	Number of Weighted Women	Number of Unweighted Women
Age			
15-19	23.5	1,797	1,794
20-24	13.3	1,015	985
25-29	16.1	1,226	1,208
30-34	14.6	1,113	1,130
35-39	13.3	1,013	1,004
40-44	10.5	800	833
45-49	8.7	666	676
Marital Status			
Never Married	30.8	2,349	2,351
Married	60.6	4,623	4,616
Widowed	5.2	399	398
Divorced	3.4	260	265
Residence			
Urban	14.6	1,110	1,206
Rural	85.4	6,520	6,424
Literacy			
Not at all	31.2	2,380	2,466
With difficulty	26.6	2,028	2,044
Easily	42.0	3,205	3,100
Can not see / blind	0.2	17	20
Socioeconomic status			
Poor	16.8	1,279	1,384
Below Average	32.1	2,448	2,556
Above Average	27.0	2,059	2,003
Better Off	24.2	1,844	1,686
Years of Schooling[1]			
0	27.5	2,099	2,145
1-3	30.3	2313	2365
4-6	25.1	1915	1892
7+	20.0	1,303	1,228
Province Group			
Isolated	8.5	651	755
Remote	11.7	891	1,159
Accessible	71.5	5,456	5,101
Capital City	8.3	632	615
All Women[2]	100.0	7,630	7,630

[1]For literacy, the interviewer asked the respondent to read a sentence.
[2]The total includes all Provinces in the sample.

Table 3.2: Level of Education: Percent distribution of women by highest level of education attended, according to age, residence, socioeconomic status, literacy, and province group

Background Characteristics	Years of Schooling				Total	
	0	1-3	4-6	7+	Percent	Number
Age						
15-19	19.7	23.0	33.8	23.4	100.0	1,797
20-24	23.0	26.2	29.2	21.7	100.0	1,015
25-29	21.5	25.8	28.0	24.7	100.0	1,226
30-34	30.3	33.7	21.8	14.2	100.0	1,113
35-39	38.6	39.9	15.3	6.2	100.0	1,013
40-44	30.6	38.0	20.5	10.9	100.0	800
45-49	41.4	35.1	15.9	7.6	100.0	666
Residence						
Urban	15.4	23.0	27.4	34.2	100.0	1,110
Rural	29.6	31.6	24.7	14.2	100.0	6,520
Socioeconomic status						
Poor	48.8	30.6	16.6	4.0	100.0	1,279
Below Average	34.7	35.6	22.9	6.8	100.0	2,448
Above Average	22.1	34.2	29.4	14.4	100.0	2,059
Better Off	9.3	18.8	29.1	42.8	100.0	1,844
Literacy						
Not at all	82.9	16.4	.6	.1	100.0	2,380
With difficulty	6.1	73.1	20.0	.7	100.0	2,028
Easily	.1	13.5	46.4	40.1	100.0	3,205
Province Group						
Isolated	33.9	36.9	19.7	9.5	100.0	651
Remote	34.6	30.7	21.5	13.2	100.0	891
Accessible	27.4	31.0	25.9	15.7	100.0	5,456
Capital City	11.7	17.3	28.7	42.2	100.0	632
All Women[1]	27.5	30.3	25.1	17.1	100.0	7,630

[1] The total includes 17 blind women.

Table 3.3 describes marital status of the respondents by age group. Interestingly, although education ends quite early for most Cambodian girls, teen-age marriage is not very common. Most Cambodian women marry in their early twenties. This is consistent with age at first birth as subsequently described in Chapter 8: Fertility.

Table 3.3 Marital Status: Percent distribution of women by current marital status, according to age

Age	Marital Status				Total Percent	Number
	Never Married	Married	Widowed	Divorced		
15-19	85.2	13.7	.2	1.0	100.0	1,797
20-24	37.7	58.4	1.8	2.1	100.0	1,015
25-29	15.7	77.5	3.0	3.8	100.0	1,226
30-34	10.1	80.9	5.0	4.0	100.0	1,113
35-39	6.0	81.0	7.4	5.6	100.0	1,013
40-44	5.4	78.9	10.7	5.0	100.0	800
45-49	3.9	72.5	18.7	4.9	100.0	666
All Ages	30.8	60.6	5.2	3.4	100.0	7,630

CHAPTER 4

UTILIZATION OF HEALTH SERVICES

4.1 Background

The National Health Survey was conducted at a critical time, as the Ministry of Health was just starting implementation of a new Health Coverage Plan, designed to significantly change the manner in which government health services were delivered and to increase their accessibility .

Previously, MOH nurses and midwives were assigned to communes to deliver basic health services, including simple curative care, immunization, and antenatal/obstetric care. Although some communes had small health posts, staff usually worked out of their own homes or went to patients' homes, and there was a great blurring of lines between functioning in a public as opposed to private capacity. The various health workers functioned alone, with little coordination among them. It was difficult to effectively monitor or supervise the activities of staff working in this manner throughout the many communes in the country. Since there was no fixed place or time when the activities of government health staff took place, it was very difficult to assess and monitor the quantity and quality of service delivery. Such data as was available, and field observations, all indicated that government health services were not effectively reaching many of the population. Realizing this, the Ministry of Health embarked on a program of health sector reform and developed a new plan for service delivery.

Under the new Health Coverage Plan, management structures have been created at District level to plan, implement and supervise a comprehensive package of basic health services, and a network of static Health Centers is being established throughout the country based on population size and geography. Health Centers are to provide a defined "Minimum Package of Activities" to one or more communes, and are staffed by between 5-8 health personnel, including nurses, midwives and, occasionally, a medical assistant, working as a team. Preventive services, such as immunization, continue to be provided at village level but through planned, scheduled outreach visits by Health Center staff.

The long process of planning this new system was just reaching conclusion, and its actual implementation was just beginning, at the time this survey was conducted. The location of all Health Centers had been finalized but less than a quarter of them had yet been opened; operational guidelines for District health services were finalized and disseminated during the survey field work. **Thus, the findings that follow may be taken as a baseline of conditions prior to full implementation of the new Health Coverage Plan.**

Utilization of health services was assessed in both the household questionnaire (asked of every household in the sample) and in the individual woman questionnaire (asked only of women of reproductive age). The household questionnaire provided information on utilization of health services by all members of the household who had been ill or

injured in the 30 day period prior to interview, while the individual questionnaire provided information specific to the use of health services for pregnancy/delivery and treatment of common child illnesses.

4.2 Prevalence of Illness/Injury

All households were questioned about the occurrence of an illness or injury among any of the household members during the prior 30 days, and were asked to categorize such events as either "slight" "moderate" or "severe".

Table 4.1 30 Day Prevalence of Sickness or Injury: Percent distribution of household members by presence and severity of sickness or injury during the 30 days before the survey, according to socioeconomic and demographic characteristics

Background Characteristics	Sick or injured				Total Percent	Number of household members
	Not sick	Slightly	Moderately	Seriously		
Sex						
Male	88.1	3.0	6.9	2.1	100.0	15,489
Female	85.1	4.2	8.6	2.0	100.0	16,687
Age						
0-4	73.0	8.2	15.2	3.6	100.0	4,429
5-14	92.0	2.5	4.3	1.2	100.0	9,764
15-24	93.4	2.0	3.4	1.2	100.0	5,597
25-39	89.0	2.7	6.5	1.7	100.0	6,350
40-54	82.3	4.2	11.3	2.3	100.0	3,492
55+	73.7	5.3	16.0	5.0	100.0	2,543
Residence						
Urban	89.4	2.8	6.3	1.5	100.0	4,332
Rural	86.1	3.8	8.0	2.2	100.0	27,844
Project Area						
CDCP	87.5	3.1	7.3	2.1	100.0	16,915
BHSP	85.3	4.4	8.2	2.0	100.0	12,728
Province Group						
Isolated	88.1	1.9	7.7	2.3	100.0	2,922
Remote	87.3	3.6	7.1	2.0	100.0	3,778
Accessible	85.9	3.8	8.1	2.1	100.0	23,086
Capital City	89.6	3.9	5.0	1.4	100.0	2,390
All household members[1]	86.5	3.6	7.8	2.1	100.0	32,176

[1] Total includes all Provinces in the sample.

As can be seen from Table 4.1, **13.5% of household members** (a total of 32,176 persons) **were reported to have been sick in the 30 days prior to the day of**

interview. This percentage may underrepresent actual morbidity for two reasons:

- Questions were asked only with regard to household members alive at the time of the interview. Therefore, the reported episodes exclude any which resulted in death prior to the day of interview. This would tend to underestimate the occurrence of severe illness/injury.

- Responses are based on the 30 day recall of a single respondent. Respondents may not have been aware of all of the illnesses/injuries which occurred in the family, or may have forgotten some of them, especially episodes in the earlier part of the 30 day period or those of only mild severity.

With these limitations in mind, and **assuming the reported prevalence to represent an average month, the annual number of illnesses/injuries per person per year would be something in the range of 1.6 episodes.** That number is only a rough estimation since, in addition to the limitations already mentioned, it is an annual projection based on a single month and thus does not capture seasonal fluctuations. Since the fieldwork was conducted in the early rainy season, typically a time of relatively low disease prevalence, the actual annual number of episodes per person may be somewhat higher than 1.6 .

Most of the reported events were perceived as either "slight" or "moderate" in severity, but 2.1% of this sample were reported to have been seriously ill or injured. Differences by gender and geographical area are small, but there is considerable difference by age group. Children under the age of five, and adults aged 55 or over, were significantly more likely to have been ill/injured overall, and also much more likely to have had an illness/injury perceived as severe. This finding is consistent with expected patterns of disease prevalence and severity in any population. **In the particularly vulnerable group of children under age 5, one-fourth of children were reported to have been ill or injured in the past 30 days, and almost a fifth were moderately or severely so.** The survey was undertaken during the early part of the rainy season, which is usually not the peak season of infant/child disease. In monsoonal Southeast Asia, infant/child illness usually increases during the dry hot season when water is scarce, and to a lesser extent, at the end of the rainy season when mosquito borne diseases (malaria, dengue) typically increase. Therefore this percentage is probably much less than would be found during the peak illness seasons. Some insight into the causes of illness among children under five may be found in Chapter 6 of this report, which documents a high prevalence of diarrhea, dysentery and respiratory infections.

4.3 Treatment Sought For Illness or Injury

For every reported illness/injury, questions were asked about the type of treatment received, if any.

4.2 a. Treatment for Sickness or Injury: Percent distribution of household members who were sick or injured in the past 30 days, by type of treatment, according to socioeconomic and demographic characteristics, and severity of illness

Background Characteristics	Source/Type of Treatment[2]					
	No treatment	Traditional or Home Remedy	Trained Health Worker	Bought Medicine	Total Percent	Number
Sex						
Male	12.6	4.2	59.3	23.9	100.0	1850
Female	15.0	4.2	58.2	22.6	100.0	2480
Age						
0-4	11.5	2.4	55.7	30.5	100.0	1194
5-14	14.2	3.0	57.9	25.0	100.0	778
15-24	17.2	5.6	59.5	17.7	100.0	370
25-39	13.8	6.7	61.3	18.2	100.0	699
40-54	14.3	4.6	60.1	20.9	100.0	619
55+	16.1	5.1	60.4	18.5	100.0	670
Residence						
Urban	15.3	3.4	63.6	17.7	100.0	460
Rural	13.8	4.3	58.1	23.8	100.0	3870
Project Area						
CDCP	13.8	4.6	57.6	24.0	100.0	2118
BHSP	14.9	3.8	57.9	23.5	100.0	1866
Province Group						
Isolated	21.0	6.7	59.8	12.5	100.0	348
Remote	15.7	3.8	50.9	29.7	100.0	481
Accessible	13.3	4.1	58.5	24.1	100.0	3254
Capital City	9.3	2.6	74.5	13.6	100.0	247
Socioeconomic status						
Poor	21.8	7.4	43.9	27.0	100.0	811
Below Average	16.2	4.2	53.3	26.3	100.0	1568
Above Average	9.4	3.6	65.4	21.5	100.0	1211
Better Off	8.0	1.8	75.2	15.0	100.0	740
Severity of illness/injury						
Slight	24.4	2.7	39.8	33.1	100.0	1169
Moderate	11.1	4.9	61.1	22.8	100.0	2495
Serious	6.4	4.0	82.6	7.0	100.0	667
Total[1]	14.0	4.2	58.7	23.2	100.0	4330

[1] Total includes all Provinces in the sample.
[2] Only the most medically qualified type of treatment was recorded

Since the intent of this survey was to obtain a baseline for use of government health services specifically, and access to trained medical care in general, only the highest

level of treatment given was recorded in the case of multiple treatments. For example, if a child was first given home remedies, then taken to a traditional healer, then given medicine bought from the pharmacy, and finally brought to a trained health worker, the response was coded only as "trained health worker" since this was the highest level of care given. If a child received home remedy, traditional treatment, and medicine from the pharmacy but was not taken to a trained health worker, then the answer was recorded as "bought medicine". In neither case would "home remedy" or "traditional" be recorded because, although used, these were supplemented by a higher level of treatment.

About 14% of all illnesses/injuries received no treatment at all, with marked differences depending on where the person lived, and on socioeconomic status. Those living in isolated provinces, and those in the poorest socioeconomic group, were far more likely to have been untreated than more affluent persons and those living in more accessible areas. When the analysis is limited only to illnesses and injuries reported to be of moderate or serious severity – the type for which non-treatment poses the greatest risk – the overall non-treatment rate drops to about 10%, but marked disparities between socioeconomic groups and province location remain (Table 4.2.b):

4.2.b Treatment for *moderate/serious* sickness or injury only, by Residence and Socioeconomic Status Percent distribution of household members who were moderately/seriously sick or injured in the past 30 days, by type of treatment, according to socioeconomic status and place of residence.

Background Characteristics	Source/Type of Treatment[1]					
	No treatment	Traditional or Home Remedy	Trained Health Worker	Bought Medicine	Total Percent	Number
Province Group						
Isolated	19.8	6.6	63.7	9.9	100.0	293
Remote	12.0	3.6	61.6	22.8	100.0	344
Accessible	8.8	4.7	65.3	21.1	100.0	2,370
Capital City	6.8	4.2	82.9	6.1	100.0	154
Socioeconomic status						
Poor	18.5	7.6	49.8	24.1	100.0	619
Below Average	11.7	5.0	60.4	22.9	100.0	1,130
Above Average	5.7	4.2	73.7	16.4	100.0	905
Better Off	4.1	1.8	82.4	11.7	100.0	507
Total	10.5	4.7	65.6	19.5	100.0	3,161

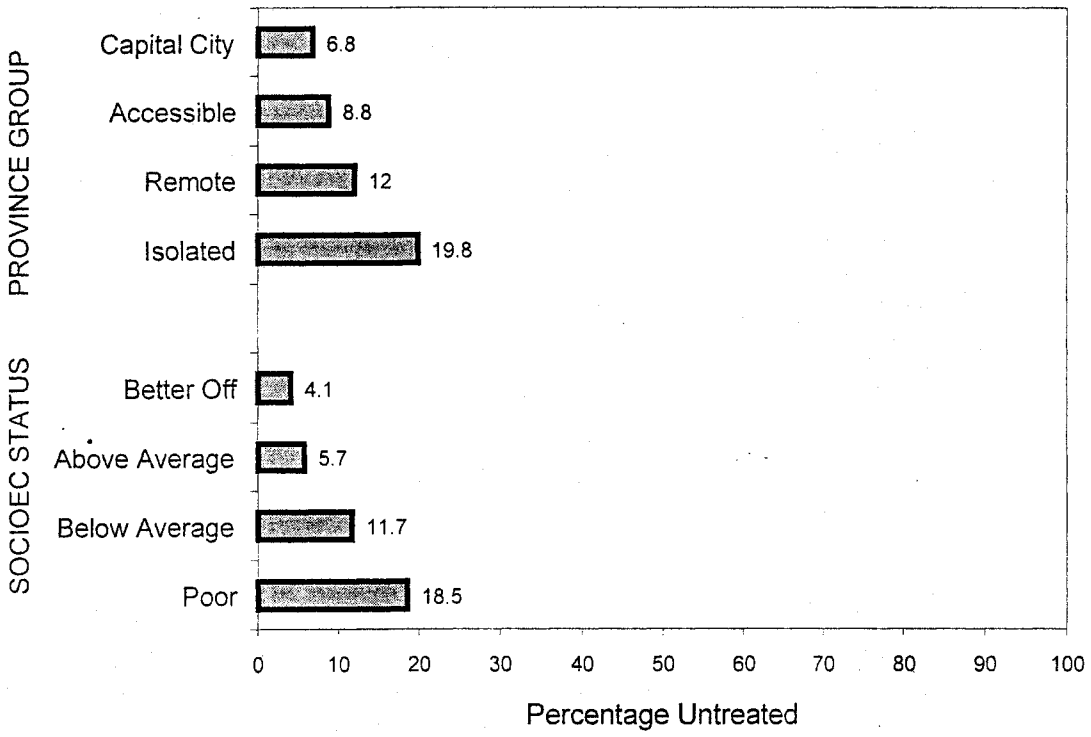
[1]Only the most medically qualified type of treatment was recorded

For moderate and severe cases, the percentage of non-treatment is twice as high among those living in one of the "isolated" provinces in comparison to the country overall; and almost three times as high in comparison to the capital city. Persons living in Phnom Penh had the highest rate of receiving treatment, with the more accessible rural areas not far behind and a slightly higher rate of non-treatment in the more remote provinces, but a **greatly increased rate of non-treatment in the isolated areas**.

There is also a noticeable difference in receipt of treatment by socioeconomic group, with the poorest segment of the population being more than four times more likely than the most affluent to go without any treatment at all.

FIGURE 4.1

PERCENTAGE OF MODERATE/SERIOUS ILLNESSES OR INJURIES WHICH RECEIVED NO TREATMENT, BY SOCIOECONOMIC STATUS AND PROVINCE GROUP



In addition to being more likely to go without treatment for moderate/serious illnesses and injuries, there is also a significant difference in the type of treatment received when treatment is obtained, according to socioeconomic status:

4.2.c Type of Treatment Received for Moderate/Serious Sickness or Injury, by Socioeconomic Status: Percent distribution of household members who were treated for a moderate/serious sickness or injury in the past 30 days, by type of treatment, according to socioeconomic status.

Background Characteristics	Source/Type of Treatment[1] Traditional or Home Remedy	Trained Health Worker	Bought Medicine	Total Percent	Number
Socioeconomic status					
Poor	9.3	61.1	29.6	100.0	504
Below Average	5.7	68.4	25.9	100.0	998
Above Average	4.5	78.2	17.4	100.0	853
Better Off	1.9	85.9	12.2	100.0	486
Total	5.2	73.0	21.7	100.0	2842

Only the most medically qualified type of treatment was recorded

When the poorest segment of the population do get treatment for a moderate/serious illness, only 61.1% of them see a trained health worker. For the highest socioeconomic group, the figure is 85.9%. (see Figure 4.2). **Significantly higher percentages of the poor receive either only home remedy/traditional treatment or medicine bought without benefit of consultation with a trained health worker.**

Although children under five had the lowest percentage of non-treatment overall, **children under five receiving treatment were disproportionately less likely to be seen by a trained health worker, and had the highest percentage of treatment by medicine bought directly from a shop:**

4.2.d Type of Treatment Received for All Illnesses or Injuries Receiving Treatment, by Age Group Percent distribution of household members treated for any sickness or injury in the past 30 days, by type of treatment, according to age.

Background Characteristic	Source/Type of Treatment[1] Traditional or Home Remedy	Trained Health Worker	Bought Medicine	Total Percent	Number
Age					
0-4	2.7	62.9	34.4	100.0	1057
5-14	3.5	67.5	29.2	100.0	667
15-24	6.8	71.9	21.4	100.0	306
25-39	7.8	71.1	21.1	100.0	602
40-54	5.4	70.1	24.4	100.0	530
55+	6.1	72.0	22.1	100.0	562
Total[1]	4.9	68.3	27.0	100.0	3724

[1]Only the most medically qualified type of treatment was recorded

Since children under the age of five are exceptionally vulnerable to both death from illness and complications or death from incorrect treatment (wrong drug, or wrong dosage), this is a point of significant concern (see Figure 4.3).

FIGURE 4.2

TREATMENT PATTERNS FOR MODERATE/SEVERE ILLNESSES BY SOCIOECONOMIC GROUP

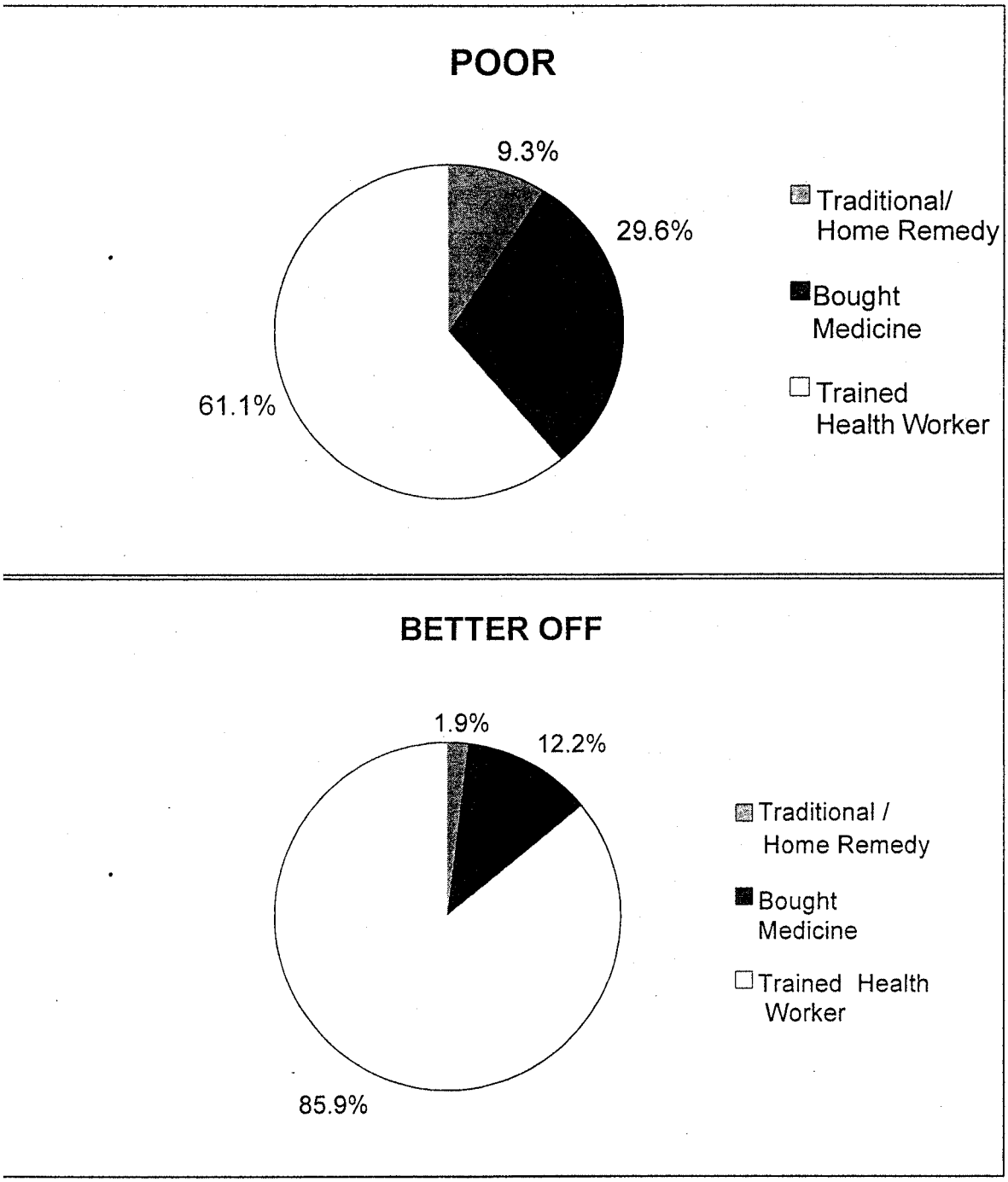
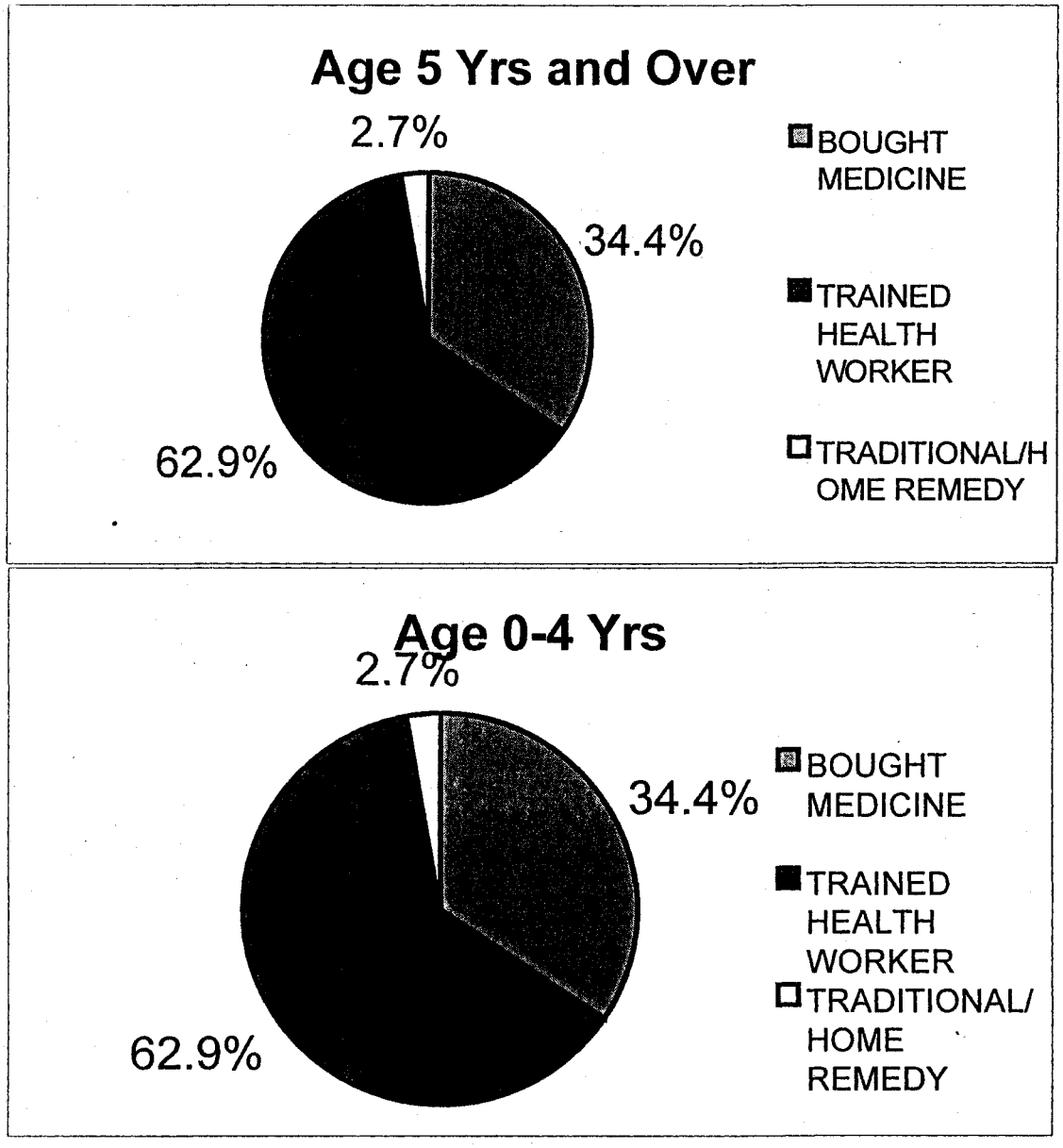


FIGURE 4.3:

TREATMENT PATTERNS BY AGE GROUP



4.4 Utilization of Public Facilities

As previously mentioned, one of the priorities of this survey was obtaining a baseline measurement of utilization of MOH health facilities for subsequent use in assessing the impact of the new Health Coverage Plan and two large donor projects supporting it. For this reason, in those cases where treatment by a trained health provider was reported, additional questions were asked to try to determine whether this treatment was received through the government program. Past experience in Cambodia indicated that patients were often unable to describe the qualifications or affiliation of a health worker beyond the simple category of "paet" (Khmer word denoting a trained practitioner of modern medicine, whether nurse, doctor, etc). Therefore, the survey used a two-step approach: first ascertaining whether any trained health worker had been consulted, and then in a separate question, asking in what physical place the treatment was obtained.

Interviewers were supplied with descriptions for the various categories possible to aid in identification. Most respondents were able to answer the question, and the differentials by residence, gender and severity of illness suggest that the responses are generally accurate in terms of differentiating place by the categories provided. For example, use of both private and Provincial Hospitals is higher in the urban strata, which is where such facilities are located. Treatment at any hospital (provincial, district or private) is more common for illnesses/injuries perceived as serious, while the less serious cases showed a higher use of both treatment at home and at health centers – logical given the level of treatment available at those levels. Women and children under five show a higher usage of Health Centers/Outreach Locations, consistent with maternal child health emphasis at that level of care.

By far the most common answers were: treatment at the patient's home, treatment at someone else's home (either worker's home or other private home) and treatment at a Provincial Hospital or Government Hospital in Phnom Penh (the latter two were treated as a single response category). These three answers between them account for almost three quarters of the responses. This is consistent with what was generally known of health service delivery under the "old" (pre-Health Coverage Plan) system. A smaller percentage reported treatment at District Hospitals, which is not surprising since not all of these have yet been rendered fully functional. A minimal percentage reported treatment at an actual Health Center – again, not surprising since the construction and development of Health Centers was a new undertaking just underway at the time of the survey.

4.3 Place of Treatment By Trained Health Worker: Percent distribution of persons treated by a trained health worker in the last 30 days by place where treatment was received, according to selected background characteristics

Background Characteristics	Public Sector Locations					Private/Other Locations				
	Total Public	Provincial Hospital	District Hospital	Health Center	Outreach Location & Other Public	Private Clinic/ Hospital	Private Home	Patient's Home	Other	Number
Sex										
Male	34.7	18.1	9.8	3.9	2.9	9.8	22.6	32.8	0.1	1098
Female	33.6	16.0	8.6	4.7	4.3	9.1	21.7	35.5	0.1	1442
Age										
0-4	32.7	15.7	7.5	5.7	3.8	9.5	30.1	27.7	0.0	665
5-14	28.1	11.3	9.1	4.1	3.6	10.5	26.7	34.8	0.0	450
15-24	31.1	17.8	7.0	3.1	3.2	8.3	21.6	39.0	0.0	220
25-39	38.0	18.1	11.9	3.7	4.3	9.4	19.2	33.2	0.2	429
40-54	39.3	19.6	9.5	5.6	4.6	10.4	15.3	34.8	0.0	372
55+	35.8	20.9	9.9	2.7	2.3	7.9	13.2	42.9	0.3	404
Residence										
Urban	44.4	31.1	3.6	5.5	4.2	15.7	12.7	27.2	0.0	292
Rural	32.7	15.0	9.9	4.2	3.6	8.6	23.3	35.3	0.1	2248
Project Area										
CDCP	35.9	20.9	9.0	4.4	1.6	9.9	18.6	35.6	0.0	1220
BHSP	29.5	13.2	9.2	2.6	4.5	9.1	24.4	36.9	0.1	1080
Province Group										
Isolated	46.5	11.6	10.7	16.7	7.5	7.0	21.3	25.1	0.0	208
Remote	33.1	15.5	12.1	4.9	0.6	6.2	22.7	37.5	0.4	244
Accessible	31.9	15.6	9.4	3.1	3.8	8.9	22.0	37.1	0.1	1903
Capital City	42.5	37.8	0.6	2.3	1.8	22.1	23.1	12.4	0.0	184
Socioeconomic Status										
Poor	33.2	12.7	10.8	6.2	3.5	6.1	21.8	38.8	0.0	356
Below Ave.	32.9	10.5	11.2	5.4	5.8	7.0	22.4	37.6	0.1	835
Above Ave.	33.2	16.7	9.6	3.5	3.4	9.3	21.4	36.1	0.0	793
Better Off	37.7	29.4	4.4	2.8	1.1	15.3	22.6	24.1	0.2	556
Severity of illness/injury										
Slight	25.9	10.6	7.4	4.4	3.5	10.0	29.4	34.7	0.0	465
Moderate	33.6	15.4	8.9	4.9	4.4	8.7	22.3	35.3	0.1	1525
Serious	42.4	26.4	11.4	2.9	1.7	10.8	15.3	31.5	0.0	551
Total	34.1	16.9	9.1	4.4	3.7	9.4	22.1	34.3	0.1	2540

1 Includes Government Hospitals in Phnom Penh

The most isolated Provinces show a significantly higher level of Health Center and Outreach Session utilization, and the lowest level of Provincial Hospital use. According to Ministry of Health (MOH) records (Planning Unit, November 1998) the pace of Health Center development is no greater in these Provinces than elsewhere in the country. As mentioned in Chapter 1, the "Isolated" province group consists of 4 provinces which are geographically inaccessible (mountainous and/or riverine) and one which has been war affected and insecure. The war-affected province of Banteay Meanchey has an unusually high level of assistance to Health Centers from Non-Governmental Organizations (NGOs) which may tend to make their services more effective. In the geographically isolated provinces, the greater distance and difficulty involved in reaching the Provincial Hospital may tend to encourage use of Health Centers in their place.

Altogether, **government health services** (defined here as services provided at a government health facility or outreach location, but excluding treatment at home or at a worker's home) **accounted for about a third of all treatment received by persons consulting a trained health worker**. Of the remaining two-thirds, most fall into the ambiguous category of treatment at a private home for which a public/private sector categorization cannot really be made. **Of patients receiving treatment from a public source, almost half did so at a Provincial or Phnom Penh Government Hospital**.

In terms of access to higher levels of care, it is noteworthy that while overall about a third of cases were treated at a hospital (public or private), there is a significant difference between use of hospitals according to socioeconomic status. **Over half of the treatment obtained by the highest socioeconomic group occurred in a hospital, compared with slightly less than a third for the lowest socioeconomic group.** Some, but by no means all, of this disparity may be explained by the fact that the highest socioeconomic group is disproportionately found in urban areas, while the poorest are more apt to be rural people. However, the gap between hospital use by socioeconomic group is wider than that for urban vs. rural residence, suggesting that more than geographical proximity is involved. The Health Care Demand Survey found that the average cost for treatment at a hospital was $65 in 1996, and that 45% of patients had to borrow money to meet that expense (NIPH 1998). Lack of financial access is a significant barrier with respect to use of hospitals by the poor.

The lower use of hospitals by the poor when they are treated by a health professional compounds the gap already noted in section 4.2, wherein the poorest socioeconomic group were much less likely to be treated by a trained health worker to begin with. It seems that, even when they are, it is at a lower level facility than the more affluent.

It should be remembered that Table 4.3 refers only to those receiving treatment from a trained health worker. The following table gives a more complete picture of management of illnesses and injuries, taking all possibilities (no treatment, bought medicine, public or private health worker etc) into account:

4.4 Treatment for Sickness or Injury [1] : Percent distribution of household members who were sick or injured in the past 30 days, by type of treatment, according to socioeconomic and demographic characteristics

Background Characteristics	No Treatment	Traditional or Home Remedy	Bought Medicine	Trained Health Worker: Public	Trained Health Worker: Private/ Other	Total: Percent	Total: Number
Sex							
Male	12.6	4.2	23.9	20.6	38.7	100.0	1850
Female	15.0	4.2	22.6	19.6	38.6	100.0	2480
Age							
0-4	11.5	2.4	30.5	18.2	37.5	100.0	1194
5-14	14.2	3.0	25.0	10.5	47.4	100.0	778
15-24	17.2	5.6	17.7	16.3	43.2	100.0	370
25-39	13.8	6.7	18.2	23.3	38.0	100.0	699
40-54	14.3	4.6	20.9	23.6	36.5	100.0	619
55+	16.1	5.1	18.5	21.6	38.8	100.0	670
Residence							
Urban	15.3	3.4	17.7	28.2	35.4	100.0	460
Rural	13.8	4.3	23.8	19.0	39.1	100.0	3870
Project Area							
CDCP	13.8	4.6	24.0	20.7	36.7	100.0	2118
BHSP	14.9	3.8	23.5	17.1	40.8	100.0	1866
Province Group							
Isolated	21.0	6.7	12.5	27.8	32.0	100.0	348
Accessible	13.3	4.1	24.1	18.7	39.8	100.0	3254
Remote	15.7	3.8	29.7	16.8	34.1	100.0	481
Capital City	9.3	2.6	13.6	31.7	42.8	100.0	247
Socioeconomic status							
Poor	21.8	7.4	27.0	14.6	29.3	100.0	811
Below Average	16.2	4.2	26.3	17.5	35.8	100.0	1568
Above Average	9.4	3.6	21.5	21.7	43.7	100.0	1211
Better Off	8.0	1.8	15.0	28.4	46.8	100.0	740
Severity of illness/injury							
Slight	24.4	2.7	33.1	10.3	29.5	100.0	1169
Moderate	11.1	4.9	22.8	20.5	40.6	100.0	2495
Serious	6.4	4.0	7.0	35.0	47.6	100.0	667
Total[2]	14.0	4.2	23.2	20.0	38.7	100.0	4330

[1] Only the most medically qualified type of treatment was recorded

[2] Total includes all Provinces in the sample.

As can be seen from the foregoing table, overall **the government sector** (as defined by trained health workers providing services either in a government facility or outreach location), **is currently utilized in only one-fifth of all illnesses and injuries. This percentage increases to one-third when the illness/injury is a serious one.** Trained health workers consulted at either a private facility or private home are utilized in over a third of all illnesses/injuries overall, with much greater utilization by the more affluent and urban segments of the population, as one would expect. As the following section (4.5) demonstrates, considerably more travel time is involved in the utilization of public vs. private health care providers, a factor which may influence the higher utilization of the latter. It will be interesting to see if the development of community based Health Centers affects this pattern in the future.

Self-treatment with medicines bought without consultation with a trained health worker is common, particularly for illnesses considered slight in severity. Disturbingly, it is also most common in the management of illnesses and injuries among children under the age of five, the very group for which incorrect prescriptions are most dangerous.

4.5 Accessing Health Care – Transportation, Time and Cost

For those patients who received treatment from a trained health worker outside their own home, questions were asked about the means of transportation, time required to reach the place of treatment, and cost of the transportation.

4.5.a Means of Transportation by Severity of Illness/Injury: Percent distribution of household members who were sick or injured in the past 30 days and who were treated by a trained health worker outside of their homes by means of transportation used to go to the place of treatment, according to severity of illness/injury.

Background Characteristics	On foot/ Carried on foot	Own Transport	Commer-cial Transport[1]	Other/ Don't Know	Total Percent	Number
Severity of illness/injury						
Slight	33.5	45.0	21.1	0.3	100.0	304
Moderate	24.3	44.8	30.6	0.3	100.0	987
Serious	12.2	41.9	44.5	1.3	100.0	377
Total[1]	23.2	44.2	32.0	0.5	100.0	1668

1 Commercial transport contains motodop, cyclo, car taxi, and commercial boat.

4.5.b: Means of Transportation for *Moderate/Serious* Illnesses and Injuries Only: Percent distribution of household members who were moderately/seriously sick or injured in the past 30 days and who were treated by a trained health worker outside of their homes by means of transportation used to go to the place of treatment, according to place of treatment, socioeconomic status and place of residence

Background Characteristics	On foot/ Carried on foot	Own Transport	Commercial transport	Other/ Don't Know	Total Percent	Number
Place of treatment						
Public Facility	9.9	41.7	47.4	1.0	100.0	673
Private /Other Facility	31.7	46.3	21.7	0.2	100.0	690
Province Group						
Isolated	39.7	52.4	7.5	0.4	100.0	143
Remote	29.3	25.5	43.5	1.7	100.0	134
Accessible	18.2	44.7	36.6	0.5	100.0	975
Capital City	11.5	49.8	38.8	0.0	100.0	112
Socioeconomic status						
Poor	41.1	18.5	37.6	2.8	100.0	191
Below Average	26.4	43.2	30.1	0.3	100.0	429
Above Average	14.2	51.8	33.7	0.3	100.0	432
Better Off	10.4	50.0	39.6	0.0	100.0	312
Total[1]	21.0	44.0	34.4	0.6	100.0	1364

1 Commercial transport contains motodop, cyclo, car taxi, and commercial boat.

Table 4.6.a. Time to Reach Place of Treatment, by Severity of Illness/Injury
Percent distribution of household members who were sick or injured in the past 30 days and who were treated by a trained health worker outside of their homes by time to reach the place of treatment, according to severity.

Background Characteristics	Time: <15 m	15-29 m	30-59 m	1-2 h	> 2 h	Don't know	Total Percent	Number
Severity of illness/injury								
Slight	47.2	25.8	13.1	8.3	3.0	2.7	100.0	304
Moderate	38.6	18.3	19.3	15.6	7.2	1.1	100.0	987
Serious	17.6	17.7	22.0	27.2	13.5	2.1	100.0	377
Total	35.4	19.5	18.7	16.9	7.8	1.6	100.0	1668

4.6.b Time to Reach Place of Treatment for *Moderate and Serious* Illnesses/injuries : Percent distribution of household members who were sick or injured in the past 30 days and treated by a trained health worker outside of their homes by time to reach the place of treatment, according to place of treatment, socioeconomic status and place of residence

Background Characteristics	Time						Total Percent	Number
	< 15 m.	15-29 m.	30-59 m.	1-2 h.	> 2 h.	Don't know		
Place of treatment								
Public Facility	18.6	14.6	21.9	27.1	15.4	2.4	100.0	673
Private/Other Facility	46.6	21.6	18.1	10.7	2.6	0.3	100.0	690
Province Group								
Isolated	39.6	20.3	18.3	15.7	6.1	0.0	100.0	143
Remote	33.8	12.5	15.4	16.3	18.0	4.0	100.0	134
Accessible	29.2	17.9	21.3	21.4	8.9	1.3	100.0	975
Capital City	54.3	24.8	16.1	2.9	1.9	0.0	100.0	112
Socioeconomic status								
Poor	32.0	18.2	17.0	23.9	7.5	1.4	100.0	191
Below Average	30.8	17.5	21.5	22.0	6.5	1.7	100.0	429
Above Average	27.7	17.9	24.8	18.2	9.8	1.5	100.0	432
Better Off	43.0	19.3	13.1	12.0	11.8	0.7	100.0	312
Total	32.8	18.2	20.0	18.8	8.9	1.4	100.0	1364

4.7.a. Cost of Transportation to Reach the Place of Treatment, by Severity of Illness/Injury: Percent distribution of household members who were sick or injured in the past 30 days and who were treated by a trained health worker outside of their homes by cost of transportation to reach the place of treatment, according to severity.

	No cost	100-500 r.	600-1,000 r.	1,100-2,000 r.	2,100-5,000r	5,100-10,000r.	> 10,000 r.	Non-Cash	Total Percent[1]	Number[1]
Severity										
Slight	50.0	10.1	11.1	9.5	8.5	2.7	1.2	6.5	100.0	304
Moderate	43.6	5.6	10.6	12.4	12.9	5.0	4.7	5.0	100.0	987
Serious	25.0	7.3	7.4	12.8	17.1	9.2	17.7	3.2	100.0	377
Total	40.6	6.8	9.9	12.0	13.1	5.6	7.0	4.9	100.0	1668

[1]Includes 0.2% who responded don't know

4.7.b. Cost of Transportation to Reach the Place of Treatment for *Moderate and Serious* Illnesses/Injuries: Percent distribution of household members who were moderately/seriously sick or injured in the past 30days and who were treated by a trained health worker outside of their homes by cost of transportation to reach the place of treatment, according to place of treatment, socioeconomic status and place of residence.

	No cost	100 - 500 r.	600 - 1,000 r.	1,100 - 2,000 r.	2,100 - 5,000 r.	5,100 - 10,000 r.	> 10,000 r.	Non-Cash	Total Percent	Number
Place of treatment										
Public Facility	20.1	4.7	8.8	17.2	20.0	10.0	15.0	4.2	100.0	673
Private Facility/ Other	56.4	7.5	10.5	8.1	8.3	2.5	1.8	4.8	100.0	690
Province Group										
Isolated	62.2	3.1	7.3	7.2	6.5	4.0	4.4	5.3	100.0	143
Remote	39.5	9.8	7.0	6.2	11.3	7.0	11.3	7.9	100.0	134
Accessible	36.9	5.7	8.3	13.5	15.8	6.7	8.9	4.2	100.0	975
Capital City	20.9	9.3	27.6	18.5	12.3	3.8	4.7	1.9	100.0	112
Socioeconomic status										
Poor	42.6	6.6	7.2	9.5	16.3	4.5	9.2	4.1	100.0	191
Below Average	45.6	4.6	9.7	8.9	13.3	5.3	7.9	4.4	100.0	429
Above Average	37.1	5.1	8.2	15.8	13.1	7.9	8.3	4.6	100.0	432
Better Off	28.0	9.1	13.3	14.9	15.2	6.0	8.5	4.6	100.0	312
Total	38.5	6.1	9.7	12.5	14.1	6.2	8.3	4.5	100.0	1364

[1]Includes the response don't know

As can be seen from tables 4.5 – 4.7 above, **patients who are seriously ill incur the greatest travel time and cost, with over 40% of seriously ill patients travelling more than one hour to receive treatment.** Of patients utilizing a government health facility for treatment of a moderate or serious illnesses/injury, over 40%:

- use commercial transportation
- travel over one hour to reach the facility (over 15% travel more than 2 hours)
- pay more than 2,100 riel to get there

This is consistent with the earlier finding that most utilization of public sector health care currently occurs in Provincial Hospitals or Government Hospitals in Phnom Penh, and the time and cost involved in reaching government services may be a factor in their currently low utilization. It will be interesting to see if this profile changes significantly once the Health Coverage Plan is fully implemented.

4.6 Utilization Patterns Specific to Maternal/Child Health

In addition to questions asked on the general household questionnaire, women who had a live birth in the last 5 years were asked about utilization of antenatal and delivery services, and mothers of children under five were asked about treatment sought for children with diarrheal and respiratory illnesses.

The following data on utilization of antenatal and delivery care was obtained with respect to live births. Pregnancies ending in abortion or stillbirth are excluded. This could potentially bias findings on the use of medical care in either direction: on the one hand, lack of antenatal care and/or trained delivery assistance might contribute to poor pregnancy outcome; on the other hand, women with perceived problems with the pregnancy or labor might be more likely to seek medical care than those whose pregnancies or labors are perceived to be proceeding normally.

Based on live births in the past five years, **more than half of all Cambodian women receive no antenatal care at all, and only one-third receive antenatal care from a medically trained person** (nurse, midwife, medical assistant or doctor). The percentages are higher for urban women, educated/literate women, and women of higher socioeconomic status. **Among women living in remote or isolated rural areas, and among women who are poor and/or illiterate, two thirds receive no antenatal care and less than one fifth receive antenatal care from a trained provider**. This is discussed in more depth in Chapter 6.

Delivery in a medical facility is extremely rare in Cambodia, with over 90% of deliveries taking place at home (own home or someone else's home). Although there is a great difference according to socioeconomic status and education/literacy, even among the highest socioeconomic group and among the most educated women, nearly two-thirds deliver at home as well. Only among women living in Phnom Penh is delivery at a medical facility commonplace.

4.8 Utilization of Childbearing Services [1]: Percent distribution of live births in the last five years by source of antenatal care, place of delivery, and type of delivery assistance according to selected background characteristics [3]

Background characteristics	Source of Antenatal Care			Place of Delivery [4]			Assistance At Delivery			
	Medical	TBA	Other	None	Public Medical Facility	Private Medical Facility	Non-medical Facility	Medical	TBA	Other	Family/ Other	Number of Births
Residence												
Urban	54.3	6.4	39.3	23.2	9.5	67.3	55.9	44.1	0.0	561		
Rural	31.6	11.8	56.5	5.0	1.6	93.4	31.1	68.6	0.3	4,193		
Province Group												
Isolated	21.8	14.1	64.1	2.9	0.5	96.6	23.6	74.6	1.8	492		
Remote	25.4	12.8	61.8	2.9	1.6	95.5	21.2	78.8	0.0	548		
Accessible	34.4	11.0	54.6	5.3	1.7	93.0	33.9	66.0	0.1	3,461		
Capital City	76.7	4.6	18.7	49.9	19.8	30.3	83.2	16.4	0.4	252		
Socioeconomic status												
Poor	19.5	11.0	69.5	2.3	0.2	97.6	16.9	82.2	0.9	1,026		
Below Average	25.2	13.2	61.6	2.8	0.5	96.6	25.6	74.3	0.1	1,878		
Above Average	38.2	12.6	49.2	4.8	1.6	93.6	36.7	63.1	0.1	1,108		
Better Off	71.8	4.4	23.8	28.6	12.1	59.3	75.0	24.9	0.1	741		
Years of Schooling												
0	17.8	14.4	67.8	2.1	0.9	97.0	18.1	81.1	0.7	1,457		
1-3	27.2	11.9	60.9	4.3	1.1	94.6	28.5	71.4	0.1	1,541		
4-6	47.5	9.6	42.9	9.4	4.0	86.6	44.2	55.7	0.1	1,096		
7+	65.3	5.1	29.6	21.6	6.8	71.6	64.9	35.1	0.0	659		
Literacy												
Not at all	19.1	14.9	66.0	2.6	0.9	96.5	19.4	80.0	0.6	1,644		
With difficulties	28.4	10.9	60.7	3.9	0.9	95.2	27.8	72.1	0.1	1,397		
Easily	53.8	7.9	38.3	14.3	5.4	80.3	53.2	46.8	0.1	1,706		
All births	34.3	11.2	54.5	7.2	2.5	90.3	34.0	65.7	0.3	4,754		

[1] Refers to live births in the 0-59 months prior to interview

[2] Medical includes trained midwife, doctor, and nurse

[3] This information came from a multiple-response question; only the most medically qualified response is recorded.

[4] Public facility includes Provincial or District Hospital; government Hospital in Phnom Penh, Health Center or other public medical facility. Private facility includes private clinic/hospital or other private medical facility; non-medical facility includes woman's own home or other person's home.

Only a third of women overall had their deliveries attended by a medical person; the overwhelming majority are attended by traditional birth attendants. As with antenatal care and hospital delivery, the percentage is higher among higher women with higher socioeconomic status, educated/literate women, women in urban areas, and especially, women of any socioeconomic background living in Phnom Penh. This is discussed further in Chapter 6.

It is interesting to note that women of reproductive age appear to be much more likely to utilize a trained health worker for curative care than they are for pregnancy/delivery care (see Table 4.2). The distance involved in reaching government health services (see

section 4.4) may partially account for this, as it is particularly difficult and inconvenient to travel long distances when pregnant or in labor.

Mothers of children under five were also asked whether the child had had diarrhea, dysentery or respiratory disease within the two weeks prior to the day of interview. For children who had, the source of treatment if any was ascertained:

4.9 Utilization of Child Health Services Percent distribution of children under five [1] reported to have had diarrhea, dysentery and/or ARI in the two weeks prior to interview, by type of treatment given [3]

Illness	Trained Health Worker			Bought Medicine	Traditional Treatment Only	No Treatment	Number
	Total	Government [2]	Private				
Diarrhea	26.8	15.7	11.1	14.1	0.7	58.4	744
Dysentery	35.2	20.7	14.5	14.0	2.0	48.9	486
ARI	30.8	16.7	14.1	39.3	1.2	28.6	875

1 Refers to children born 0-59 months before the survey who suffered from diarrhea, dysentery or ARI respectively in the last two weeks.

2.Includes Provincial and District Hospitals, government Hospitals in Phnom Penh, Health Centers, and treatment from the khum nurse or other public medical staff.

3.This information comes from a multiple response question; only the most medically qualified response is recorded.

In most developing countries, diarrhea, dysentery and ARI are major causes of infant death after the neonatal period. The above table is striking in the very high rates of non-treatment for these illnesses, and for the very high percentage of children with ARI who are treated with medicine bought without benefit of consultation with a trained health worker.

It is also noteworthy that the overall percentage of treatment, and treatment from a trained health worker, are much lower for these three diseases than for illness/injury episodes in children aged 0-4 as reported in the household questionnaire (see table 4.2). There are two methodological factors which may contribute to this gap:

1□ The responses shown in table 4.2 refer to a 30 day recall period, and to illness/injury in general, while the responses shown in table 4.9 refer to a 2 week recall period and questions specifically asking about diarrhea, dysentery and ARI. Longer recall periods are known to lead to underreporting of illnesses, especially those perceived as minor. Hence, the questions specific to diarrhea, dysentery and ARI may have captured a higher percentage of milder illnesses than did the general question about illness/injury of household members. A larger number of mild cases in the denominator would contribute to a lower treatment rate.

2□ The general questions about illness/injury in the last 30 days (table 4.2) included a filter to confirm whether or not a trained health worker was consulted. This would contribute to higher reporting of such treatment than would be the case in the questions on childhood illness, which did not have such a filter.

Even taking these factors into account, the difference is so great as to suggest the possibility that children suffering from these common illnesses are treated much less often, and with a lower level of treatment if any, than children suffering from other health problems. This is of potential concern since these three diseases are usually major causes of post-neonatal mortality, which as discussed in the following Chapter, is high and appears to be rising in Cambodia.

CHAPTER 5

INFANT AND CHILD MORTALITY

5.1 Introduction

The mortality estimates presented in this chapter were calculated from birth histories and birth summary information obtained from every woman aged 15 – 49 years living in the sample households. The birth summary section asked about the number of sons and daughters now living with the woman, the number living elsewhere, and the number who have died. These questions were followed by a retrospective birth history in which the woman was is asked to list each of her live births, beginning with the first birth. The sex, Gregorian and Khmer months and years of birth were recorded for each live birth. The mother was asked whether the child was still living, and if so, the child's current age was recorded; if not, the age at death and Gregorian and Khmer dates of death were.

Mortality rates are estimated directly from the information on a child's birth date, survivorship status, and, for dead children, the age at death. In this chapter, the following rates are used to assess the mortality of children:

Neonatal mortality: the probability of dying within the first month of life;
Post-neonatal mortality: the probability of dying between the first through twelfth month of life.
Infant mortality: the probability of dying during the first year of life;
Child mortality: the probability of dying between the first and fifth years of life.
Under-five mortality: the probability of dying before the age of five years.

Careful assessments of data quality indicate that the mortality estimates derived from this survey are comparable in reliability to data from other international surveys. Nonetheless, in any country, mortality estimates are subject to influence from factors such as the following:

1. Data was collected only from women now living and therefore, information about the deaths of children whose mother also died prior to the survey is not included. Such children are likely to experience higher than average mortality, therefore, their exclusion can lead to an underestimation of mortality.

2. Underreporting of deaths, usually as a result of failing to remember the birth and death of an infant who died soon after birth, can also lead to an underestimation of mortality. This possibility was assessed by examining the proportion of neonatal deaths reported in the first week of life and the proportion of infant deaths reported to have taken place during the first month of life. If there was any substantial underreporting of deaths, one would expect to see an abnormally low ratio of deaths under age seven days compared to all neonatal deaths, and an abnormally low ratio of neonatal deaths to infant deaths. Underreporting of deaths is also more likely for births that occurred long before the survey, so changes in these ratios over time were also examined. This analysis indicates that underreporting of neonatal deaths was probably minor for the recent past (0-4 years before the survey, the period upon which current mortality estimates are based). However, a decreased proportion of early

neonatal deaths in the more distant past suggests that there may have been omission of neonatal deaths and/or misrecall of age at death for neonatal deaths that occurred longer ago, particularly those occurring more than 15 years back. This is not unusual since recall naturally decreases over time (see Appendix C for details).

3. Misreporting of birth dates can also contribute to errors in mortality estimates. An analysis of the ratio of births reported by calendar year (see Appendix C) suggests that there may have been an underreporting of births in 1993 and an overreporting of births in 1992. In other words, there may have been a tendency to misrecord births that occurred in 1993 as having occurred in 1992. Births occurring in 1993 were subject to additional questions about child health while births occurring before that year were not, so such misrecording would reduce the interviewer's workload. Therefore, interviewer bias may partially account for this apparent underreporting of 1993 and overreporting of 1992 deaths. The same problem has been encountered in similar surveys in other countries worldwide. As a result of this misreporting, the level of mortality for the most recent period (0-4 years before the survey) is likely to be somewhat underestimated, while the level of mortality for the previous period (5-9 years before the survey) will be somewhat overestimated.

4. Misreporting of the age at death can bias estimates of the age pattern of mortality if it changes the age segments for which the rates are calculated. For example, an overestimate of child mortality relative to infant mortality will result if children who actually died during the first year of life are reported to have died at age one year (12 months) or older. In an effort to avoid this problem, interviewers were instructed to record the age at death in months for children who died before the age of two years. In addition, they were asked to probe whenever the mother reported an age at death of "1 year" or "12 months." The date of death was also recorded and interviewers were instructed to check the consistency between the age at death reported by the mother and the age at death calculated from the dates of birth and death. With the help of these procedures, only a slight overreporting of age of death as "one year" appears to have occurred (see Appendix C). This was small enough to have had no effect on calculations of the level of infant and child mortality.

Such methodological limitations of the retrospective technique, as well as selective underreporting of deaths and/or misreporting of birth dates and age at death usually cause only a negligible margin of error in measurement of recent events (Sullivan et al. 1990). Therefore, the data presented in this report have not been adjusted.

5.2 Levels and Trends in Infant and Childhood Mortality:

Table 5.1 presents early childhood mortality rates for the 25 years preceding the NHS. **Under-five mortality** for the period 0 to 4 years before the survey (the calendar years 1993-1998) **is 115 deaths per 1,000 live births**. At this level, more than one in nine Cambodian children will die before their fifth birthday.

Most of this mortality occurs during the first year of life. The infant mortality rate is 89 deaths per 1,000 live births, while mortality between the first and the fifth birthday is 28 deaths per 1,000 children surviving at the first birthday. Mortality during the first month **(neonatal mortality) is high (36 per 1,000), but post-neonatal mortality** (between the first month and the first birthday) **is much higher**

than expected (54 per 1,000), accounting for 60% of infant mortality.

5.1 Infant and Child Mortality: Neonatal, post-neonatal, infant, and child mortality for five-year periods preceding the survey

Years Prior to Survey	Corresponding Years	Neonatal Mortality (NN)	Post-neonatal Mortality[1] (PNN)	Infant Mortality ($_1q_0$)	Child Mortality ($_4q_1$)	Under Five Mortality ($_5q_0$)
0-4 years	**1998-1993**	35.7	53.6	89.4	28.1	114.9
5-9 years	**1993-1988**	36.8	34.2	71.0	30.9	99.8
10-14 years	**1988-1983**	38.3	30.0	68.3	28.6	94.9
15-19 years	**1983-1978**	39.9	30.4	70.2	37.9	105.5
20-24 years [2]	**1978-1973**	36.8	67.4	104.2	93.1	187.6

[1]Computed as the difference between the infant and neonatal mortality rates.

2 Does not include the mortality of children born to women aged 30 to 49 years during that period.

A similar infant mortality rate, using less reliable indirect methods, was calculated in the 1996 Demographic Survey of Cambodia (Huguet J. W., 1997).

The results in table 5.1 can be used to explore the trends in early childhood mortality in Cambodia. Since the rates in table 5.1 are derived from retrospective data; they are subject to errors of omission and misreporting of dates of birth and ages at death especially for events further back in time, such as 20 or more years ago. As previously noted, while the quality of the recent data appears good, there is evidence of underreporting especially of neonatal deaths for more distant time periods.

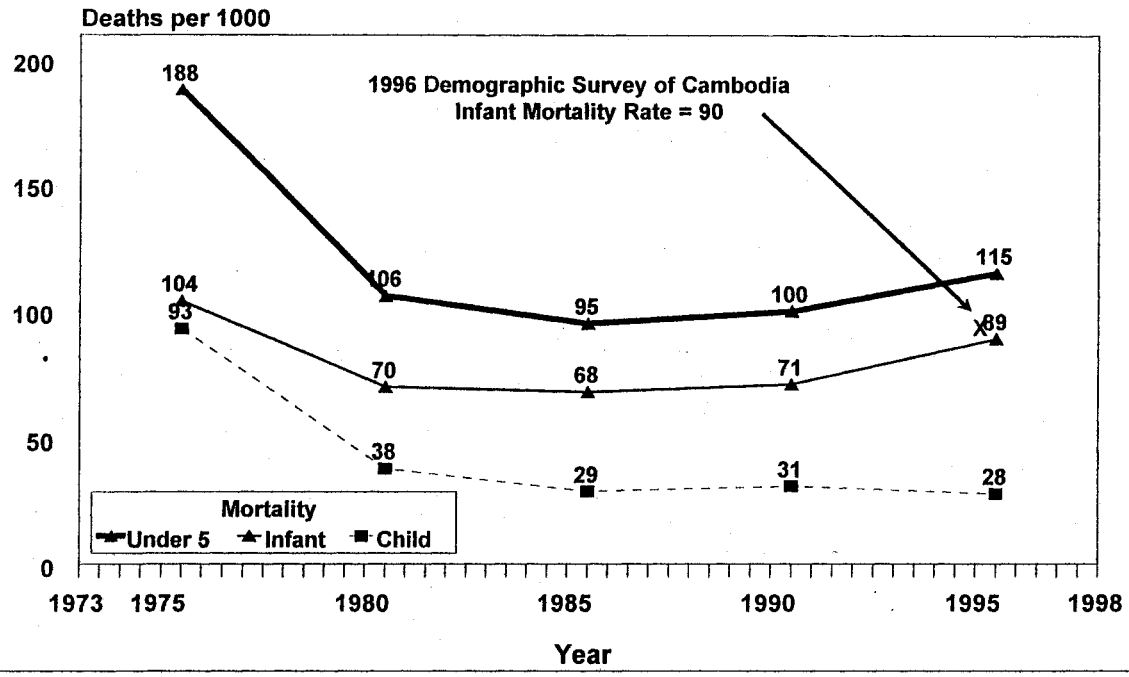
Since women aged 15 to 49 years at the time of the survey were aged 10 to 44 years during the period 5 to 9 years before the survey, the mortality of children born to women age 45 to 49 years are not recorded for that period. For that period, the effect is fairly negligible, but the amount of missing information and its impact on mortality estimates increases as one goes further back in time with the result that the levels of mortality for these periods are likely to be less accurate.[1] In particular, **the mortality rates for the period 20 to 24 years before the survey should be considered as rough estimates that are likely to be underestimates.**

Early childhood mortality was extremely high 20 to 24 years before the survey (years 1973 to 1978), a time period that corresponds roughly to the period of Khmer Rouge rule --- and, as noted above, this is almost certainly an underestimation. During this period, at least one in five Cambodian children died before their fifth birthday. Early childhood mortality dropped considerably between the end of the Khmer Rouge period and 1983; the child mortality rate fell to about one third of its level in the previous period. Between this period and the next period (1983 to

1 Women age 15-49 years at the time of the survey were less than 30 years old during the period 20 to 24 years before the survey: therefore, the mortality of children born to women age 30 to 49 years are not recorded for this period.

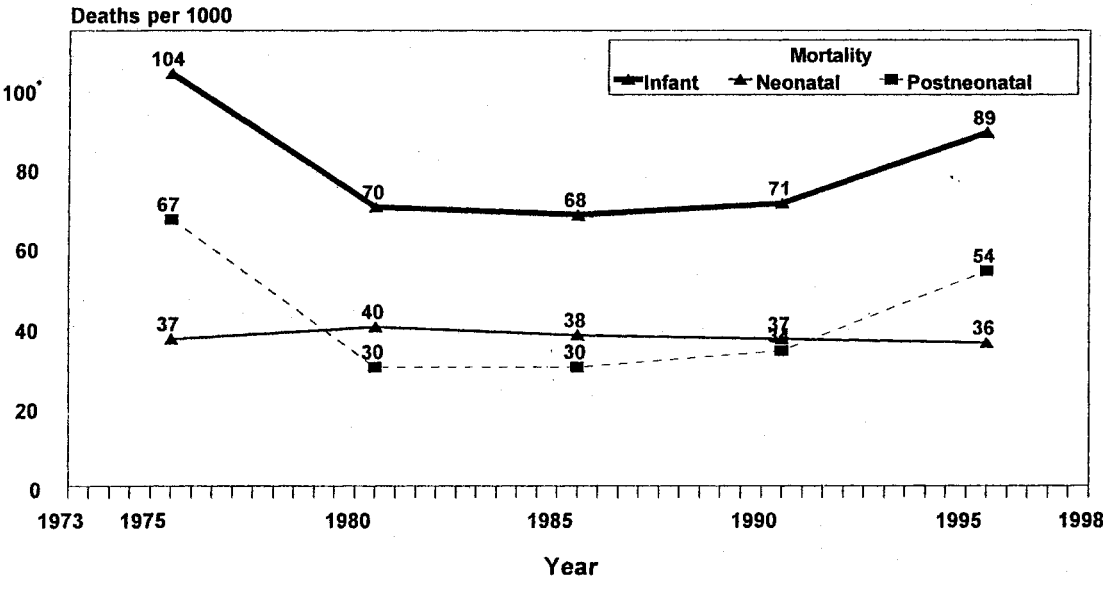
1988), child mortality continued to decline slowly, decreasing from 38 per 1,000 to 29 per 1,000. Since then it has remained at approximately the same level.

Figure 5.1
Trends in Early Childhood Mortality



After dropping from its very high level during the Khmer Rouge years, the infant mortality rate remained relatively stable until about 1993. However, there has been an increase in infant mortality during the most recent period, **with the infant mortality rate rising from 71 deaths per 1,000 for the period 1988 - 1993 to the current level of 89 deaths per 1,000** for the period 1993 – 1998.

Figure 5.2
Trends in Infant Mortality



This is due entirely to an increase in post-neonatal mortality. Figure 5.1 shows the trends in infant mortality as well as the trends of its components, neonatal mortality and post-neonatal mortality. During the last 20 years, neonatal mortality has been at approximately the same level, with 36 deaths per 1,000 for the most recent period and 40 deaths per 1,000 15 to 19 years ago. However, trends in post-neonatal mortality follow a much different pattern. From a maximum of 67 deaths per 1,000 during the Khmer Rouge's rule, post-neonatal mortality dropped to 30 deaths per 1,000 for the period 1978 to 1983 and remained near this level until the period 5 to 9 years before the survey when it increase modestly to 34 deaths per 1,000. **During the most recent period 1993 - 1998, post-neonatal mortality has increased dramatically, rising to 54 deaths per 1,000.**

The vast majority of the increase in under five and infant mortality during the most recent period is due to the rise in post-neonatal mortality. The low ratio of neonatal mortality to infant mortality for the most recent period (41%) seems to be the consequence of this recent increase in post-neonatal mortality, not a sign of underreporting of neonatal deaths. Careful analysis of the data shows no evidence of any major errors, omission, and/or displacement that might produce an artificial increase in post-neonatal mortality. Nor is there any reason to believe that the data on post-neonatal deaths would be less accurate than the data collected on the other components of early childhood mortality, particularly neonatal deaths. **The increase in post-neonatal mortality seems therefore to be a real phenomenon**.

An increase in post-neonatal deaths only, without a simultaneous change in neonatal or child deaths, usually indicates a change for the worse in the incidence and/or treatment of infectious diseases. Relevant findings described in Chapters 4, 6 and 7 of this report include:

- **Lack of exclusive breast-feeding**, even in very young infants.

- **High levels of infant diarrhea, dysentery and respiratory infection**. It is particularly noteworthy that there is a high rate of dysentery in infants, for whom it carries a high mortality risk. Dysentery is more commonly encountered in older children, but the early giving of supplemental food and fluid to very young infants deprives many Cambodian children of the protective effects of exclusive breast-feeding and exposes them to pathogens.

- A relatively **low rate of appropriate treatment as defined by consultation with a trained health professional, and, for watery diarrhea, oral rehydration therapy.**

- A **tendency to treat illnesses in young infants with medicines bought directly from a shop, without the advice of a trained health worker**. As mentioned in Chapter 4, the practice of buying medicine without trained consultation -- particularly dangerous for infants, where selection of correct drug and dosage requires specialized knowledge -- is actually *more* common in the case of infant illnesses than for older children or adults.

- **Low levels of immunization against childhood diseases and low coverage with Vitamin A prophylaxis,** especially in remote or isolated provinces and among families of lower socioeconomic status.

All of the above factors could contribute to high levels of post-neonatal mortality.

However, none of them are new to Cambodia. Whether and why they might have worsened within the past five years is a matter of conjecture only. It is possible that the proliferation of private pharmacies and availability of over the counter pharmaceuticals since the early 1990's has led to an increase in parents treating their children without medical advice. However, this is only speculation, and we have no means of determining if it is in fact the case. It is also possible that there has been an increase in the incidence of diarrhea and dysentery, perhaps due to climatic changes, decreased availability of rainwater as a drinking source, etc, but this also cannot be verified from our survey data.

Because the increase in post-neonatal mortality began around 1990-1993, it cannot be attributed to the recent onset of HIV/AIDs in Cambodia,. However, it is possible that HIV/AIDS has contributed to post-neonatal deaths in the most recent 1-2 years, and it will certainly do so at an increasing rate in the coming years.

More research is urgently needed to determine the causes of rising post-neonatal mortality in Cambodia and to develop appropriate interventions.

5.3 Differentials in Mortality:

Tables 5.2 and 5.3 to follow present differentials in infant and child mortality rates by selected background characteristics. For most variables, the mortality estimates in Table 5.2 are calculated for a ten-year period before the survey in order to have a sufficient number of cases in each category to ensure statistical significance. However, five-year rates are presented for the medical maternity care variable because information was collected for this indicator only for births during the period since January 1993. For the same reason, only the neonatal, post-neonatal, and infant mortality rates are present for this group. Therefore, the rates presented in this table will in most cases differ from the rates given in Table 5.1, which were based on a five year period. The Table 5.1 five-year rates are the rates which most accurately reflect current mortality levels. The ten year period calculations which appear in Table 5.2 are for purposes of examining the relationship of various background characteristics on mortality only, and should not be used as current estimates.

As expected, **infant and child mortality is inversely associated with the household's socioeconomic status, with the poorest socioeconomic group experiencing more than twice the level of mortality of the highest socioeconomic group** (see figure 3). In poor households, under five mortality is 138 per 1,000. It drops to 122 per 1,000 for children living in households with a below average socioeconomic status, to 92 per 1,000 for children living in households with an above average socioeconomic status, and to only 65 per 1,000 for the highest socioeconomic group.

The same general pattern is found for the years of schooling and literacy of mothers. Levels of mortality are indistinguishable for children born to mothers who never attended school and for children born to mothers with 1 to 3 years of schooling, but children born to women with at least 4 years of schooling experience lower mortality: under five mortality is 94 per 1,000 for children born to mothers with 4 to 6 years of schooling and 82 per 1,000 for those born to mothers with 7 or more years of schooling. As noted in Chapter 2, mothers with 4 or more years of schooling are usually literate while mothers with less than that amount of schooling

tend to be either illiterate or only partially literate.

Children living in rural areas are at greater risk of death than those living in urban areas. (figure 5.3). For example, the under five mortality in rural Cambodia is 110 deaths per 1,000 births, versus 88 per 1,000 in urban areas.

5.2 Infant and Child Mortality by Socioeconomic Characteristics: Neonatal, post-neonatal, infant, and child mortality by selected socioeconomic characteristics for the ten-year period preceding the survey

Socioeconomic Characteristic	Neonatal Mortality (NN)	Post-neonatal Mortality[1] (PNN)	Infant Mortality ($_1q_0$)	Child Mortality ($_4q_1$)	Under Five Mortality ($_5q_0$)
Residence					
Urban	29.8	34.6	64.4	25.2	88.0
Rural	37.2	44.9	82.1	30.0	109.6
Project Areas					
CDCP	33.8	41.6	75.3	24.5	98.0
BHSP	41.4	42.8	84.2	32.3	113.9
Socioeconomic Status					
Poor	43.7	54.6	98.3	43.8	137.8
Below average	44.0	49.5	93.5	31.4	122.0
Above average	29.4	39.1	68.4	25.1	91.8
Better off	21.6	25.8	47.3	18.5	64.9
Years of Schooling					
0	39.1	47.6	86.7	30.9	115.0
1-3	40.6	45.4	86.0	32.5	115.8
4-6	32.0	40.4	72.3	23.5	94.1
7+	24.4	33.4	57.9	25.4	81.8
Literacy					
Not at all	41.4	49.0	90.4	32.0	119.6
With Difficulty	34.8	43.1	77.8	32.6	107.9
Easily	32.6	37.6	70.2	23.4	92.0
Medical Maternity Care[2]					
No Antenatal or Delivery Care	38.7	66.4	105.1	U[3]	U
Antenatal or Delivery Care	34.1	37.3	71.5	U	U
Total	36.3	43.6	79.9	29.4	107.0

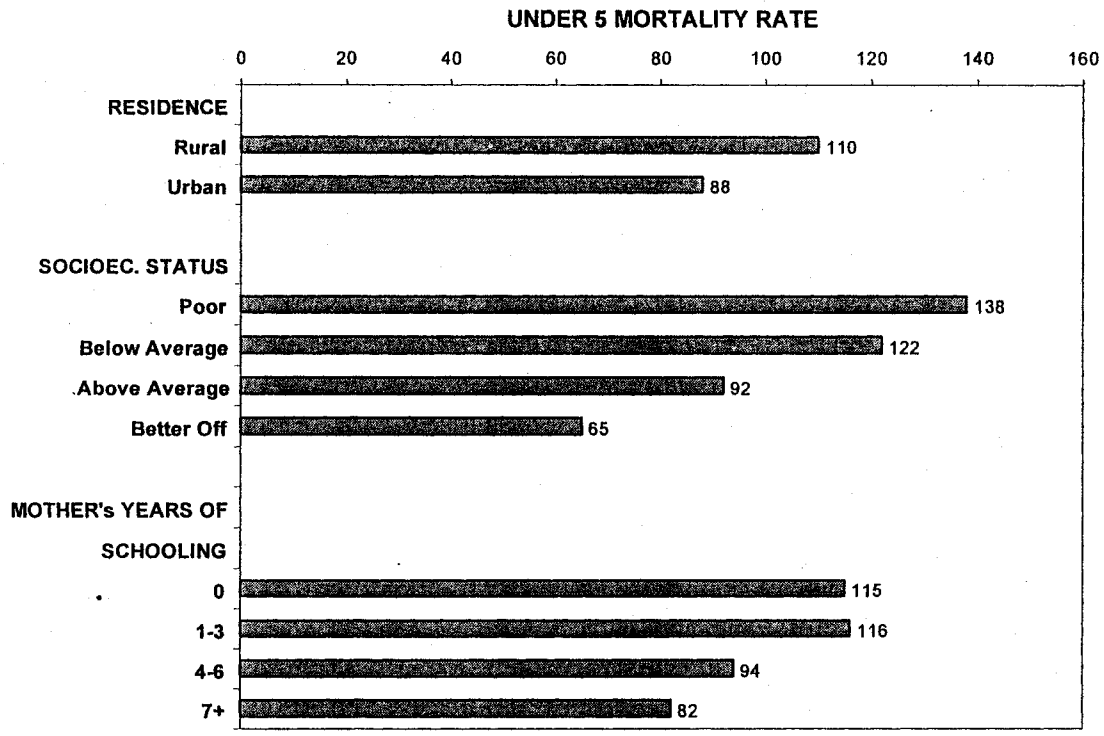
[1]Computed as the difference between the infant and neonatal mortality rates.

[2]Rates for the five-year period before the Survey. Medical care is care given by a doctor, nurse, or trained midwife or received in a hospital, health center, or clinic.

[3]No information.

FIGURE 5.3

UNDER 5 MORTALITY BY SOCIOECONOMIC CHARACTERISTICS



Maternity care during pregnancy and delivery is associated with a lower risk of early childhood mortality. However, this association should be viewed with some caution since the relationship remains strong across all infant age groups: neo-natal, as well as post-neonatal. The primary impact of antenatal and delivery care is on maternal, perinatal, and neonatal mortality. Table 5.2 shows a slightly lower rate of neonatal mortality when the mother has received trained antenatal and/or delivery care, as one would expect. However it also shows an even greater difference for post-neonatal mortality. There is little scientific reason to expect antenatal and delivery care to cause a reduction in mortality after one month of age. More likely, the correlation between maternity care and post-neonatal mortality reflects the confounding effects of socioeconomic status and maternal education/literacy. As noted in Chapter 6 to follow, only a minority of Cambodian women currently receive trained antenatal and delivery care, and these are mostly women of higher socioeconomic status and above average education, both factors strongly associated with infant/child mortality.

The relationship between early childhood mortality and various demographic variables is examined in table 5.3. As with Table 5.2, this table uses rates for a ten year period in order to have enough cases for statistical significance. Therefore, the mortality rates presented in this table are not the same as those given in Table 5.1 and should not be used as the current rates.. The ten year rates are used solely for the purpose of examining relationships between demographic variables and mortality, which cannot be done for a five year period due to insufficient cases. However, for current estimates of mortality, the rates given in Table 5.1 should be used as these most accurately reflect the current situation.

As expected, mortality levels at all ages are significantly higher for boys than for

girls. However, the gap is extremely high with boys roughly 50% more likely to die between their first and fifth birthdays than girls. The size of the gender mortality gap could be due to an underreporting of female deaths and/or parental behaviors which in some way favor female survival. Whatever the cause, the gender mortality gap found in this survey is smaller than that estimated by the 1996 Demographic Survey of Cambodia (Huguet 1997).

The relationship between maternal age and mortality generally takes the form of a U-shaped curve, with higher mortality for children born to the youngest and oldest mothers. This is not the case in Cambodia. Infant mortality among children born to mothers under the age of 20 is higher than the infant mortality of children born to mothers age 20 to 29, but lower than the infant mortality of children born to mothers age 30 to 39. After the youngest age group, infant mortality increases steadily with age and peaks for children born to mothers age 40 to 49.

5.3 Infant and Child Mortality by Demographic Characteristics: Neonatal, post-neonatal, infant, and child mortality by selected bio-demographic characteristics for the ten-year period preceding the survey

Bio-demographic Characteristic	Neonatal Mortality (NN)	Post-neonatal Mortality[1] (PNN)	Infant Mortality ($_1q_0$)	Child Mortality ($_4q_1$)	Under Five Mortality ($_5q_0$)
Sex of Child					
Male	39.3	45.2	84.5	34.5	116.1
Female	33.2	42.0	75.2	24.1	97.5
Mother's age at birth					
Less than 20	39.3	40.4	79.8	25.2	103.0
20-29	31.1	41.1	72.2	28.1	98.3
30-39	43.8	45.1	88.9	32.3	118.4
40-49	(37.1)	(72.3)	(109.4)	(31.1)	(137.1)
Birth order					
1	35.0	41.9	76.9	24.0	99.1
2-3	28.6	39.9	68.5	25.6	92.3
4-5	32.9	42.9	75.8	37.3	110.3
6+	56.0	53.5	109.5	32.4	138.3
Previous birth interval					
Under 2 yrs	54.3	64.8	119.1	42.9	156.9
2-3 years	30.1	37.3	67.4	26.8	92.4
4 years or more	33.5	38.9	72.4	24.3	95.0

Rates in parentheses are based on 250 to 499 exposed persons.

[1]Computed as the difference between the infant and neonatal mortality rates.

The relationship between mortality and birth order exhibits the expected pattern of higher infant mortality for first births and high order births. First births have a high infant mortality rate (77 per 1,000), but sixth order and higher births have a much higher infant mortality rate (110 per 1,000) than any of the other orders.

The **length of the previous birth interval is strongly associated with mortality levels.**. Mortality levels are higher at all ages among children born less than two years after a preceding birth. Overall, **the under five mortality rate for children born less than two years after a preceding birth is 157 per 1,000, more than 50% higher than for children born two or more years after a preceding birth.**

CHAPTER 6

MATERNAL AND CHILD HEALTH

This chapter covers various aspects of maternal-child health care such as antenatal visits, vaccinations – including vaccinations of children – type and source of assistance during delivery, and mothers' knowledge and practice with regard to acute respiratory infection, diarrhea and dysentery.

6.1 Antenatal Care

6.1 Number of Antenatal Care Visits and Stage of Pregnancy

Percent distribution of live births in the last 5 years by number of antenatal care (ANC) visits, and by the stage of pregnancy at the time of the first visit

	All births
Number of ANC visits	
None	54.5
1 visit	15.0
2-3 visits	22.6
4 or more visits	5.5
Unknown or missing	2.4
Total	100.0
Median No. of visits (for those with ANC)	2.0
Months pregnant at the time of first ANC visit	
No antenatal care	54.5
Less than 6 months	19.8
6-7 months	13.7
8+ months	9.7
Unknown or missing	2.3
Total	100.0
Median months pregnant at first visit (for those with ANC)	6.0
Number of live births[1]	4754

[1]Includes births born 0-59 months before the survey.

As can be seen from table 6.1, **in the majority (54.5%) of births which occurred in the past five years, the mother did not receive any antenatal care**. Another 15% had only one antenatal visit; 22.6% had 2 or 3 visits, and only 5.5% had 4 visits or more. This level of antenatal care is very inadequate, a fact which may contribute to the very high maternal mortality ratio in Cambodia which is estimated as at least 473 deaths per 100,000 live births (NMCHC 1996).

The second part of the same table shows the distribution of the first ANC visit according to the stage of pregnancy expressed in months. The findings indicate that Cambodian women, when they do obtain antenatal care, tend to do so fairly late in pregnancy. The median stage of pregnancy at first antenatal visit is 6 months gestation.

6.2 Antenatal care: Percent distribution of live births in the last 5 years by source of antenatal care (ANC) during pregnancy, according to maternal and background characteristics

Background Characteristic	Antenatal Care Provider				Total Percent	Number
	Doctor	Nurse/Midwife	TBA/Other[1]	No one		
Mother's age at birth						
less than 20	2.7	38.2	11.0	48.1	100.0	373
20-34	2.5	31.9	11.0	54.5	100.0	3540
35+	1.2	29.3	12.2	57.3	100.0	840
Birth order						
1	3.4	40.5	11.7	44.4	100.0	951
2-3	2.6	32.9	11.2	53.4	100.0	1776
4-5	2.0	29.4	10.2	58.4	100.0	1048
6+	1.1	24.7	11.8	62.4	100.0	978
Residence						
Urban	5.9	48.4	6.4	39.3	100.0	561
Rural	1.8	29.8	11.8	56.5	100.0	4193
Project Areas						
CDCP	3.0	34.5	12.6	49.8	100.0	2486
BHSP	1.4	29.7	9.0	59.9	100.0	1825
Province Group						
Isolated	1.1	20.7	14.1	64.1	100.0	492
Remote	.1	25.2	12.8	61.8	100.0	548
Accessible	1.5	32.9	11.0	54.6	100.0	3461
Capital City	20.6	56.1	4.6	18.7	100.0	252
Socioeconomic status						
Poor	.2	19.3	11.0	69.5	100.0	1026
Below Average	.7	24.5	13.2	61.6	100.0	1878
Above Average	1.3	36.9	12.6	49.2	100.0	1108
Better Off	10.9	60.9	4.4	23.8	100.0	741
Years of Schooling						
0	.6	17.3	14.4	67.8	100.0	1457
1-3	1.2	25.9	11.9	60.9	100.0	1541
4-6	3.2	44.3	9.6	42.9	100.0	1096
7+	7.3	58.0	5.1	29.6	100.0	659
Literacy						
Not at all	.5	18.6	14.9	66.0	100.0	1644
With difficulties	1.3	27.1	10.9	60.7	100.0	1397
Easily	4.9	48.9	7.9	38.3	100.0	1706
All births[2]	2.3	32.0	11.2	54.5	100.0	4754

Note: If more than one source of ANC was mentioned, *only the provider with the highest qualifications was considered in this tabulation.*

[1]Includes don't know responses

[2]Includes births 0-59 months prior to the survey; all provinces in the sample and the births of 17 blind women.

Table 6.2 indicates that the majority of antenatal care providers are nurses and midwives. Secondary in frequency is the Traditional Birth Attendant (TBA). Doctors play a minimal role in the provision of antenatal care in Cambodia, with the sole exception of the capital city. Even there, their role is secondary to that of nurses and midwives.

The location of where mothers live, their socioeconomic status, the number of years of schooling they have had and their level of literacy all have a very strong relationship with the receipt of antenatal care in general and also (for those receiving antenatal care) with the type of provider. **81.3% of births to women in the capital city received antenatal care**. By contrast, **among women living in remote or isolated provinces, the figure is less than 40% – a more than two-fold difference.** There is an even greater gap when the comparison is limited to antenatal care by a medically trained person (doctor, nurse or trained midwife): 76.7% of births to women in the capital received antenatal care from a medically trained person compared to only 25.3% and 21.8% of women in the remote and isolated province groups respectively – a three fold difference. (See Figure 6.1)

Considering socioeconomic status, **71.8% of mothers in the highest socioeconomic group received antenatal care from a medically trained person** (doctors 10.9%, nurses/midwives 60.9%). This rate decreases sharply with lower socioeconomic status; **only 19.3% of the lowest socioeconomic group obtained antenatal care from a trained provider – an almost four-fold difference**.

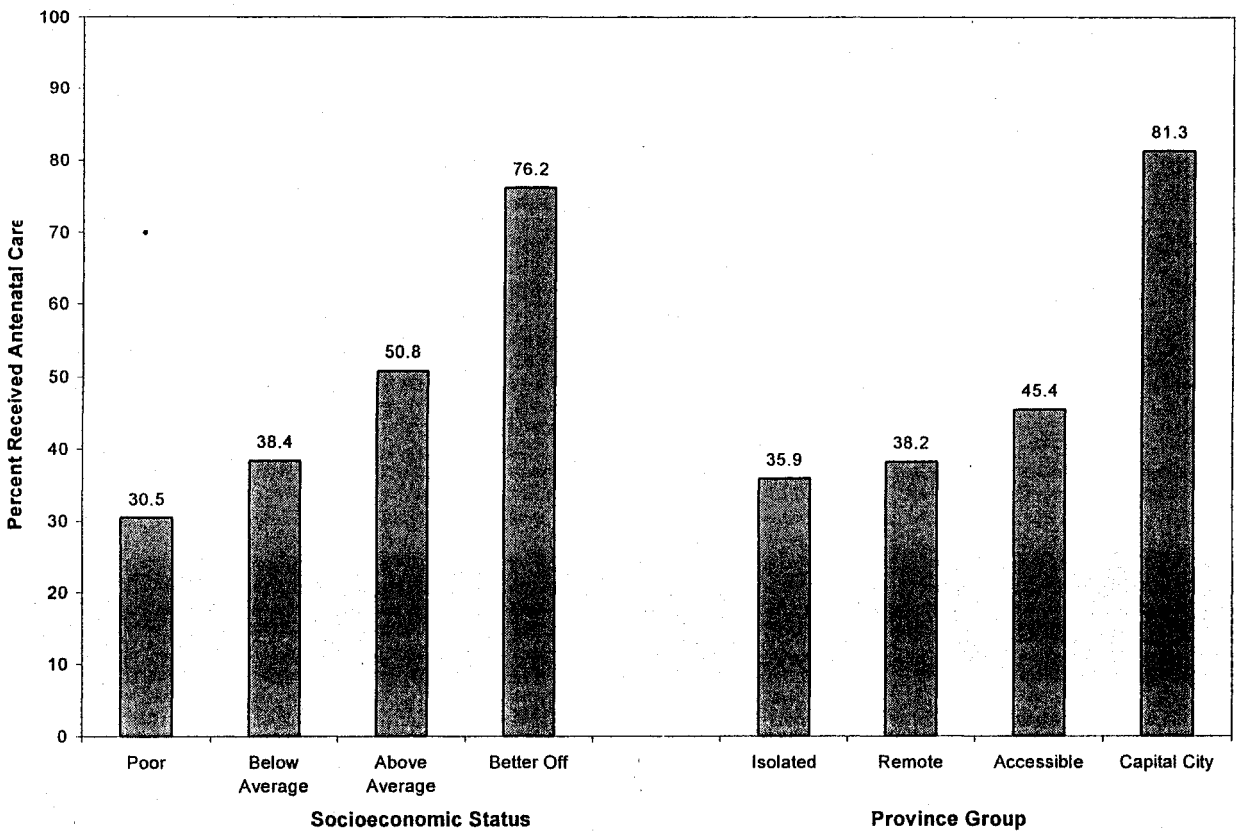
When the number of years of schooling received by the woman and her level of literacy are taken into account, the findings clearly show a **positive relationship between education/literacy and receipt of antenatal care.** Receipt of antenatal care by mothers with zero years of education (or who cannot read at all) is about 32% while those with 7+ years of schooling (or who can read easily) have a rate of more than 62%.

For women over 20, there is little difference in receipt of antenatal care by the mother's age at birth. However, those less than 20 years of age showed a higher rate of antenatal care than did women over 20 (51.9% versus 45.5% for women aged 20-34 and 42.7% for women aged 35 or older). It appears that younger mothers are more likely to seek care. This could in part be related to the markedly higher levels of education and literacy among younger women as noted in Chapter 3.

Younger women's pregnancies are naturally more likely to be first order births; and the data show an inverse relationship between birth order and receipt of antenatal care. The higher the birth order the less the likelihood of the mother receiving antenatal care. For 62.4% of births with a birth order of six or higher, the mother had not received any care at all, versus 44.4% for first order births. Since the mother's age and birth order are closely related, it is difficult to say whether this simply reflects less utilization of antenatal care by older (and, in general, less educated) women or whether there is also a tendency to seek antenatal care more for first than subsequent births.

Figure 6.1

Percentage of Live Births Preceded By Antenatal Care According to Socioeconomic Status and Province Group



6.2 Tetanus Toxoid Vaccination

Table 6.2 shows the number of tetanus toxoid immunizations received during pregnancy for live births which occurred in the past five years.

Of all live births in the last 5 years, **only 15.2% of the mothers had received the recommended minimum of two tetanus toxoid injections during pregnancy**, and only 5.6% had received the preferred three doses. **60% of women did not receive a single dose of tetanus toxoid vaccine during pregnancy.** The location where mothers live, their socioeconomic status, their number of years of schooling and the literacy level all show a strong relationship with the number of tetanus toxoid injections received during pregnancy.

In the capital city 43.8% of births had received two or more doses of tetanus toxoid in pregnancy, compared to less than 20% for births to women living outside the capital – a more than two-fold difference. It is noteworthy, however, that even in the best-served part of the country (Phnom Penh), coverage is below 50%.

6.3 Tetanus Toxoid Vaccinations Percent distribution of live births in the last 5 years by number of tetanus toxoid injections mother received during pregnancy, according to maternal and background characteristics

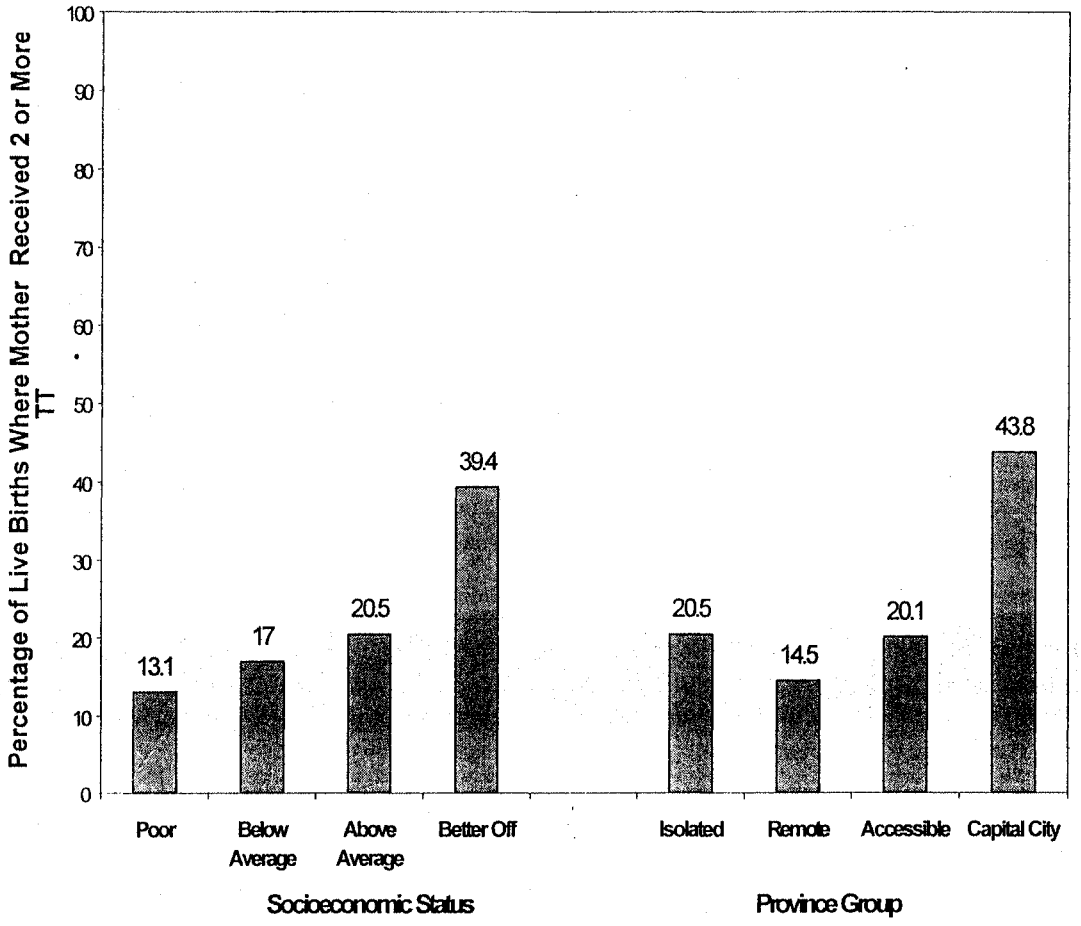
Background Characteristic	Number of Tetanus Toxoid Injections					Total Percent	Number
	None	1 dose	2 doses	3+ doses	Don't Know/ missing		
Mother's age at birth							
less than 20	55.3	15.8	22.7	6.0	0.3	100.0	373
20-34	59.9	18.9	14.9	6.1	0.2	100.0	3540
35+	64.3	19.2	13.2	3.2	0.1	100.0	840
Birth order							
1	53.6	19.7	19.4	7.2	0.1	100.0	951
2-3	57.8	19.1	16.6	6.2	0.2	100.0	1776
4-5	63.4	18.3	13.2	4.9	0.3	100.0	1048
6+	68.1	17.6	10.8	3.4	0.1	100.0	978
Residence							
Urban	45.8	22.8	23.2	7.8	0.4	100.0	561
Rural	62.3	18.2	14.1	5.3	0.1	100.0	4193
Project Areas							
CDCP	58.3	19.4	16.3	5.8	0.2	100.0	2486
BHSP	62.8	19.2	13.8	4.2	0.0	100.0	1825
Province Group							
Isolated	65.0	14.1	12.6	7.9	0.4	100.0	492
Remote	70.3	15.2	11.6	2.9	0.0	100.0	548
Accessible	60.7	19.2	14.8	5.3	0.1	100.0	3461
Capital City	24.6	29.9	33.2	10.6	1.7	100.0	252
Socioeconomic status							
Poor	71.2	15.3	9.5	4.1	0.0	100.0	1026
Below Average	66.0	16.9	12.0	5.0	0.1	100.0	1878
Above Average	59.8	19.6	15.3	5.2	0.1	100.0	1108
Better Off	31.9	26.9	31.0	9.4	0.7	100.0	741
Years of Schooling							
0	75.9	12.8	7.6	3.5	0.1	100.0	1457
1-3	64.0	19.0	12.2	4.6	0.2	100.0	1541
4-6	50.8	22.6	19.3	7.1	0.1	100.0	1096
7+	33.0	24.7	32.1	9.7	0.5	100.0	659
Literacy							
Not at all	74.2	13.3	8.7	3.8	0.0	100.0	1644
With difficulty	64.3	18.7	11.8	4.9	0.3	100.0	1397
Easily	43.7	24.0	24.2	7.8	0.3	100.0	1706
All births[1]	60.3	18.7	15.2	5.6	0.2	100.0	4754

[1]Includes births in the period 0-59 months prior to the survey; includes all provinces in the sample and the births of 17 blind women.

With regards to socioeconomic status, 40.4% of births to better off mothers had received two or more doses of tetanus toxoid during pregnancy, compared to only 13.6% of births to the poorest group – a threefold difference. **Tetanus toxoid immunization coverage, like antenatal visits, drops sharply with declining socioeconomic status.**

Figure 6.2 compares tetanus toxoid immunization coverage by Province Group and socioeconomic status.

FIGURE 6.2:
PRENATAL RECEIPT OF TETANUS TOXIOD BY SOCIOECONOMIC STATUS AND PROVINCE GROUP



The level of maternal education and literacy also show a strong relationship with tetanus vaccination coverage. Births to women who can read easily and/or have 7+ years of schooling are about twice as likely to be vaccinated as those where the mother had no schooling and/or is illiterate.

As was the case with antenatal visits in general, births to younger mothers have a higher percentage of immunization than do births to older ones, and there is an inverse relationship between birth order and vaccination during pregnancy.

6.3 Place of Delivery

As shown in Table 6.4, **90% of births in Cambodia occur at home or in other non-medical facilities**. Any attempts to improve delivery conditions at medical facilities, which has been the focus of many recent initiatives, will therefore not benefit the majority of women unless it is accompanied by a change in the practice of delivering at home.

The only exception is in births to for mothers living in the capital city. **Seventy percent of births to mothers living in the capital city took place in a medical facility, versus about 5% for births to mothers living anywhere else: an almost fifteen-fold difference.**

Births to mothers aged less than 20 years are significantly more likely to occur in a medical facility (15%) compared to those of women aged 35 and over (7%). This seems consistent with **a general pattern of better health seeking behavior in pregnancy on the part of younger women**, an encouraging trend.

Births with a lower birth order (from first to third birth) occurred in a medical facility about twice often as those with a birth order of 4 or higher. This may, of course, simply reflect the fact that higher birth orders generally belong to older women, who as already discussed, are less educated/literate and generally show less utilization of modern antenatal and obstetric care.

When socioeconomic status is taken into account, **40.6% of births to women in the highest socioeconomic group occurred in a medical facility. This drops sharply to below 5% for all others; among births to the poorest women, only 2.4% occurred in a medical facility – an almost 20 fold difference between the lowest and highest socioeconomic groups**.

With regard to maternal education and literacy, there is a **strong positive relationship between both literacy and schooling, and birth in a medical facility**. The difference is very significant, **almost 10 fold between births to women with no versus 7+ years of schooling; and about 6 times for births to those who cannot read at all compared to mothers who can easily read.**

Antenatal care shows a positive relationship to delivery in a medical facility. For births which had received four or more antenatal checks during pregnancy, the percentage delivering at a medical facility is 45%. This figure drops significantly from 21% down to 8% and 2% for births which received antenatal care 2-3 times, one time and not at all, respectively. Aside from the possible effect of antenatal care in encouraging women to deliver in a medical facility, this may also reflect the confounding effect of pregnancy complications: women with perceived problems in pregnancy may be more likely to seek antenatal care and choose to deliver in a medical facility. It probably also reflects the confounding effects of socioeconomic status, literacy and education, since all three of those variables are positively associated with both antenatal care and delivery in a medical facility.

Not surprisingly, the rate of delivery in a medical facility for births to mothers living in urban areas is almost 33%, about 5 times as frequent as the rate for mothers who live in rural areas, where the percentage is only 6.6%.

6.4 Place of delivery: Percent distribution of live births in the last 5 years by place of delivery according to maternal and background characteristics

Background Characteristic	Place of Delivery		Total Percent	Number
	Medical Facility	Non-medical facility		
Mother's age at birth				
less than 20	14.9	84.7	100.0	373
20-34	9.7	90.3	100.0	3540
35+	7.2	92.8	100.0	840
Birth order				
1	17.2	82.7	100.0	951
2-3	10.3	89.7	100.0	1776
4-5	6.6	93.4	100.0	1048
6+	4.5	95.5	100.0	978
Residence				
Urban	32.7	67.3	100.0	561
Rural	6.6	93.4	100.0	4193
Project Areas				
CDCP	13.2	86.7	100.0	2486
BHSP	5.8	94.2	100.0	1825
Province Group				
Isolated	3.4	96.6	100.0	492
Remote	4.5	95.5	100.0	548
Accessible	7.0	92.9	100.0	3461
Capital City	69.7	30.3	100.0	252
Socioeconomic status				
Poor	2.4	97.6	100.0	1026
Below Average	3.4	96.6	100.0	1878
Above Average	6.4	93.6	100.0	1108
Better Off	40.6	59.2	100.0	741
Years of Schooling				
0	3.0	97.0	100.0	1457
1-3	5.4	94.6	100.0	1541
4-6	13.4	86.5	100.0	1096
7+	28.4	71.6	100.0	659
Literacy				
Not at all	3.5	96.5	100.0	1644
With difficulty	4.8	95.2	100.0	1397
Easily	19.7	80.3	100.0	1706
Number of ANC visits				
None	1.9	98.1	100.0	2591
1 visit	7.8	92.2	100.0	712
2-3 visits	21.2	78.7	100.0	1074
4 or more visits	45.2	54.8	100.0	260
D.K., missing	8.3	91.7	100.0	116
All births[2]	9.7	90.3	100.0	4754

[1] Includes responses of don't know and missing response (0.03%).

[2] Includes births in the period 0-59 months prior to the survey; includes all provinces in the sample and the births of 17 blind women.

Delivery Assistance

When mothers were asked about different types of assistance provided during delivery, three kinds of assistance were considered. These included assistance from (1) medical staff (doctor, nurse or trained midwife) (2) a TBA and (3) a family member or others.

Of all births during the last five years, **about two-thirds (65.7%) were assisted by a TBA during delivery. About one-third (34%) were assisted by medical personnel.** Delivery assistance by family member/others is practically nil. One possibility that might explain this situation would be the cost. Traditionally, the cost of delivery by a TBA is far lower than that of delivery by trained medical personnel.

As with other health-seeking behaviors in pregnancy, women under age 20 were more likely to obtain medical assistance than older women. Similarly, birth orders of 1 have a higher rate of medical assistance which then declines steadily as the birth order increases. This rate reverses in connection with assistance provided by TBAs. The percentage of mothers who got assistance from a TBA during delivery increases gradually from 55% -- for mothers giving birth the first time -- to 75% for those giving birth the sixth time or more. This may in part reflect the influence of both maternal age and socioeconomic status (higher order births tending to be older women and women of lower SES).

For births to mothers staying in the **capital city, the percentage of medical assistance at delivery is 83%.** The remaining 16% rely on a TBA. **Everywhere else, the average is about 25% medical assistance versus 73% for assistance from a TBA**. This clearly shows considerable reliance on TBAs in all parts of the country except the capital. Possible reasons for this include the greater availability of trained midwives in the capital city. In the rural areas there is a scarcity of trained midwives, especially "secondary" midwives who have three years of training (as opposed to primary midwives who have only one year total training). The capital, on the other hand, is well supplied with secondary midwives, female secondary nurses, as well as medical assistants and doctors. In addition, the higher socioeconomic status of residents of the capital would make such assistance more accessible in financial terms than it is in the countryside.

As for socioeconomic status, there is also a large gap although of less magnitude than that based on place of residence. **75% of births to mothers in the highest socioeconomic group had medical assistance during delivery while amongst the poor and the very poor mothers, it is only about 20%.** Mothers of lower socioeconomic status depend primarily on TBAs for delivery assistance (see Figure 6.3).

6.5 Assistance During Delivery: Percent distribution of live births in the last 5 years by type of assistance during delivery, according to maternal and background characteristics

Background Characteristics	Assistance at Delivery[1]			Total Percent	Number
	Medical	TBA	Family/Other		
Mother's age at birth					
less than 20	43.0	57.0	0.0	100.0	373
20-34	33.4	66.3	0.3	100.0	3540
35+	32.4	67.3	0.3	100.0	840
Birth order					
1	44.2	55.4	0.4	100.0	951
2-3	35.8	64.0	0.2	100.0	1776
4-5	30.7	68.9	0.4	100.0	1048
6+	24.4	75.4	0.2	100.0	978
Residence					
Urban	55.9	44.1	0.0	100.0	561
Rural	31.1	68.6	0.3	100.0	4193
Project Areas					
CDCP	36.9	62.7	0.4	100.0	2486
BHSP	30.4	69.5	0.1	100.0	1825
Province Group					
Isolated	23.6	74.6	1.8	100.0	492
Remote	21.2	78.8	0.0	100.0	548
Accessible	33.9	66.0	0.1	100.0	3461
Capital City	83.2	16.4	0.4	100.0	252
Socioeconomic status					
Poor	16.9	82.2	0.9	100.0	1026
Below Average	25.6	74.3	0.1	100.0	1878
Above Average	36.7	63.1	0.1	100.0	1108
Better Off	75.0	24.9	0.1	100.0	741
Years of Schooling					
0	18.1	81.1	0.7	100.0	1457
1-3	28.5	71.4	0.1	100.0	1541
4-6	44.2	55.7	0.1	100.0	1096
7+	64.9	35.1	0.0	100.0	659
Literacy					
Not at all	19.4	80.0	0.6	100.0	1644
With difficulty	27.8	72.1	0.1	100.0	1397
Easily	53.2	46.8	0.1	100.0	1706
Number of ANC visits					
None	18.5	81.0	0.4	100.0	2591
1 visit	36.3	63.5	0.2	100.0	712
2-3 visits	59.5	40.4	0.1	100.0	1074
4 or more visits	81.5	18.5	0.0	100.0	260
D.K., missing	23.2	76.8	0.0	100.0	116
All births[2]	34.0	65.7	0.3	100.0	4754

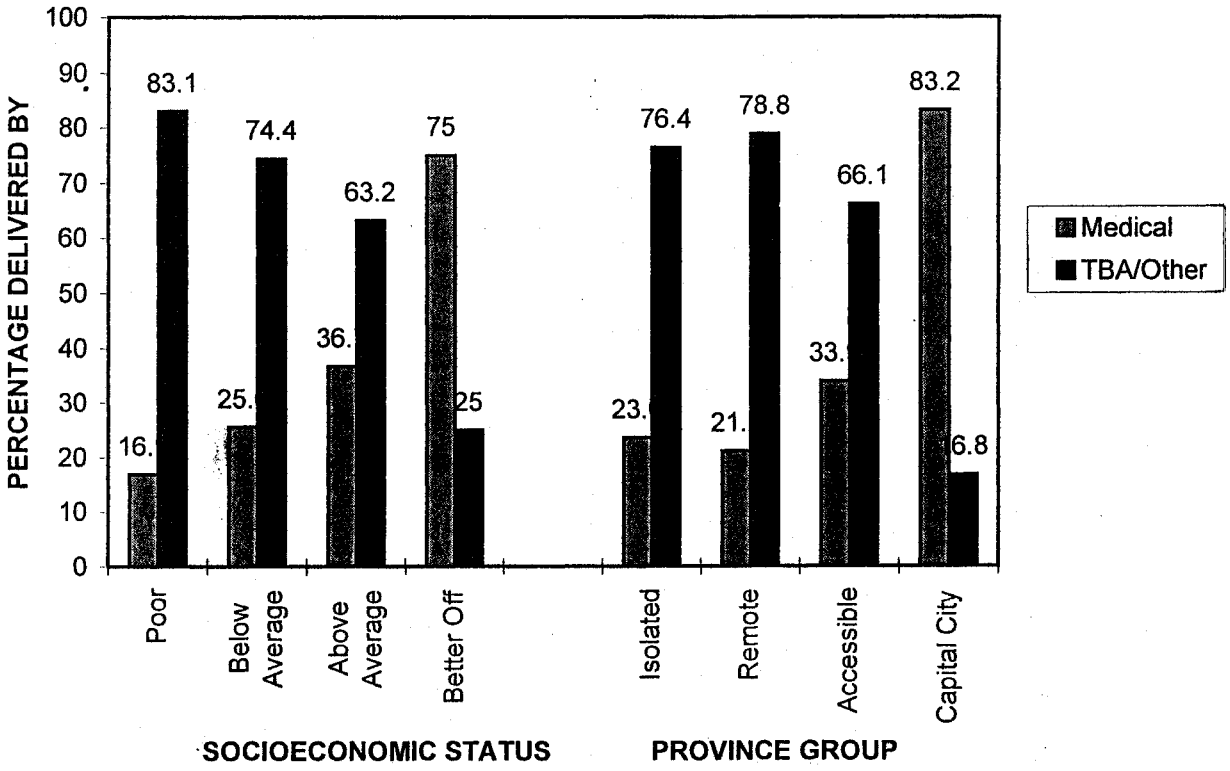
[1] If the respondent mentioned more than one attendant, only the most qualified is considered in this tabulation.

[2] Includes births in the period 0-59 months prior to the survey; all provinces in the sample and the births of 17 blind women.

When we look into the effects of education and literacy, it is clear that better educated mothers are much more likely to get medical assistance (instead of assistance given by TBA) during delivery. Of women with zero years of schooling only 18% had medical assistance during delivery compared to 65% of those with 7+ years of schooling. A similar pattern exists for literacy.

As described in connection with delivery in a medical facility (see table 6.4), the number of antenatal care (ANC) visits appear to have significant association with the type of assistance received by the mother during delivery. For those who had received ANC four times or more, the percentage receiving medical assistance during delivery is 81%. This figure drops significantly from 60% down to 36% and 18% for mothers who had ANC 2-3 times, one time and zero times respectively.

FIGURE 6.3: TYPE OF DELIVERY ASSISTANCE BY SOCIOECONOMIC GROUP AND PLACE OF RESIDENCE



6.5 Vaccination of Children

For each surviving child born in the last five years, the mother was asked if she had a vaccination card for the child, and, if so, the interviewer asked to see it. When a mother was able to show the card to the interviewer, the dates of vaccinations were copied from the card to the questionnaire. If the child has never received a vaccination card, or the mother was unable to show the card to the interviewer, the mother was asked whether the child had ever received vaccinations against specifics diseases, namely, tuberculoses, measles, diphtheria, pertussis, tetanus and polio. As recommended by the World Health Organization (WHO), data on immunization coverage is therefore compiled from two sources: one, card verified record of immunizations; and, two, non-verifiable mother's recall. Table 6.6 presents immunization coverage data for children aged 12 to 23 months at the time of the survey, by which age they should have been fully vaccinated. The table also shows the percentage of such children who received the full immunization series by the age of 12 months.

6.6 Vaccinations by Source of Information: Among children 12-23 months of age, the percentage who have received each vaccine at any time before the interview and before 12 months of age, according to whether the information is from the vaccination card or from the mother.

	Percentage Vaccinated Among Children 12-23 Months Old											
	BCG	DPT			Polio				Measles	All[2]	None	Number
		1	2	3+	0[1]	1	2	3+				
Vaccinated at any time before the interview												
Source of Information												
Vaccination Card	33.4	33.0	29.4	26.8	17.5	33.0	29.4	26.6	25.7	**23.8**	0.0	804
Mother's Report	33.4	29.0	25.5	19.7	3.6	48.2	43.7	29.5	23.8	**15.2**	17.2	804
TOTAL (either source)	66.7	62.0	54.9	46.5	21.2	81.1	73.1	56.1	49.5	**38.9**	17.2	804
Vaccinated by 12 months of age[3]												
	65.5	60.9	54.0	44.4	21.1	79.6	71.9	53.8	45.4	**33.9**	17.2	804

[1]Polio 0 is the Polio vaccination given at birth.

[2]Children who are fully vaccinated, i.e., those who have received BCG, measles, and three doses of DPT and polio vaccine (excluding polio vaccine given at birth).

[3]For children whose information was based on the mother's report, the proportion of vaccinations given during the first year of life was assumed to be the same as for children with a written record of vaccination.

Overall, **less than 40% of children born during the 12 to 23 months prior to the survey have received all of the vaccines**. The coverage rate is highest for the first and second doses of polio (81% for first doses and 73% for second doses), probably because a special polio eradication effort was carried out before and during the survey period with mass polio immunization days during which only polio vaccine was given. The **drop out rate** as measured by the difference between percentages who received the first and third doses divided by the percentage receiving the first dose, is **25% for DPT and 30.8% for polio**. These figures reflect the combined total of card-verified vaccinations and unconfirmed mother's reports.

Since the immunization series should be completed by the end of the first year of life, immunization coverage by age 12 months is also reported in Table 6.6. In the case of card-verified vaccinations, this could be calculated from the recorded date of vaccination relative to the child's date of birth. For non-verified vaccinations (i.e., mother's recall, no card available) an assumption was made that the percentage receiving all doses by age 12 months would be the same as that for card-verified immunizations. **Only one third of children born in the previous 12-23 months were fully vaccinated by age one year** (34 percent). BCG, first and second doses of DPT, and first and second doses of polio have the highest levels, while coverage for the third doses of DPT and polio, and measles is significantly lower.

These findings are similar to immunization coverage rates found on other recent population based surveys, including the 1996 Socioeconomic Survey of Cambodia (NIS 1998), and the Contracting for Health Services Pilot District Baseline Survey (Fronczak 1998).

Differentials in immunization coverage among children 12-23 months by background characteristics are presented in table 6.7. The rates are based on both health card and mother's report. Coverage varies only slightly by the child's sex. There are **enormous difference between rates for children in the capital city and more accessible provinces and those living in more remote or isolated areas. Children in Phnom Penh have 78% immunization coverage compared to only 17% for those in the most isolated provinces --- a more than four-fold difference.** Complete vaccination rates also have a negative association with birth order and strong positive association with mother' s education and socioeconomic status of the mother (see Figure 6.4).

NOTE: An attachment of the National EPI Coverage for the last three years is included at the end of this report.

6.7 Vaccinations by Background Characteristics: Among children 12-23 months, the percentage who had received each vaccine by the time of the survey (according to a vaccination card or the mother), by background characteristics

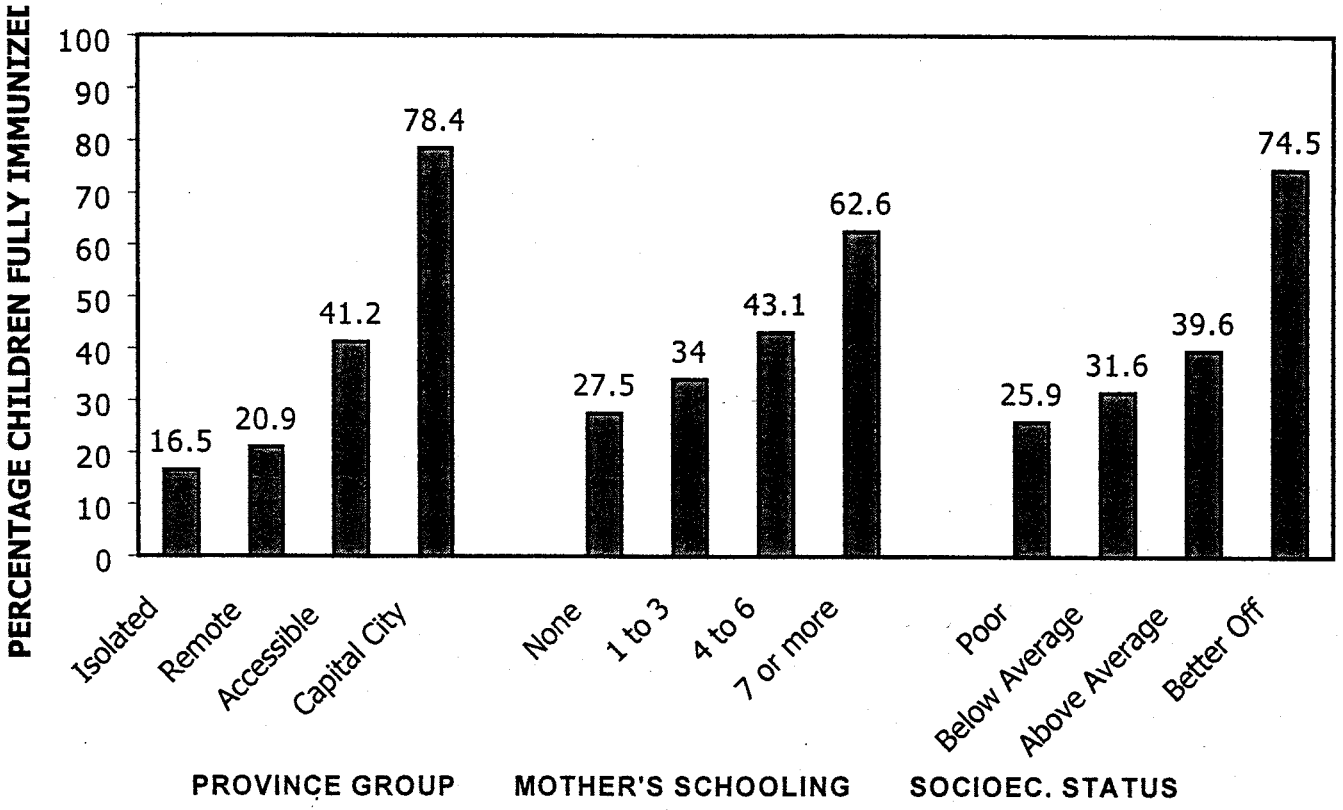
Background Characteristics	BCG	DPT 1	DPT 2	DPT 3	Polio 0	Polio 1	Polio 2	Polio 3	Measles	All[2]	None	No. of Children
Sex												
Male	68.2	62.0	54.8	46.2	18.1	82.2	73.1	54.0	50.4	39.3	16.4	400
Female	65.3	62.0	55.0	46.9	24.2	80.1	73.1	58.1	48.5	38.6	17.9	404
Birth order												
1	69.7	66.9	59.5	51.3	24.3	86.4	75.9	59.4	54.7	44.1	12.3	145
2-3	70.2	65.6	58.5	49.4	24.8	81.6	73.8	57.2	52.8	41.5	16.9	334
4-5	59.9	54.3	48.2	42.6	18.7	73.8	65.4	51.7	43.0	36.0	23.5	172
6+	63.9	58.2	50.3	40.2	13.0	83.5	77.4	55.5	44.6	31.8	15.4	153
Residence												
Urban	67.4	65.5	57.4	53.5	35.9	77.3	68.9	62.9	50.3	44.8	20.5	89
Rural	66.6	61.6	54.6	45.7	19.3	81.6	73.6	55.2	49.4	38.2	16.8	715
Project Areas												
CDCP	72.1	67.7	62.1	52.8	27.9	82.0	76.0	62.4	53.9	46.1	16.6	444
BHSP	63.3	57.6	50.3	43.6	14.7	83.3	73.4	50.0	47.0	33.3	15.4	294
Province Group												
Isolated	37.0	31.2	26.3	18.3	6.7	48.2	44.5	31.8	25.5	16.5	46.7	64
Remote	52.0	45.5	34.7	22.6	6.7	71.5	58.2	38.0	32.5	20.9	28.5	90
Accessible	70.4	65.7	58.6	50.4	21.2	85.5	77.4	59.4	52.2	41.2	13.1	608
Capital City	90.5	90.5	88.0	85.5	73.3	88.2	85.6	83.1	83.3	78.4	7.1	42
Socioeconomic status												
Poor	55.7	49.0	40.3	33.7	10.8	73.7	61.6	43.2	35.3	25.9	25.0	181
Below Average	63.4	56.0	49.4	39.7	17.8	79.9	71.8	50.2	46.2	31.6	17.5	317
Above Average	68.8	66.8	58.8	47.9	17.7	83.2	78.3	60.9	49.7	39.6	16.4	178
Better Off	87.7	88.7	83.8	79.8	49.4	91.8	85.0	82.1	77.3	74.5	6.6	127
Literacy												
Not at all	61.3	51.8	44.0	35.0	13.6	79.7	68.2	45.7	39.1	26.9	19.0	263
With difficulty	60.4	54.2	47.3	39.8	15.9	75.2	67.2	50.3	40.7	32.0	22.7	239
Easily	76.8	77.5	70.7	62.2	32.1	87.5	82.3	70.0	65.7	55.2	10.9	300
Years of Schooling												
0	62.0	52.7	46.2	36.9	12.1	77.0	66.9	45.7	37.7	27.5	21.4	226
1-3	61.2	56.3	47.8	39.8	15.9	76.8	68.4	50.8	43.1	34.0	21.4	248
4-6	67.1	66.2	59.2	51.7	28.6	84.5	76.3	60.8	56.5	43.1	12.9	205
7+	85.5	83.2	77.6	69.0	35.6	91.7	88.1	77.4	71.9	62.6	8.3	125
All Children[3]	66.7	62.0	54.9	46.5	21.2	81.1	73.1	56.1	49.5	38.9	17.2	804

[1]Polio 0 is the Polio vaccination given at birth.

[2]Children who are fully vaccinated, i.e., those now aged 12-23 months who received BCG, measles, and three doses of DPT and polio vaccine (excluding polio vaccine given at birth) at any time prior to the survey.

[3]Includes all the Provinces in the sample and the children of 17 blind women.

FIGURE 6.4: PERCENTAGE OF CHILDREN WHO HAD ALL VACCINES ACCORDING TO PLACE OF RESIDENCE, MOTHERS' YEARS OF SCHOOLING AND SOCIOECONOMIC STATUS



6.6 Receipt of Vitamin A Prophylaxis

Mothers of children below the age of 5 years were shown a vitamin A capsule and asked whether the child had received this in the previous 12 months, and, if so, how many times. All data is based on mother's recall.

Table 6.8 Vitamin A: Percentage of children born in the last 5 years who received a Vitamin A capsule in the last 12 months, by background characteristics

Background Characteristics	Received 1 or more capsules	Number of Vitamin A Capsules[2]					Number of Children
		0	1	2	3+	Total	
Child's Age							
0-5	6.7	93.3	4.6	1.9	.2	100.0	445
6-11	24.0	76.0	17.6	4.2	2.2	100.0	339
12-23	53.1	46.9	31.0	17.9	4.2	100.0	804
24-35	56.3	43.7	27.8	21.7	6.9	100.0	788
36-47	58.1	41.9	28.1	22.1	7.8	100.0	916
48-59	57.3	42.7	25.2	24.3	7.8	100.0	996
Residence							
Urban	48.2	51.8	25.1	17.9	5.3	100.0	515
Rural	48.7	51.3	24.6	18.3	5.8	100.0	3772
Sex							
Male	47.6	52.4	25.0	17.0	5.6	100.0	2,149
Female	49.7	50.3	24.3	19.5	5.9	100.0	2,139
Birth order							
1	45.2	54.8	23.7	16.2	5.2	100.0	859
2-3	50.1	49.9	25.8	18.7	5.6	100.0	1,632
4-5	51.0	49.0	26.4	18.9	5.7	100.0	947
6+	46.7	53.3	21.4	18.7	6.6	100.0	849
Project Areas							
CDCP	51.8	48.2	24.8	20.0	6.9	100.0	2,264
BHSP	47.3	52.7	25.2	17.2	4.8	100.0	1,633
Province Group							
Isolated	30.8	69.2	18.0	10.3	2.5	100.0	422
Remote	39.1	60.9	25.9	11.5	1.6	100.0	505
Accessible	51.0	49.0	24.8	19.8	6.4	100.0	3,120
Capital City	69.5	30.5	31.2	26.8	11.6	100.0	240
Socioeconomic status							
Poor	41.6	58.4	22.7	13.6	5.3	100.0	894
Below average	44.5	55.5	24.9	15.9	3.7	100.0	1,668
Above average	55.3	44.7	24.7	22.9	7.7	100.0	1,019
Better off	57.4	42.6	26.3	23.0	8.1	100.0	705
Literacy							
Not at all	42.9	57.1	24.1	13.9	4.9	100.0	1,464
With difficulty	46.4	53.6	22.4	18.2	5.9	100.0	1,262
Easily	55.9	44.1	27.1	22.4	6.4	100.0	1,556
Years of Schooling							
0	42.7	57.3	22.8	14.7	5.1	100.0	1,310
1-3	47.1	52.9	24.3	17.5	5.3	100.0	1,374
4-6	52.1	47.9	25.9	20.3	5.8	100.0	991
7+	59.1	40.9	27.2	24.1	7.8	100.0	611
All children[1]	48.6	51.4	24.6	18.2	5.7	100.0	4,288

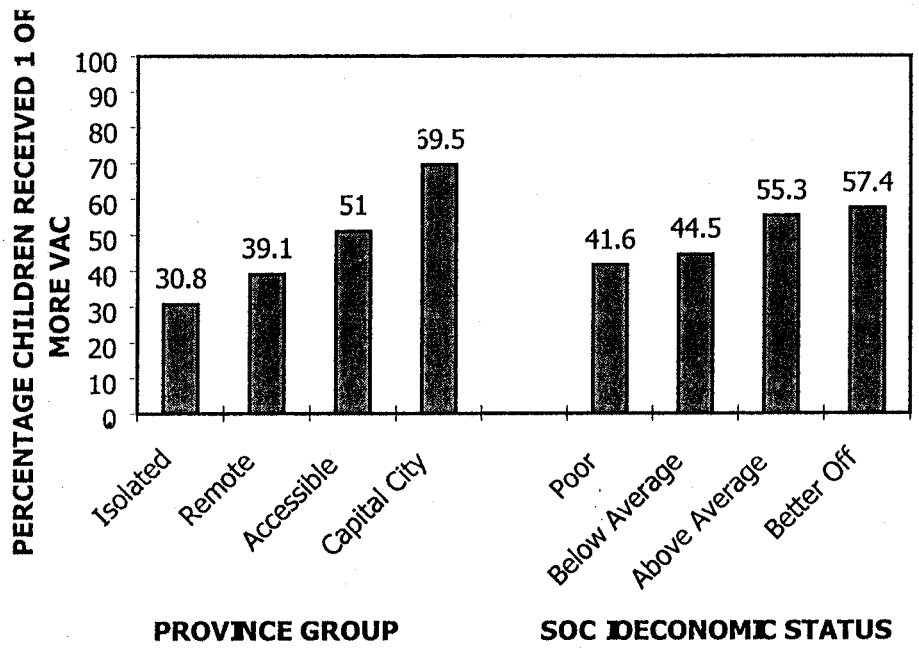
[1]Includes all provinces in the sample and the children of 17 blind women.
[2]The interviewer asked "did (NAME) receive a capsule of vitamin A like this during the last 12 months" and then showed the respondent a vitamin A capsule.

Overall, **less than half of Cambodian children under the age of five received a vitamin A capsule (VAC) in the twelve months prior to the survey, and most of those who did, received it only once.** VAC should be received every six months by children between the ages of 6 – 59 months of age in order to prevent vitamin A deficiency and reduce morbidity and mortality from a variety of infectious diseases (including ARI and diarrhea). Prophylactic administration of vitamin A to children in developing countries has been proven to confer a significant protective effect against mortality from those common diseases.

Receipt of VAC shows no relationship to the child's sex or birth order, but has a strong positive relationship to maternal education, literacy and socioeconomic status. There is also a strong relationship between VAC receipt and place of residence, identical to the pattern noted for immunization: coverage is far higher in the capital city than elsewhere, and especially low in remote and isolated rural provinces (see figure 6.5).

FIGURE 6.5

RECEIPT OF 1 OR MORE VAC BY PLACE OF RESIDENCE (CHILDREN UNDER 5 YEARS)



6.7 Prevalence and Treatment of Acute Respiratory Information

Acute respiratory infection is a significant cause of death among children under 5. In the survey, the mothers with children under 5 years were asked whether the child had been ill with a cough accompanied by fast breathing during two weeks before the survey.

6.9 Prevalence and Treatment of Acute Respiratory Infection: The percentage of children aged under 5 years who were ill with a cough accompanied by fast breathing during the 2 weeks before the survey, according to socioeconomic and demographic characteristics

Background Characteristics	% of Children With Cough accompanied by Fast Breathing	Number of Children	Among children with ARI % Taken to a Health Facility or Provider[1]	Number of Children with ARI
Child's Age				
0-5	25.9	445	27.8	115
6-11	29.2	339	29.4	99
12-23	22.7	804	31.5	183
24-35	21.1	788	34.9	166
36-47	16.6	916	35.8	152
48-59	16.0	996	24.1	160
Residence				
Urban	21.8	515	28.3	112
Rural	20.2	3,772	31.2	762
Sex				
Male	20.2	2,149	32.2	434
Female	20.6	2,139	29.5	440
Birth order				
1	20.9	859	35.6	180
2-3	18.7	1,632	28.0	306
4-5	21.8	947	29.9	206
6+	21.5	849	32.1	183
Project Areas				
CDCP	18.9	2,264	35.4	428
BHSP	20.9	1,633	28.5	341
Province Group				
Isolated	34.2	422	20.7	144
Remote	19.9	505	23.0	101
Accessible	18.4	3,120	32.3	575
Capital City	22.9	240	56.5	55
Socioeconomic status				
Poor	23.2	894	19.6	207
Below Average	22.4	1,668	29.3	374
Above Average	19.2	1,019	35.1	196
Better Off	13.9	705	52.0	98
Literacy				
Not at all	21.7	1,464	23.9	318
With difficulty	20.7	1,262	28.4	261
Easily	18.9	1,556	40.6	294
Years of Schooling				
0	20.4	1,310	23.9	267
1-3	21.7	1,374	28.6	505
4-6	20.9	991	37.8	505
7+	16.9	611	41.4	103
All Children[2]	20.4	4,288	30.9	874

[1]Includes the public and private medical sectors.
[2]Includes all the provinces in the sample and the children of 17 blind women.

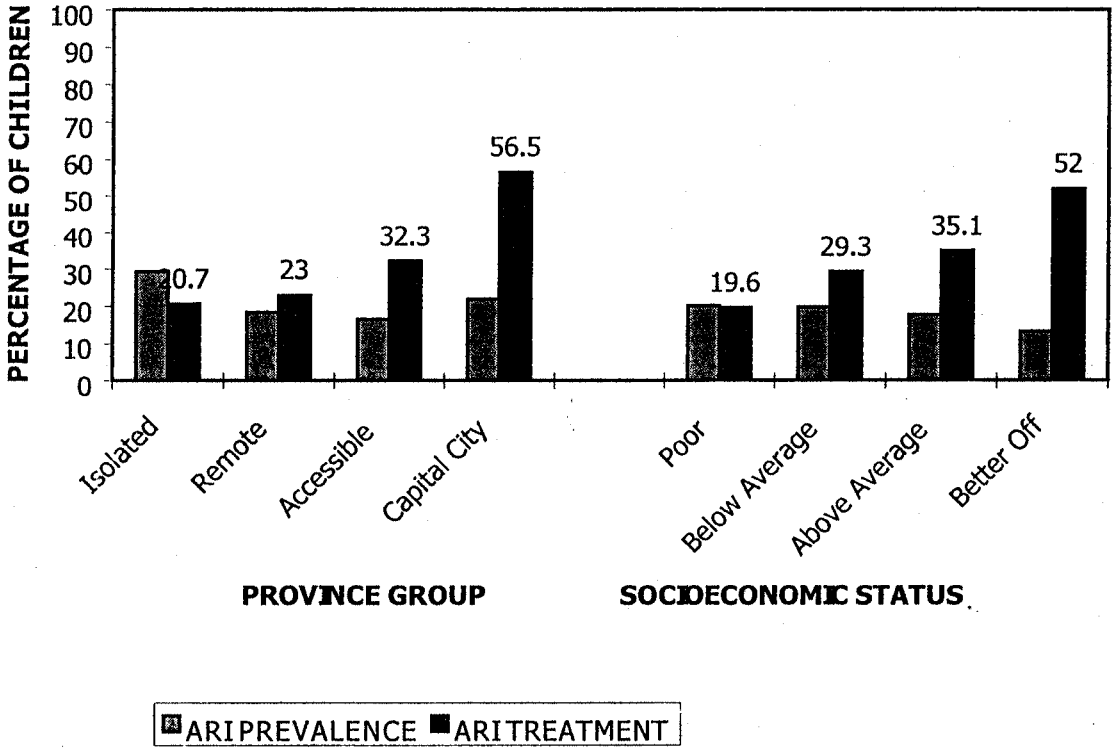
The **two-week prevalence for ARI**, defined as cough accompanied by fast breathing, is **20.4% for all children under age 5**.. It is highest in the youngest age groups: **for infants aged 0-5 months, over one quarter were reported to have had an ARI in the immediate two week period – an extremely high prevalence rate in a very vulnerable age group**. It should further be noted that this reflects prevalence in the

early rainy season which is not usually a peak time for ARIs; in Cambodia, ARIs are most common in the cool dry season. There is no significant difference in prevalence by sex or birth order , but an inverse relationship exits with socioeconomic indicators (SES, maternal education, and literacy).

Among children who had an ARI, 30.9% overall were taken to a health facility or provider. **But while prevalence of ARI shows only slight variation by background characteristics, treatment rates are strongly influenced by place of residence and socioeconomic status. Children with ARI are much more likely to be taken to a health facility or provider in the capital city and accessible rural areas than those in the remote and isolated**, probably due to greater accessibility of health care in those places. In addition, **children from poor families have much lower treatment rates for ARI than those from better off families**, suggesting that financial access to care is a significant barrier to treatment. (see figure 6. 6).

FIGURE 6.6

ARI PREVALENCE AND TREATMENT PATTERNS BY PROVINCE GROUP AND SOCIOECONOMIC STATUS



6.8 Prevalence of Diarrhea and Dysentery

Mothers with children under 5 years of age were asked if their children had had either watery diarrhea or dysentery (dysentery = "rrhea moul" a Khmer term indicating frequent stools with blood/mucus) at any time during two weeks before the survey.

As Table 6.10 shows., more than 1 out of 6 children were reported as having had watery diarrhea (17.3%) and more than 1 in 10 children as having had dysentery (11.4%) within the two week period before the survey.

It should be kept in mind that these are "off season" prevalence rates. They reflect conditions in the early rainy season (May – July, when field work was conducted) which is not the peak season for diarrheal illness. In Cambodia, both diarrhea and dysentery peak in the hot dry season (March – April) when water is scarce and flies increase. The prevalence of watery diarrhea shows little variation by background characteristics, except for the child' s age. Prevalence is highest in the age group of 6 to 35 months.

The same age trend is seen in the prevalence of dysentery. In addition, unlike watery diarrhea, dysentery prevalence shows a significant relationship to place of residence (province group) and socioeconomic indicators. Children in remote and isolated areas are more likely to suffer from dysentery than those in the capital city and accessible rural areas. Children of mothers with high socioeconomic status are less likely to be affected by the dysentery than those of poorer mothers.

Although the prevalence of diarrhea and dysentery in children under age 5 years peaks as expected between ages 6-35 months, it is noteworthy that very young infants – 0 to 5 months of age – had a two week prevalence of 15% for watery diarrhea and 6.7% for dysentery. Dysentery is not usually seen in children so young and, when it does occur in that age group, poses a very high mortality risk. These high rates in very young infants almost certainly reflect the lack of exclusive breastfeeding practice, as described in Chapter 7 to follow.

6.9 Knowledge of Oral Rehydration Solution

Questions about knowledge of oral rehydration solution (pre-packaged oral rehydration salts, commonly sold under the brand name Oralyte in Cambodia) were asked of all women of reproductive age. Results have been tabulated both for all respondents and respondents who are mothers of children under the age of five. As shown in Table 6.11, less than half of Cambodian women of reproductive age have heard of ORS. There is little difference in knowledge between all women of reproductive age and those who are mothers of children under five.

The level of knowledge about ORS is higher in urban vs. rural areas overall, and higher in the capital city and accessible provinces than in more remote and isolated areas. Knowledge of ORS has a strong relationship with maternal education and literacy. It is almost twice as high among educated mothers and women than for mothers and women with no education (Figure 6.7).

6.10 Diarrhea Prevalence: Percentage of children under 5 years of age with watery diarrhea and bloody diarrhea during the 2 weeks before the survey, according to socioeconomic and demographic characteristics

	Diarrhea in previous 2 weeks			Number of Children
	None	Watery Diarrhea	Dysentery	
Child's Age				
0-5	78.3	15.0	6.7	445
6-11	56.4	30.4	13.2	339
12-23	58.1	26.1	15.9	804
24-35	66.2	18.9	15.0	788
36-47	78.5	13.2	8.2	916
48-59	81.3	9.5	9.2	996
Sex				
Male	70.5	18.2	11.3	2,149
Female	72.0	16.5	11.5	2,139
Birth order				
1	72.1	16.3	11.6	859
2-3	72.1	17.2	10.7	1,632
4-5	71.0	17.4	11.7	947
6+	69.2	18.7	12.0	849
Residence				
Urban	74.2	15.5	10.2	515
Rural	70.9	17.6	11.5	3,772
Project Areas				
CDCP	72.9	16.7	10.5	2,264
BHSP	71.1	17.2	11.7	1,633
Province Group				
Isolated	59.0	22.1	18.9	422
Remote	69.0	19.4	11.6	505
Accessible	72.9	16.4	10.7	3,120
Capital City	76.9	16.7	6.5	240
Socioeconomic status				
Poor	67.4	17.7	14.9	894
Below Average	68.0	19.2	12.8	1,668
Above Average	74.4	15.7	9.9	1,019
Better Off	79.5	14.8	5.7	705
Literacy				
Not at all	69.5	17.3	13.1	1,464
With difficulty	68.6	18.9	12.5	1,262
Easily	75.3	16.0	8.7	1,556
Years of Schooling				
0	71.7	15.7	12.7	1,310
1-3	67.1	20.1	12.8	1,374
4-6	73.1	17.2	9.7	991
7+	76.8	15.1	8.1	611
All Children[1]	71.3	17.3	11.4	4,288

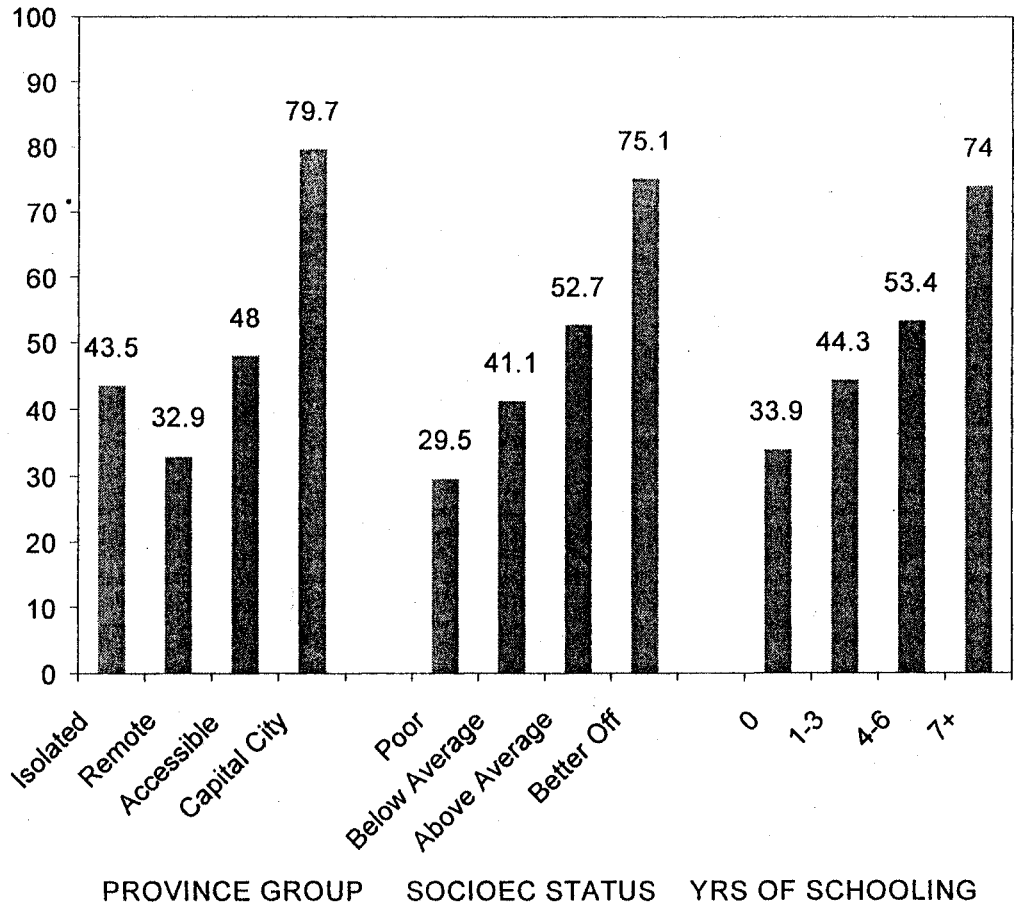
[1]Includes all the provinces in the sample and the children of 17 blind women.

6.11 Knowledge of Oralyte: Percentage of mothers who know about oralyte, according to demographic and background characteristics

	% Mothers Who Know about ORS Packets	Total No. of Mothers	% Women aged 15-49 years Who Know about ORS packets	Total No. of Women
Mother's Age				
15-19	48.5	114	44.4	1797
20-24	43.6	522	44.0	1015
25-29	45.5	894	47.9	1226
30-34	51.8	796	53.7	1113
35-39	45.0	589	51.7	1013
40-44	58.0	324	57.9	800
45-49	41.6	137	49.8	666
Residence				
Urban	65.1	408	66.9	1110
Rural	45.4	2968	46.1	6520
Project Areas				
CDCP	52.2	1746	54.5	3976
BHSP	42.6	1322	43.3	3101
Province Group				
Isolated	43.5	341	46.4	651
Remote	32.9	389	34.6	891
Accessible	48.0	2440	48.1	5456
Capital City	79.7	205	81.5	632
Socioeconomic status				
Poor	29.5	682	30.1	1279
Below Average	41.1	1257	39.0	2448
Above Average	52.7	826	50.3	2059
Better Off	75.1	610	74.4	1844
Literacy				
Not at all	32.9	1126	32.4	2380
With difficulty	45.3	975	45.3	2028
Easily	62.8	1270	63.9	3205
Years of Schooling				
0	33.9	999	32.2	2099
1-3	44.3	1094	46.2	2313
4-6	53.4	781	53.9	1915
7+	74.0	502	74.5	1303
All Women[1]	47.7	3376	49.1	7630

[1]Includes all the provinces in the sample and 17 blind women.

FIGURE 6.7: PERCENTAGE OF MOTHER'S WITH KNOWLEDGE OF ORS BY PROVINCE GROUP, SES AND EDUCATION



6.10 Treatment of Diarrhea and Dysentery

Table 6.12 examines in detail the treatment approaches that were adapted for children under five years who were reported to have experienced an episode of diarrhea or dysentery during the two-week period before the survey. This was a multiple-response question and row totals may exceed 100%, as children may have had more than one treatment type. The overall rate of children suffering from diarrhea or dysentery who were taken to a health facility or provider is 30.1%.

The total Oral Rehydration Therapy (ORT) treatment rate (defined as administration of either oral rehydration salts or recommended home solution) is 19.9% for watery diarrhea and 23.0% for dysentery. Most of these received the commercially prepared ORS packets; only 3.3% of children received the recommended home solution.

Although the ORT treatment rate is low, it is encouraging to note that 78% of children who had diarrhea or dysentery were given increased fluids (more fluids than the normal) during the episode. Fluids in this case could include breast milk, water, or any other liquid. This probably reflects the traditional Cambodian custom of demand feeding: infants and children are given as much breastfeeding and/or other liquids as they desire. In addition, Cambodian mothers traditionally tend to offer the breast more often to a sick or crying child, as a comfort measure.

68% of the children who had diarrhea or dysentery were given oral medicine, while 12% received injections and 4% received an intravenous fluid or medication. When diarrhea and dysentery are examined separately, there is little difference in the frequency of medication use. Children with simple watery diarrhea are just as likely to receive pills, injections or IVs as children with dysentery. Use of antibiotics and other medications for watery diarrhea is usually an unnecessary and potentially harmful practice.

Children in the capital city or accessible provinces were more than twice as likely to be taken to a health facility or provider than children in remote or isolated provinces (50.7% compared to 22.8 %).

Treatment by a health facility or provider, receipt of ORT (either ORS or RHS) and receipt of increased fluids all have a strong, positive relationship to maternal socioeconomic status, level of literacy, and years of schooling.

While these appropriate treatment patterns are more common among children of educated and/or higher socioeconomic class mothers, it is interesting to note that the same is true for the less desirable use of pills, injections and IVs, probably because they can more easily afford to obtain them.

Among poor and/or uneducated mothers, there is a greater tendency to give no treatment or a home/folk remedy only.

6.12 Diarrhea Treatment: Percentage children under five years of age who had diarrhea/dysentery in the past two weeks, by treatment received.

	Percent Taken to a Health Facility or Provider[1]	ORS packets	RHS	Either ORS or RHS	Increased Fluids[2]	Not Given ORS, RHS, or increased fluids	Pill or Liquid Medicine	Injection	I.V.	Home Remedy/Other	None[3]	Number of Children with Diarrhea
Child's Age												
0-5	24.7	15.6	2.3	17.9	52.7	39.2	58.6	6.7	2.2	1.3	21.5	97
6-11	36.0	24.3	3.6	26.2	79.3	17.8	68.7	12.7	3.3	8.1	3.8	148
12-23	36.0	22.4	3.5	25.1	82.4	13.0	75.1	16.0	5.3	8.4	3.0	337
24-35	25.6	19.6	3.2	21.8	79.5	15.9	66.7	10.5	3.4	8.0	7.6	267
36-47	30.6	16.2	3.4	19.0	79.4	18.3	64.7	9.7	3.5	10.3	5.4	197
48-59	23.4	10.6	3.4	12.9	80.6	17.7	62.6	9.5	3.1	10.7	6.5	186
Sex												
Male	30.7	20.0	3.4	22.0	80.2	16.8	67.3	12.4	4.1	8.7	5.6	633
Female	29.4	17.4	3.3	20.2	76.4	18.9	68.1	11.0	3.5	8.0	7.3	598
Birth order												
1	33.6	22.8	5.2	26.7	75.3	19.0	72.7	10.8	4.0	7.4	6.9	240
2-3	28.7	16.1	1.6	16.9	80.2	15.9	64.3	12.9	3.5	7.8	5.8	455
4-5	29.9	20.3	5.6	24.2	76.6	19.5	64.7	9.0	4.2	9.0	8.5	275
6+	29.4	17.9	2.3	20.2	79.8	18.2	72.1	13.2	3.7	9.5	5.1	261
Type of Diarrhea												
Watery Diarrhea	26.8	18.1	2.7	19.9	77.4	19.1	67.5	10.9	3.6	8.2	6.9	744
Dysentery	35.1	19.7	4.3	23.0	79.8	15.9	68.0	12.8	4.1	8.5	5.8	487
Residence												
Urban	25.5	24.4	1.4	25.8	72.8	24.4	63.7	8.7	5.0	5.8	13.3	133
Rural	30.6	18.0	3.6	20.6	79.0	17.0	68.2	12.1	3.6	8.7	5.6	1098
Province Group												
Isolated	22.8	14.7	1.8	16.1	62.4	32.2	53.8	10.2	7.3	7.9	11.7	173
Remote	22.7	9.7	.5	10.2	78.2	18.5	64.5	5.5	2.4	3.8	7.2	157
Accessible	31.6	19.4	4.4	22.5	81.3	15.2	71.3	13.2	3.0	9.5	5.3	846
Capital City	50.7	47.2	.0	47.2	83.3	11.0	63.9	11.3	9.2	5.6	5.5	56
Socioeconomic status												
Poor	25.6	13.9	2.6	14.9	78.8	19.5	58.3	11.2	3.1	9.2	7.8	292
Below Average	26.1	15.6	2.2	17.7	78.5	17.6	69.2	10.0	2.6	10.4	6.7	533
Above Average	32.1	17.4	5.7	21.6	80.9	16.0	69.3	14.2	4.7	7.5	5.8	261
Better Off	50.3	42.5	4.5	45.5	72.0	18.5	78.8	14.6	8.2	.7	4.1	144
Years of Schooling												
0	20.7	13.4	1.2	14.6	75.3	22.0	57.2	8.5	2.4	11.2	10.9	371
1-3	30.4	19.2	4.1	21.9	80.9	15.4	71.0	12.5	4.0	7.2	4.2	718
4-6	37.3	19.2	4.1	21.9	80.9	15.4	71.0	12.5	4.0	7.2	4.2	718
7+	39.9	30.5	5.2	34.5	73.2	19.1	78.3	15.8	6.1	6.6	6.3	142
All Children with diarrhea[4]	30.1	18.7	3.3	21.1	78.3	17.8	67.7	11.7	3.8	8.4	6.5	1231

[1]Includes provincial hospital, district hospital, government hospital in Phnom Penh, health center, khum nurse, other public medical, trained health worker, and other private medical.
[2]The child was given more fluids than normal during the diarrhea.
[3]The child was not given ORS, RHS, increased fluids, or any of the other medications.
[4]Includes all provinces in the sample and the children of 17 blind women.

CHAPTER 7

BREASTFEEDING AND FOOD SUPPLEMENTATION

7.1 Introduction

This chapter examines breast-feeding and food supplementation practices of Cambodian mothers. The description will be structured into: prevalence of breast-feeding, food supplementation, and duration of breast-feeding.

The pattern of infant breast-feeding has an important influence on the health of children. It has been shown that breast-feeding plays a crucial role in physical and mental development of the children. Feeding practices are the principal determinant of a young child' s nutritional status, and poor nutritional status has been shown to increase the risk of developing illnesses and death among children. Breast-feeding not only has an effect on the health of children but also on the mothers' fertility as well. More frequent breast-feeding for longer durations as well as delays in the age at which supplementary foods are introduced are associated with longer period of postpartum amenorrhea, and, thus longer birth intervals and consequently lower fertility. During the first 4 to 5 months of life, breast milk alone is adequate for an infant's nutritional needs and exclusive breast-feeding during that time provides significant protection against diarrhea, dysentery and other food/water borne diseases at an age when infants are highly vulnerable.

7.2 Initial breast-feeding

Breast feeding is almost universal in Cambodia: 96.6% of children born in the preceding 5 years before the survey were breast-fed (see Table 7.1).

The likelihood of breast-feeding does not vary significantly by the sex of the child, nor by urban/rural status. Even socioeconomic status shows only minimal variation (96.7% for the poorest vs. 94.3% for the best off socioeconomic groups). In fact, the prevalence of breast-feeding is around 95% for every subgroup examined with one sole exception: **Women who delivered their baby at a medical facility were less likely to breast-feed than those who delivered at home: 89.2% compared to 97.4%.**

It should be noted in this regard that, **despite official MOH policy to the contrary, many private hospitals and clinics continue to promote infant formula.** Currently this affects few women since the overwhelming majority deliver at home (see Chapter 6), but as access to and use of medical facilities for delivery increase, this could become a significant public health concern if uncorrected.

7.1 Initial Breast-feeding: Percent of all children who were ever breast-fed and who started breast-feeding within one hour and one day of birth, among children born in the five years before the survey, according to background characteristics

Background Characteristic	Percent Ever Breast-fed	Percent Started Breast-feeding Within 1 Hour of Birth	Percent Started Breast-feeding Within 1 Day	Number of Children
Sex				
Male	96.4	5.6	49.9	2401
Female	96.9	6.3	51.3	2352
Project Areas				
CDCP	96.5	6.0	50.4	2486
BHSP	97.1	5.7	53.0	1825
Province Group				
Isolated	95.5	6.7	40.8	492
Remote	97.7	5.6	48.6	548
Accessible	96.8	5.6	51.1	3461
Capital City	93.9	9.8	68.0	252
Socioeconomic status				
Poor	96.7	5.6	47.3	1026
Below Average	97.0	5.6	46.7	1878
Above Average	97.4	6.3	52.1	1108
Better Off	94.3	6.9	63.1	741
Literacy				
Not at all	96.4	5.4	45.1	1644
With difficulty	97.9	5.7	51.1	1397
Easily	95.8	6.7	55.6	1706
Years of Schooling				
0	96.8	5.4	44.1	1457
1-3	97.2	5.6	51.2	1541
4-6	96.4	6.1	52.7	1096
7+	95.3	7.8	60.4	659
Type of Delivery Assistance				
Medically Trained	94.7	6.9	56.5	1616
TBA	97.6	5.5	47.8	3124
Family/Other	93.4	.0	7.8	14
Place of Delivery				
Medical Facility	89.2	9.4	62.8	460
Non-medical facility	97.4	5.6	49.3	4292
Residence				
Urban	95.7	7.4	56.2	561
Rural	96.7	5.8	49.9	4193
All Children	96.6	6.0	50.6	4754

All Children includes all the provinces in the sample and the children of 17 blind women.

Although breast-feeding is nearly universal, its onset in Cambodia is typically delayed. As table 7.1 shows, **virtually no infants start breast-feeding within an hour of birth, and half do not begin even within the first day**.

An early start to breast-feeding is beneficial for a number of reasons. For the mother, early breast sucking by the child promotes the release of hormones which help the uterus to achieve a contracted state and thus reduces the risk of postpartum hemorrhage. For the child, the fluid (colostrum) secreted by the breast immediately after birth is an essential element enriched with maternal antibodies that protect children against certain infectious diseases. In the early stages of infancy, these natural antibodies are very important to prevent infection since the newborn's own immune system is immature.

However, in some places, lack of knowledge and cultural norms dictate against giving infants colostrum. In Cambodia, it is traditional practice to withhold the breast until the regular milk flow occurs and to give the infant sugar water in the interim. This means that **the infant is not only denied the protective effects of colostrum, but also unnecessarily exposed to pathogens through consumption of other fluid.**

This undesirable health practice shows a strong relationship with socioeconomic indicators and place of residence. The children of more educated, literate and/or higher socioeconomic status mothers have a higher proportion of onset of breast-feeding within the first day. Women in the capital city and accessible provinces, and in the urban strata overall, are more likely to start early breast-feeding than those who live in remote or isolated provinces.

Interestingly, while women who delivered in a medical facility had a lower percentage of breast-feeding , those who did breast-feed were more likely to do so early than those who delivered elsewhere. The same is true of those who had a medically trained assistant at delivery, regardless of place of delivery. In other words, those medical facilities and providers which do promote breast-feeding, seem to also promote its early onset.

7.3 Type of Breast-feeding and Introduction of Supplementary Liquids/foods

For children born in the five years prior to the survey the current breast-feeding status was ascertained. If the child was no longer being breast-fed, the mother was asked how long she had breast-fed before weaning. For children who were currently breast-fed, the mothers were asked if they had given various types of liquids or solids foods to the child within the last 24 hours.

Table 7.2 shows the frequency distribution of breast-feeding by age and by type of supplementation, if any. In this table, children are classified as exclusively breast-fed if they are given only breast milk. If plain water is also given, but no other foods or fluids, they are considered as fully breast-fed (= exclusive + plain water). Children who were given other liquids or solid or semi-solid foods are classified as supplemented breast-feeding.

7.2 Breast-feeding Status by Child's Age: Percent distribution of living children by breast-feeding status, according to child's age in months

Age in Months	Percent Among All Living Children						Number of Children
	Not Breast-feeding	Exclusively Breastfeeding	Breast-feeding and Plain Water Only	Breast-feeding and Other Liquids	Breast-feeding and Solid/Semi-Solid Foods	Total	
0-1	0.8	27.2	53.3	10.4	8.2	100.0	101
2-3	0.4	9.0	53.1	21.0	16.5	100.0	178
4-5	3.2	3.2	42.0	14.0	37.6	100.0	166
6-7	3.5	0.0	18.6	23.8	54.1	100.0	112
8-9	3.3	0.0	7.7	10.0	79.0	100.0	120
10-11	4.0	2.8	8.5	9.2	75.5	100.0	107
12-13	7.9	0.0	1.8	2.8	87.5	100.0	136
14-15	14.8	0.0	5.1	0.5	79.7	100.0	150
16-17	17.9	0.0	1.5	4.4	76.1	100.0	160
18-19	27.5	0.0	0.5	1.4	70.5	100.0	102
20-21	40.6	0.0	1.5	0.5	57.4	100.0	145
22-23	53.7	0.0	0.8	0.0	45.5	100.0	112
24-25	62.8	0.0	0.0	0.9	36.2	100.0	140
26-27	73.7	0.0	1.0	0.0	25.3	100.0	156
28-29	74.4	0.0	0.0	0.7	24.9	100.0	150
30-31	84.7	0.0	0.0	0.0	15.3	100.0	105
32-33	84.7	0.0	0.0	0.0	15.3	100.0	122
34-35	84.1	0.0	0.0	0.0	15.9	100.0	115
0-3 months	0.6	15.6	53.2	17.1	13.5	100.0	279
4-6 months	3.3	2.3	36.8	16.9	40.8	100.0	227
7-9 months	3.3	0.0	9.6	13.9	73.2	100.0	171
TOTAL							4288

Median Duration for all Children:	
Any Breast-feeding	21.6
Exclusive Breast-feeding	1.0
Full Breast-feeding	3.2

Mean Duration for all Children:	
Any Breast-feeding	23.5
Exclusive Breast-feeding	0.8
Full Breast-feeding	4.5

Note: Breast-feeding status refers to last 24 hours.
Median and mean based on current status

The median duration of breast-feeding is estimated at 21.6 months and the mean is 23.5 months. This duration is of sufficient length to provide positive birth-spacing effects and undoubtedly contributes to the favorable birth intervals noted in Chapter 8: Fertility.

However, the results shown in table 7.2 also indicate that most children in Cambodia are introduced to supplementary fluids and foods too early. **Among children aged 0 to 3 months** – an age group where breast milk is 100% sufficient for nutritional needs and other liquids/foods pose a threat of infection -- **only 15.6% are exclusively breast-fed.** The majority of children in this age group were receiving plain water as a supplement to the breast-feeding and about a third were also receiving other fluids or foods (see figure 7.1).

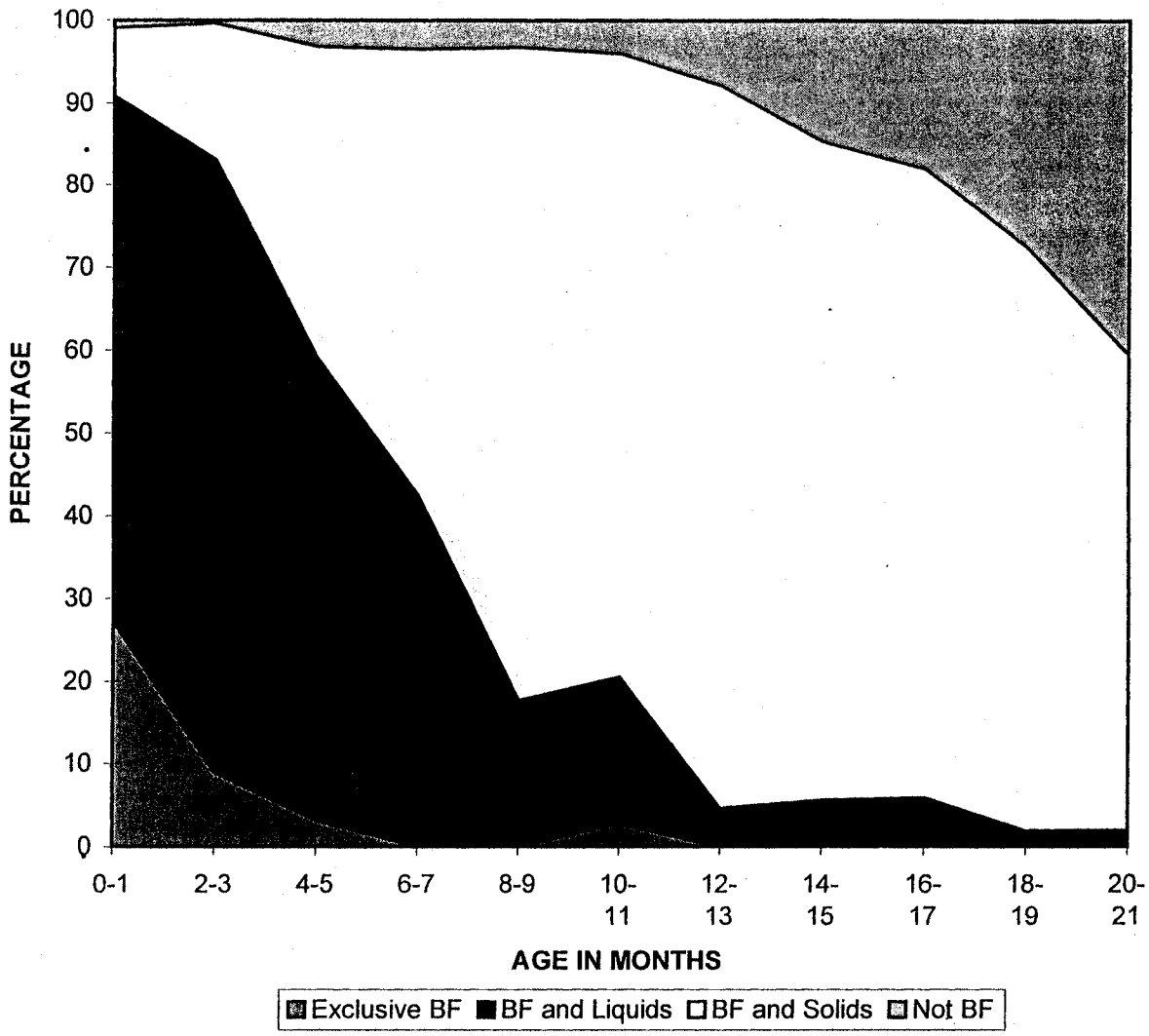
The response categories for this question listed "plain water" and "other liquids" as choices for recording a fluid given, but as sugar water is commonly given to young infants in Cambodia, it is likely that some of the "plain water" responses actually refer to water with dissolved sugar.

By the time the infants are 4-6 months, the pattern of infant feeding has changed dramatically, with over half receiving either other liquids and/or solid/semi-solid foods. Only 2.3% of infants aged 4-6 months are exclusively breast-fed. The percentage receiving solid or semi-solid food rises steadily with age, but **introduction of food supplementation to children aged 6 months and over is not as rapid and widespread as it should be to ensure adequate nutritional status.**

While breast milk alone is sufficient for the first few months of life, by the age of six months all infants have a nutritional need for solid or semi-solid food in addition to breast milk. However, **over one-third of Cambodian children aged 6-7 months do not receive any solid or semi-solid foods at all. Even at age one year, about 15% of children are not receiving solid/semi-solid food supplementation**.

FIGURE 7.1:

BREAST-FEEDING AND FOOD SUPPLEMENTATION PATTERNS



In summary, there are serious problems with the current patterns of both breast-feeding and introduction of food supplementation for Cambodian infants:

- **Lack of early onset of breast-feeding deprives infants of the protective effects of colostrum, and deprives mothers of the positive health effects of post-partum lactation;**

- **Non-exclusivity of breast-feeding with premature exposure to other liquids and foods puts young infants at avoidable risk for diarrhea, dysentery and other water or food borne illnesses, and quite likely accounts for the unusually high prevalence of these diseases in young infants in Cambodia as shown in Chapter 6.**

- **A significant percentage of infants over the age of six months are at risk of malnutrition due to delayed onset of food supplementation at an age when breast milk is no longer sufficient for all the infant's nutritional needs.**

There is an **urgent need to educate Cambodian mothers about the need to start breast-feeding immediately after birth, maintain exclusive breast-feeding in the first few months of life, and then introduce solid/semi-solid food supplementation at an appropriate age (6-7 months).**

CHAPTER 8

FERTILITY

8.1 Introduction

The NHS collected a birth summary and a birth history. In the birth summary each woman was asked the number of her sons and daughters currently living with her, the number living elsewhere, and the number who had died. Each woman was also asked about all pregnancies that did not end in live births.

In the birth history a complete history of each woman's live births was obtained. Data were collected on the sex, the Gregorian month and year of birth, the Khmer month and year of birth, and whether the child was still alive. For living children, mothers were also asked about each child's current age and whether the child lived with her. For dead children, mothers were asked about each child's age at death, the Gregorian date of death, and the Khmer date of death. In addition to the information in the birth summary and the birth history, information was collected on whether women were pregnant at the time of the interview.

The fertility estimates in this chapter were calculated using the information gathered in the birth history. The reliability of these fertility estimates depends on the completeness with which births are reported and the extent to which birth dates are accurately reported. Underreporting of births directly affects fertility estimates, and misreporting of birth dates can affect the accuracy of fertility trends over time. A particularly important concern is the omission of live births, especially the omission of children not living with their mothers and children who died soon (a few hours or days) after birth. Respondents may not report the birth of a child who died soon after birth or they may report this live birth as a stillbirth (stillbirths are not included in the measurement of fertility). In an effort to avoid these problems, two things were done: (1) wherever a gap of two or more years existed between reported births, the interviewers probed to make sure there had not been a birth in that interval which the woman forgot to mention; and (2) information was collected on pregnancies that did not end in live births. If a respondent reported a pregnancy that did not end in a live birth, additional questions were asked to determine whether this pregnancy was ended by a stillbirth, a miscarriage or abortion, or a live birth which died soon after birth. In this last case, interviewers were instructed to correct the information previously collected and to record this birth as a live birth.

A number of indicators that can be used to assess the quality of the NHS fertility data are presented in Appendix C. There is no evidence of any major omission of births. However, there are fewer than expected reported births in the year 1993 and greater than expected reported births in 1992, suggesting that some births occurring on 1993 were misreported as occurring in 1992. Births occurring in 1993 were subject to additional questions about child health while births occurring in 1992 or earlier were not, so interviewers may have been biased to record birth dates in 1992 rather than 1993. A similar tendency has been noted in the data from similar surveys in other countries as well. As a result of this misreporting, the level of fertility for the period 0 to 4 years before the survey is likely to be slightly underestimated

while the level of fertility for the previous period (5 to 9 years before the survey) would be slightly overestimated. This problem has been dealt with by basing current fertility estimates on the three year period before the survey (a period covering approximately the years 1995 to 1998).

8.2 Current Fertility Levels

The measures of current fertility presented in this chapter include the total fertility rate, age-specific fertility rates, the general fertility rate, and the crude birth rate.

Age specific fertility rates are the current frequency of births per year per 1,000 women of a specific age group.

The *total fertility rate (TFR)* is the number of children a woman would have by the end of her childbearing years if she were to pass through those years bearing children at the currently observed age-specific rates. The TFR is calculated by summing the age-specific fertility rates, which are first multiplied by 5 (since they are calculated for five-year age groups).

The *general fertility rate (GFR)* represents the annual number of births in a population per 1,000 women age 15-44.

The *crude birth rate (CBR)* is the annual number of births in a population per 1,000 persons.

8.1 Current Fertility: Age-specific and cumulative fertility rates and crude birth rate for the three years preceding the survey, by urban-rural residence (1995 – 1998)

Age Group	Residence		Total
	Urban	Rural	
15-19	41	46	45
20-24	146	203	196
25-29	175	216	210
30-34	147	183	178
35-39	101	125	121
40-44	43	60	57
45-49	10	16	15
Total Fertility Rate	3.31	4.25	4.11
General Fertility Rate	108	138	133
Crude Birth Rate	25	29	29

Age Specific Fertility Rates are expressed per 1,000 women

TFR: Total Fertility Rate for ages 15-49 expressed per woman.

GFR: General Fertility Rate (Births/Number of Women 15-44), expressed per 1,000 women.

CBR: Crude Birth Rate, expressed per 1,000 population.

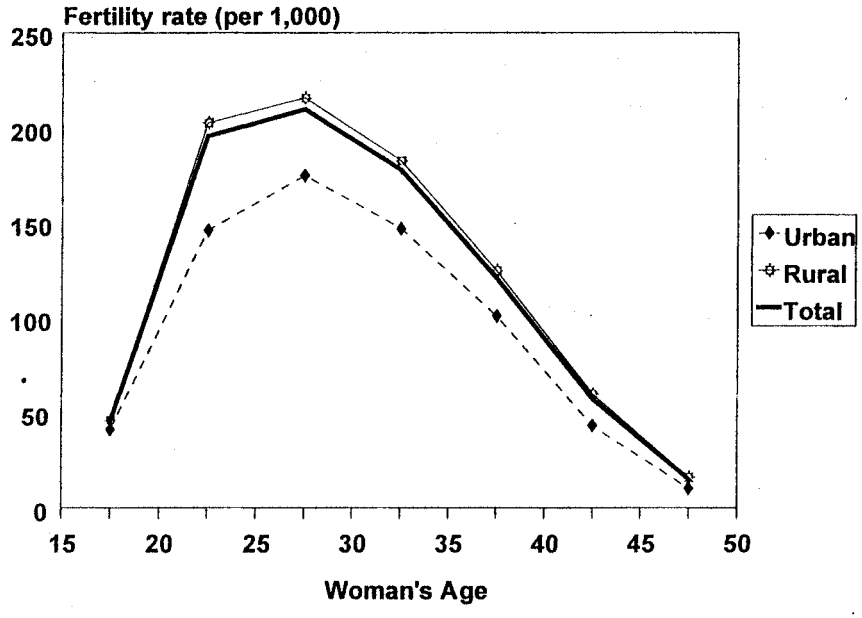
Note: Rates for the period 1-36 months before interview. Rates for the age group 45-49 might be slightly biased due to truncation.

The total fertility rate shown in the table indicates that, **if fertility rates were to remain at the levels prevailing during the period 1995-1998, a Cambodian woman would bear 4.1 children during her lifetime. In urban areas, the TFR is 3.3 births per woman, one child lower than the rate in rural areas (4.3 births per woman).**

For the period 1995-98, the crude birth rate was 29 births per thousand members of the population. Due to differences in fertility levels as well as differences in age and sex population structures, there are substantial differences by residence in both rates. The **lowest rates are found in urban Cambodia, where the CBR is 25 births per thousand population. By contrast, in rural areas where the rates are highest, the CBR was estimated to be 29 births per thousand population.** It should be remembered that crude birth rates reflect birth age specific fertility rates and the number of women in the reproductive age groups. As noted in Chapter 2, there is an unusual gap in the age group 20-24 years due to lower fertility and higher infant/child mortality during the Khmer Rouge regime. This contributes to a lower CBR than would otherwise be the case.

The average Cambodian woman begins childbearing around the age of 20 (see section 8.6) and will give birth to 1.2 children by age 25 and 2.3 children by age 30. Fertility rates peak in the age group 25 – 29 years and then decrease slowly but steadily thereafter. Although, as mentioned above, the number of children born is higher among rural women, the age pattern of childbearing is essentially the same in both rural and urban areas:

Figure 8.1
Age Specific Fertility Rates



Note: Rates for the three year period preceding the survey

8.3 Fertility Differentials and Trends

Table 8.2 shows the total fertility rate, the percentage of women currently pregnant, and the mean number of children ever born to women age 40-49 by selected background characteristics. The mean number of children ever born (CEB) to older women who are nearing the end of their reproductive period can be compared to the current Total Fertility Rate to assess changes in fertility over the past 20 to 25 years. If fertility has remained stable over time the TFR and the mean CEB will be equal or similar.

The results in Table 8.2 suggest that **there has been a substantial decline in fertility during the past several decades.** Women age 40-49 have had an average of 5.0 births, almost one births more than the current fertility level. However, women currently aged 40-49 years were about 15-29 years old at the time of the Khmer Rouge rule when fertility was assumed to be extremely low. The same women were about 20-34 years old in the early 1980s when a "baby boom" occurred following the end of Khmer Rouge rule. Therefore, women currently 40-49 years old experienced highly variable fertility during their reproductive life and caution should be used when interpreting the mean Children Ever Born (CEB).

8.2 Fertility by Background Characteristics: Total fertility rate for the three years preceding the survey, percentage currently pregnant, and mean number of children ever born to women 40-49 years of age, by selected background characteristics.

Background Characteristic	Total Fertility Rate[1]	Percent Currently Pregnant	Mean Number of Children Ever Born to Women Age 40-49 Years
Residence			
Urban	3.31	5.2	4.35
Rural	4.25	6.5	5.14
Socioeconomic Status			
Poor	5.18	8.1	4.69
Below Average	4.89	8.0	5.18
Above Average	3.62	5.7	5.36
Better Off	2.71	3.4	4.64
Literacy			
Easily	3.48	5.1	4.53
With Difficulty	4.60	7.0	5.21
Not at all	4.40	7.3	5.25
Total[2]	4.11	6.3	5.02

[1]Rate for women age 15-49 year.

[2]Includes all Provinces in the sample and 17 blind women.

Bearing the necessary caution in mind, both current fertility (TFR) and cumulative fertility (mean CEB) vary with urban-rural residence. **The decline in fertility implied by the difference between current and completed fertility has been greater in urban areas than in rural areas; in urban Cambodia the TFR (3.3) is 1.1 births lower than the mean number of children ever born to women 40-49 (4.4). It has also been greater among women of higher socioeconomic status.** Among the highest socioeconomic group, the TFR (2.7) is 1.9 births lower than the mean number of children ever born to women 40-49 (4.6).

Differences according to the woman's literacy are also marked. Women who can easily read a simple sentence will have, on the whole, one less child than those who are illiterate or partially literate. TFR for illiterate women is 0.9 birth higher than the rate for women who can read easily (4.4 births and 3.5 births per woman, respectively). The differentials in completed fertility among educational groups are smaller.

All of these differentials in fertility parallel those seen in contraceptive use as described in Chapter 9: Birth Spacing.

Another indicator of current fertility, the percentage of women who are currently pregnant, is included in Table 8.2. Overall, 6 percent of NHS respondents were pregnant at the time of the survey, a percentage that is consistent with the current fertility level. This percentage varies by urban-rural residence, socioeconomic status, and literacy. The percentage of pregnant women is higher in poor households (8.1%; the highest percentage in any group) than in the best off households (3.4%). It is also higher in rural area (6.5%) than in urban areas (5.7%), and higher for illiterate women (7.3%) than for women who read with easily (5.1 %).

Table 8.4 presents the trend in age-specific fertility rates for successive five-year periods, using data from the NHS birth history. The rates shown in brackets in table 8.4 are truncated; they do not include the fertility experience of women who were of childbearing age during the period for which the rates are calculated, but who were age 50 and older at the time of the NHS and, thus, not interviewed. The last age-specific fertility rate estimated for each period preceding the survey is truncated so these rates are unreliable and should be interpreted with caution.

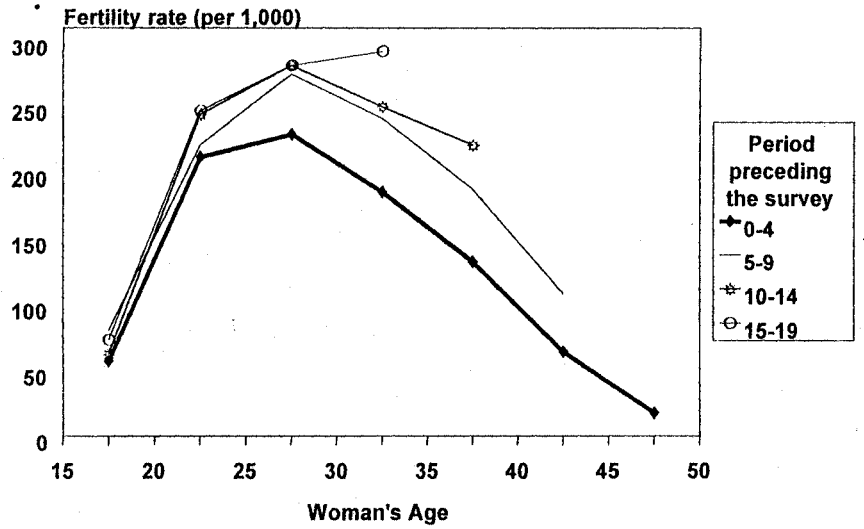
8.3 Fertility Trends: Age-specific fertility rates for five-year periods preceding the survey

	Years Preceding the Survey			
Maternal Age At Birth	0-4	5-9	10-14	15-19
15-19	57	80	62	73
20-24	211	220	243	246
25-29	228	274	281	281
30-34	185	240	249	[292]
35-39	132	187	[220]	
40-44	64	[108]		
45-49	[17]			

Note: Age-specific fertility rates per 1,000 women

Table 8.4 shows a **decline in fertility among all age groups**. Figure 8.3 illustrates this decline, and makes clear that **the decline has been recent and predominantly in the 25-29, 30-34 and 35-39 age groups.**

Figure 8.2
Age Specific Fertility Rates for Five Years Periods Preceding the Survey



The cumulative fertility rate for women age 15-34 decreased from 4.5 births per woman during the period 15-19 years before the survey (the period immediately following the Khmer Rouge regime) to 4.2 and 4.1 births per woman during the periods 1983-1988 and 1988-1993 respectively. The cumulative fertility rate for women age 15-34 for the current period (1995- 1998) is 3.4 births per woman, a sharp decline from the 4.1 births per woman for the previous period.

Data collected in 1994-95 (KAP Survey on Fertility and Contraception in Cambodia) found a TFR of 4.90 for women aged 15-44 years. Due to security constraints at the time, that survey was conducted in only ten Provinces and thus was not nationally representative; it was also limited to currently married women with the level of general fertility indirectly estimated from the fertility of these women (Chhun L., and al., 1995). The NHS on the other hand estimated fertility directly, so the estimates are not completely comparable. Nonetheless, the earlier survey's findings reinforce the idea that **there has been a very recent and significant decrease in fertility in Cambodia.**

As the subsequent chapter will show, **there has also been a dramatic increase in use of contraception during this same interval. This is the primary reason for the fertility decline**. Age at first birth has not declined (see section 8.6 to follow). Breast-feeding, which is nearly universal in Cambodia, undoubtedly makes a substantial contribution to birth-spacing, but this is not a new factor and thus cannot account for the recent change.

8.4 Children Ever Born and Living

Table 8.4 presents the distribution of all women and currently married women by the number of children they have had. Since the data represent the accumulation of births over time it is not representative of the current fertility situation in Cambodia.

The number of children women have increases with age, reflecting the natural family building process. The level of fertility among teenagers is low: only 6 percent of women age 15-19 have had a child. The past high fertility of Cambodian women can be seen from the relatively large proportion of women age 45-49 who have had 10 or more children (7 percent). Since voluntary childlessness is virtually nonexistent, the proportion of women who are childless at age 40 or above can be taken as evidence of infertility, which appears to be infrequent: only 2 percent of currently married women over the age of 40 have never given birth.

The last two columns of Table 8.4 show the average number of children ever born and the average number of children who are still living by mother's age. The mean number of children ever born is 5.2 for women at the end of their reproductive life (age 45-49). Differences in the mean number of children born and living are small in the younger ages, but they become more noticeable after the age group 25-29. Women age 45-49 have given birth to an average of 5.2 children, of whom 4.4 survived.

8.4 Children Ever Born and Living: Percent distribution of all woman and currently married women by number of children ever born and mean number ever born and living according to age group

Age	Children Ever Born (CEB)											Total Percent	Number of Women	Mean CEB	Mean Living Children
	0	1	2	3	4	5	6	7	8	9	10+				
All Women															
15-19	93.6	5.6	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	1797	0.07	0.06
20-24	47.2	24.3	19.4	7.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	100.0	1015	0.92	0.83
25-29	20.4	18.2	28.2	18.8	10.7	2.6	1.1	0.1	0.0	0.0	0.0	100.0	1226	1.94	1.76
30-34	12.1	6.4	17.2	19.8	17.7	14.8	7.4	3.9	0.5	0.2	0.0	100.0	1113	3.22	2.89
35-39	8.4	5.6	9.4	11.1	17.7	16.9	12.9	8.6	5.4	2.7	1.3	100.0	1013	4.31	3.80
40-44	7.8	5.5	7.7	9.3	12.9	14.7	13.9	11.4	6.8	4.5	5.4	100.0	800	4.89	4.26
45-49	5.0	5.1	8.4	10.5	13.7	14.4	11.6	9.0	9.2	6.2	6.8	100.0	666	5.17	4.40
All ages	35.7	10.2	12.6	10.3	9.4	7.6	5.4	3.7	2.3	1.4	1.3	100.0	7630	2.46	2.17
Currently Married Women															
15-19	56.9	37.8	4.9	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	245	0.49	0.43
20-24	15.5	36.9	32.5	13.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	100.0	593	1.49	1.36
25-29	4.9	18.9	35.0	22.7	13.6	3.4	1.5	0.1	0.0	0.0	0.0	100.0	950	2.38	2.15
30-34	2.1	4.5	18.5	22.1	20.4	17.7	9.0	4.7	0.7	0.2	0.0	100.0	901	3.73	3.35
35-39	2.3	3.2	7.9	12.2	19.4	18.9	14.7	10.1	6.3	3.3	1.6	100.0	821	4.83	4.25
40-44	2.4	2.5	7.0	8.9	13.8	16.1	15.7	13.2	8.5	5.3	6.5	100.0	631	5.50	4.81
45-49	1.2	2.2	5.2	9.7	13.7	16.1	13.6	10.7	11.8	7.1	8.6	100.0	482	5.86	5.04
All ages	7.3	12.6	18.1	15.1	13.8	11.4	8.2	5.7	3.6	2.1	2.1	100.0	4623	3.65	3.23

8.5 Birth Intervals

A child's health status is closely related to the length of the preceding birth interval. Children born after a short birth interval are at greater risk of illness and death than those born after a long birth interval. Closely spaced births give a mother insufficient time to restore her health, which may limit her ability to take care of her children. The duration of breastfeeding for the previous child may also be shortened if her/his mother becomes pregnant.

Table 8.5 shows the percent distribution of second and subsequent births in the five years preceding the survey by length of the previous birth interval. Overall, birth intervals are relatively long. Around one-fifth occurred four or more years after a previous birth, and three-quarters occurred at least two years after a prior birth.

The **median birth interval was 32.0 months**. Younger women have shorter birth intervals than older women. The median interval varies from 23.4 months among women age 15-19 to 38.1 months among women age 40 and older. For children whose preceding sibling is dead, the median interval between births is 9 months shorter than for children whose preceding sibling is still alive (24 months and 33 months, respectively). Birth intervals do not vary much with the child's birth order or sex, but there are residential differentials in birth interval length. The median birth interval in urban areas is 30.0 months compared with 32.0 months in rural areas. Additionally, birth intervals are longer in the Capital City (34.0) than they are in the other Province Groups. There are only small differences birth interval length by mother's years of schooling and literacy.

The very high prevalence of breastfeeding (see Chapter 7) undoubtedly contributes to this favorable spacing of births.

Although the majority are appropriately spaced, 24 percent of second order and higher births are born too soon (i.e., less than 24 months) after a prior birth.

8.5 Birth Intervals: Percent distribution of births in the five years before the survey by interval since previous birth by demographic and background characteristics

	Months Since Previous Birth					Total Percent	Median Months Since Previous Birth	Number of Births
	7-17	18-23	24-35	36-47	48+			
Mother's Age at Birth								
15-19	27.1	23.0	42.8	5.3	1.7	100.0	23.4	101
20-29	9.1	17.4	40.4	19.9	13.2	100.0	29.0	2137
30-39	7.0	14.0	32.2	21.5	25.3	100.0	34.0	1699
40+	6.7	8.8	25.6	23.2	35.8	100.0	38.1	281
Birth order								
2-3	8.2	16.1	35.7	19.7	20.3	100.0	31.0	1956
4-6	7.6	14.0	38.0	20.2	20.2	100.0	32.0	1569
7+	11.6	17.6	33.2	23.0	14.6	100.0	30.0	693
Sex of Prior Birth								
Male	9.2	15.1	34.4	21.6	19.7	100.0	32.0	2193
Female	7.8	16.0	38.1	19.1	18.9	100.0	31.0	2025
Survival Status								
Alive	5.9	15.3	37.0	21.3	20.6	100.0	33.0	3729
Dead	28.8	18.0	29.9	13.4	9.9	100.0	24.0	489
Residence								
Urban	7.8	19.4	33.5	18.6	20.7	100.0	30.0	490
Rural	8.6	15.1	36.5	20.6	19.1	100.0	32.0	3728
Province Group								
Isolated	7.3	16.2	37.3	20.4	18.8	100.0	31.0	452
Remote	7.3	15.8	37.9	19.0	20.1	100.0	31.7	493
Accessible	9.2	15.5	35.8	20.6	18.9	100.0	31.0	3078
Capital City	3.7	14.9	35.1	20.8	25.5	100.0	34.0	195
Socioeconomic status								
Poor	9.2	15.8	38.2	18.5	18.3	100.0	31.0	920
Below Average	10.9	16.0	35.9	20.0	17.3	100.0	30.0	1680
Above Average	6.0	15.4	36.7	22.9	19.0	100.0	32.0	1022
Better Off	5.3	14.2	33.0	20.4	27.1	100.0	34.0	594
Years of Schooling								
0	8.4	15.7	37.2	19.3	19.4	100.0	31.0	1388
1-3	9.0	14.2	35.1	21.9	19.9	100.0	32.0	1454
4-6	8.4	17.9	36.5	20.3	16.9	100.0	31.0	907
7+	7.7	15.1	35.6	19.2	22.3	100.0	32.0	469
Literacy								
Not at all	8.9	15.3	37.6	19.9	18.4	100.0	31.0	1555
With difficulty	7.7	15.3	35.0	22.5	19.6	100.0	32.5	1276
Easily	8.9	16.1	35.6	19.1	20.3	100.0	31.0	1377
Total[1]	8.5	15.6	36.2	20.4	19.3	100.0	32.0	4218

Note: First order births are excluded. The interval for multiple births is the number of months since the preceding pregnancy that ended in a live birth.

[1]Includes all provinces in the sample and the births of 17 blind women.

8.6 Age at First Birth and Teenage Pregnancy/Motherhood

Table 8.6 presents the median age at first birth for different subgroups and examines the trend by age within these subgroups. This is presented only for ages 25 and over because less than half the women in the younger age groups have already had a birth.

8.6 Age at First Birth by Background Characteristics: Median age at first birth among women aged 25-49 years, by current age and selected background characteristics

Background Characteristic	Current Age					Ages 25-49
	25-29[a]	30-34	35-39	40-44	45-49	
Residence						
Urban	21.4	22.1	22.3	23.5	23.9	22.3
Rural	21.1	21.3	21.2	22.8	21.8	21.6
Province Group						
Isolated	20.2	21.1	21.1	21.9	21.9	21.2
Remote	21.1	21.9	21.5	22.8	22.8	21.8
Accessible	21.2	21.4	21.3	23.0	21.7	21.7
Capital City	21.9	22.0	22.4	23.8	25.8	22.6
Socioeconomic status						
Poor	21.1	21.1	22.0	23.4	22.2	21.8
Below Average	21.4	21.9	21.6	23.0	22.0	21.9
Above Average	20.8	21.5	20.8	22.8	21.2	21.2
Better Off	21.2	21.0	21.8	22.6	23.0	21.9
Literacy						
Not at all	21.0	20.9	21.2	22.8	21.9	21.5
With difficulty	21.0	21.6	21.2	23.0	21.5	21.7
Easily	21.3	22.0	21.8	22.9	22.8	22.0
Years of Schooling						
0	21.1	20.8	21.2	22.8	22.0	21.5
1-3	21.0	21.1	21.1	22.9	21.3	21.4
4-6	21.1	21.8	22.1	22.9	22.3	21.8
7+	21.6	23.2	22.1	24.1	24.4	22.3
All women[1]	21.2	21.5	21.3	22.9	22.0	21.8

[a] Cohorts for which less than 50 percent of women had had a birth by the first age in the cohort are excluded.

[1] Includes all the Provinces in the sample and the births of 17 blind women.

There are slight differences in the ages at which women have their first child. Overall, the median age at first birth is 21.8 years. Urban women start childbearing nearly one year later than their rural counterparts (median of 22.3 and 21.6 respectively). On average, women in Phnom Penh have their first birth 1.4 years later than women in isolated provinces, and almost a year later than women in other rural Provinces. Both years of schooling and literacy suggest that as education increases so does age at first birth.

Teenage fertility is of social and health concern because teenage mothers and their children are at higher risk of illness and death. As table 8.7 shows, 9 percent of teenagers in Cambodia have begun childbearing, with 6 percent having already given birth and 3 percent pregnant with their first child. Most of these are older teenagers: the proportion of girls who have begun childbearing rises from less than one percent among 15 year-olds to 6 percent among 17 year-olds and finally to 26 percent among 19 year-olds.

8.7 Adolescent Fertility: Percentage of teenagers 15-19 who are mothers or pregnant with their first child, by background characteristics

Background Characteristic	Percent who are Mothers	Percent who are Pregnant with First Child	Percent who have Begun Childbearing	Number of Teenagers
Age				
15	0.6	0.2	0.7	306
16	1.8	1.9	3.7	450
17	2.9	3.2	6.2	383
18	11.1	3.0	14.1	377
19	18.4	7.9	26.3	280
Residence				
Urban	5.0	2.6	7.6	278
Rural	6.6	3.1	9.7	1518
Project Areas				
CDCP	6.5	2.1	8.6	989
BHSP	6.5	4.4	10.9	704
Province Group				
Isolated	5.7	1.7	7.4	131
Remote	4.2	0.7	4.9	221
Accessible	7.2	3.8	11.0	1282
Capital City	3.2	1.9	5.0	163
Socioeconomic status				
Poor	7.5	3.8	11.3	257
Below Average	5.9	2.2	8.1	516
Above Average	5.8	3.3	9.1	522
Better Off	6.8	3.3	10.1	502
Literacy				
Not at all	6.8	5.0	11.8	417
With difficulty	7.1	2.1	9.2	431
Easily	5.9	2.6	8.5	948
Years of Schooling				
0	7.3	5.0	12.3	354
1-3	4.5	2.9	7.4	414
4-6	7.3	2.7	10.0	608
7+	6.0	2.1	8.1	421
Total[1]	6.4	3.1	9.4	1797

[1] Includes all provinces in the sample.

There are slight residential differences in the level of teenage childbearing. The level of teenage fertility is higher in rural areas (10 percent) than in urban areas (8 percent). By Province group, the accessible provinces have the highest level of teenage childbearing (11 percent), while Phnom Penh and the remote provinces have the lowest (5 percent). The level of teenage fertility is also associated with woman's years of schooling and literacy. The highest levels are observed for women who are illiterate and those who have no schooling (12 percent)

8.7 High-risk Fertility

Research has shown that there is a strong relationship between fertility patterns and child mortality. Children are more likely to die in early childhood if they are born to mothers who are too young or too old, if they are born after too short a birth interval, or if they are of too high a birth order. For purposes of the analysis which follows, a mother is classified as "too young" if she is less than 18 years of age and "too old" if she is over 34 years at the time of the birth. A "short birth interval" is defined as a birth occurring less than 24 months after the preceding birth. A child whose mother has given birth previously to three or more children (i.e., the child is of birth order four or higher) is considered of "high birth order."

Table 8.8 presents the distributions of births in the five year period before the survey and of currently married women according to these risk factors. The table also examines the relative risk of dying for children by comparing the proportion dead in each high-risk category with the proportion dead among children not in any high-risk category.

One risk group is considered separately from the rest because it is considered to be an unavoidable risk: first order births to women aged between 18 and 34 years.

The data presented in the first two columns of table 8.8 address the issue of high-risk fertility for children. The table shows that **32 percent of the births in the five-year period before the survey were in at least one of the high-risk categories,** and 23.percent faced two or more risk factors. **A short birth interval and high birth order were the most common risk factors.**

Considering the risk ratios in the second column, **the risk of dying for a child in any of the avoidable risk categories is 1.4 times the risk for children not in any of the risk categories. Among the single risk categories, young age of the mother at birth and short birth intervals placed children at the highest risk.** Children born to mothers less than 18 years of age were 1.5 times as likely to die as children without any risk factor; children born less than 24 months after a preceding birth were 1.2 times as likely to die as children without any risk factor.

8.8 High-Risk Fertility : Percent of children born in the last 5 years at elevated risk of mortality and percent of currently married women at risk of conceiving a child with an elevated risk of mortality

Risk Category	Births in Last 5 Years		% Currently Married Women[1]
	Percent of Births	Risk Ratio	
Not in any risk category	26.5	1.00	25.5
Unavoidable risk category			
First order births between ages 18 and 34 years	18.0	1.09	5.7
Single risk categories			
Age under 18 years at birth	2.3	(1.45)	0.7
Age over 34 years at birth	1.8	(0.97)	9.0
Birth interval under 24 months	8.5	1.24	11.9
Birth order 4 or higher	19.8	1.04	7.9
Subtotal	32.3	1.12	29.5
Multiple risk categories			
Age < 18 yrs and Birth Interval < 24 mos[2]	0.2	*	0.2
Age > 34 yrs and Birth Interval < 24 mos	0.2	*	0.4
Age > 34 yrs and Birth Order > 3	12.6	1.32	29.0
Birth Interval I < 24 mos and Birth Order > 3	7.3	2.03	4.8
Age > 34 yrs and Birth Interval < 24 mos and Birth Order > 3	2.9	(2.34)	4.8
Subtotal	23.2	1.67	39.2
In any avoidable risk category	55.6	1.35	68.7
Total	100.0	NA	100.0
Number	5,313	NA	4,623

Risk Ratio: Ratio of proportion dead of births in last 5 years in each category of risk to the proportion dead of births in the category of "not in any risk".

[1]Women are placed into the categories according to the status they would have at the birth of a child if they were to conceive at the current time: current age less than 17 years and 3 months or older than 34 years and 2 months, latest birth occurred less than 15 months ago, or latest birth being of order 3 or higher.

[2]Also includes the categories age under 18 and birth order greater than 3.

[A]Includes sterilized women

The risk ratios were higher for children in a multiple risk category (1.7) than children in single risk category (1.1). With regard to the specific combination of risk factors, the highest risks were found for high order births of old mothers after a short interval (2.3) and for high order births after a short interval (2.0).

The data in column 3 assess the potential for high-risk births among currently married women. A woman's current age, the time elapsed since her last birth, and her parity were used to determine the risk category that a birth she conceived at the time of the survey would fall in. For example, if a 30 year old respondent who has had four births (with the last birth occurring 10 months before the survey) were to

become pregnant, she would fall in the multiple-risk category. Her parity (four or more births) would be too high and her birth interval too small (less than 24 months after a preceding birth).

Sixty-nine percent of currently married women, if they were to become pregnant right now, would deliver a child with an elevated mortality risk. In the majority of cases the risk would be due to a short birth interval and can be avoided by delaying the pregnancy. However, as discussed in Chapter 9 to follow, less than one-quarter of these high risk women are currently using a method of birth-spacing (see table 9.5).

CHAPTER 9

BIRTH-SPACING

9.1 Background:

As noted in the previous chapter in fertility, there has been a recent and significant decrease in fertility among Cambodian women which is primarily attributable to the use of contraception. This Chapter will discuss findings on women's knowledge and use of various methods.

Questions on birth-spacing were asked of all women aged 15-49 years, whether currently married or not. Responses are provided separately for all women, and women currently married.

Birth-spacing services were introduced into the national program only in late 1991, 7 years before the survey. The national program currently provides a range of four methods: pills, injectable, IUD and condom. Of these four, the IUD is available only at hospital level while the remaining three are available at community level through Health Centers, commune-based staff (where Health Centers have not yet been established), and, in the case of pills and condoms, through the marketplace. In addition, there is a once-a-month pill from China available on the commercial market.

Implants have not yet been introduced into the program, but are available from some private practitioners in the urban areas (especially the capital city), and women living near the Vietnamese border sometimes obtain them in Viet Nam.

Vaginal methods are essentially unknown and unavailable.

Sterilization is not common, but the procedure is legal and it is available in some private and tertiary Government hospitals.

9.2 Knowledge of Birth-Spacing:

Women were asked whether they knew of any methods of birth-spacing, and to name those they knew. After recording the spontaneous answers, the interviewers read out a description of all methods not spontaneously mentioned and asked the woman if she had ever heard of it. Thus, two measures of knowledge are available: spontaneous, and spontaneous plus probed. It is likely that the actual level of knowledge falls somewhere in between these two: spontaneous knowledge will be lower than actual because a woman may either forget or be too shy to mention a method she has in fact heard of, while probed responses may include some false affirmatives due to a desire to give the "correct" answer. As the following table shows, there is a large gap between spontaneous and probed knowledge, with the knowledge of a source for a method more closely matching the level of spontaneous, rather than probed, knowledge. This would tend to suggest that at least some of the probed affirmative responses were either inaccurate (in an attempt to give the "right" answer) or reflected only a very vague knowledge.

9.1.a Knowledge of Methods: Percentage of all women and currently married women who know any birth spacing method and a source for that method, by specific method

Method	Knew Method Spontaneously		Knew Method		Knew Source	
	All Women	Currently Married	All Women	Currently Married	All Women	Currently Married
Any Method	66.2	73.5	91.7	95.6	62.2	70.6
Any Modern Method	65.6	72.7	91.6	95.5	62.2	70.6
Pill (Daily)	47.9	54.5	80.1	86.1	43.4	51.3
Monthly Pill (Chinese)	15.0	17.6	42.3	47.9	18.8	23.2
IUD	28.2	31.6	73.3	79.8	32.5	37.8
Injectable	41.7	48.7	80.2	87.1	45.9	53.8
Implant	9.0	9.7	38.2	42.2	11.7	13.1
Vaginal Methods	0.3	0.3	1.6	2.0	0.3	0.5
Condom	27.7	30.0	78.7	82.0	36.2	39.1
Female Sterilization	6.4	7.2	42.6	50.0	18.0	21.6
Male Sterilization	3.1	3.6	25.1	3.5	8.2	10.0
At least 3 Modern Methods	32.4	37.3	81.4	87.4	38.8	45.3
Any Traditional Method	4.8	6.6	20.3	27.7	NA	NA
Periodic Abstinence	3.9	5.3	17.6	24.0	NA	NA
Withdrawal	1.9	2.6	11.0	15.6	NA	NA
Folkloric Methods	0.3	0.4	0.3	0.4	NA	NA
Any Traditional or Folkloric Method	5.1	7.0	20.5	28.0	NA	NA
Mean No. of Methods Known	1.9	2.1	4.9	5.5	-	-
No. of Women	7,630	4,623	7,630	4,623	7,630	4,623

[1]Knew method either spontaneously or when probed.

Anywhere from 73.5% (spontaneous) to 95.6% (probed) of currently married women know of at least one modern method. For all women, including those not currently married (single, widowed or divorced), the figure is between 66.2% - 91.6%. On average, Cambodian women have heard of 2 or more methods of birth-spacing, and a third of all Cambodian women could spontaneously name least 3 modern methods. On probing, over 80% said they had heard of three or more methods, but as previously mentioned, the high level of probed affirmatives should be viewed with some caution. The true level of knowledge probably lies somewhere between the spontaneous and spontaneous + probed figures.

The methods most commonly known, by spontaneous answer, are not surprisingly the same four that form the basis of the national program: pills, injectables, IUD and condom. Pills and injectables, the two female methods which are widely available at community level, had by far the highest percentage of spontaneous mention. Condoms and IUDs were less likely to be mentioned spontaneously but had a higher rate of response on probing, so the combined spontaneous + probed knowledge for each of these four methods is between 70-80% .

Factors which might account for a higher probed than spontaneous knowledge of the IUD and condom include: (1) IUDs are available only in hospitals which are far from where most of the population live, and thus may not readily come to mind; (2) condoms have been heavily promoted as a means of STD/AIDS prevention and thus may also not readily come to mind when in response to a question about birth-spacing.

In general, the data in Table 9.1 on knowledge conforms to the known availability of methods in Cambodia and to use patterns. There is one major exception: implants, which have not been introduced into the program at all and are therefore available only to the more affluent urban and those living near the Vietnamese border, show a very unlikely level of knowledge. It is noteworthy that most of this knowledge is probed. This plus the fact that the term used for implants in Khmer is similar to that for the IUD (literally, "IUD in the arm") suggest that there may have been many false affirmative answers due to confusion over what was being referred to, on the part of either the respondent, the interviewer or both. (The vast majority of the interviewers had not previously heard of implants).

For each method known, women were asked if they knew a source for obtaining it. Women who did not know of a method, even upon probing, were assumed not to know a source. The percentages given for knowledge of source, therefore, captures the effects both of having heard of a method(s) and of knowing where to get it. It is thus the best measure of the knowledge necessary to access services. **Approximately one-third of women do not know the source for obtaining any modern method of birth-spacing**, either because they have never heard of any method, or because they do not know where to get them.

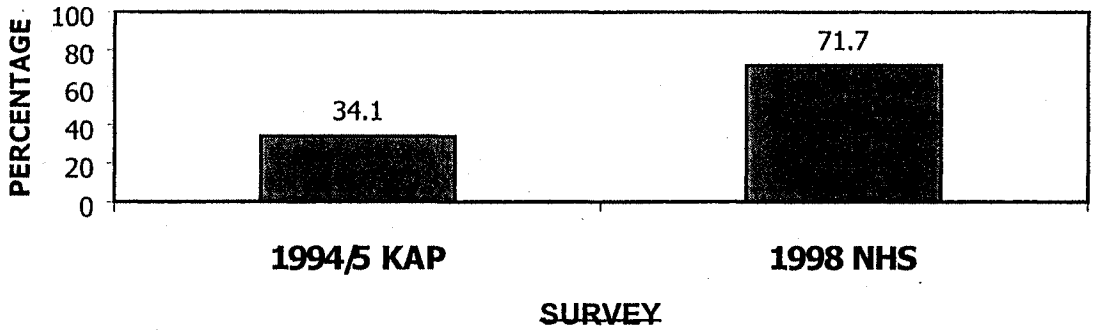
Knowledge of source is highest for pills and injectables, the two female methods which are available at community level. It is lower for condoms, despite their ready availability in the marketplace, perhaps because it is a male method and thus more often obtained by men. It is lower for IUDs, which is not surprising since the source for that method is currently limited to hospitals.

It should, however, be remembered that knowledge of a source does not necessarily imply access. A woman may know that a certain method exists and can be obtained at a health facility, without having the financial and other means of actually going there.

A KAP Survey done by the MOH in 1995 (NMCHC 1995), limited to women ages 15-44 years and to only 10 Provinces due to insecurity in the more remote areas, found a much lower level of birth-spacing knowledge than is the case now. **Spontaneous knowledge of birth-spacing methods has almost doubled in the past three years**, as indicated in Figure 9.1.

FIGURE 9.1:

CURRENTLY MARRIED WOMEN WHO KNOW THE SOURCE OF AT LEAST ONE MODERN METHOD OF CONTRACEPTION



Note: The above 1998 figure is limited to women aged 15-44 years for the purposes of comparability; hence, the 1998 percentage differs from that in Table 9.1.a, which reflects all women aged 15-49 years.

Knowledge of birth-spacing does not show much difference between women of various age groups, nor between the urban and rural strata overall. However, there are significant differences according to socioeconomic status, literacy/ education, and between the isolated Provinces as opposed to all other geographical strata. Table 9.1.b refers to spontaneous plus probed knowledge:

9.1.b. Knowledge of Methods by Background Characteristics Percentage of currently married women who know at least one method and at least one modern method, by selected background characteristics

Background Characteristic	Knows Any Method	Knows a Modern Method[1]	Number of Women
Province Group			
Isolated	85.6	85.2	437
Remote	96.4	96.4	524
Accessible	96.5	96.4	3320
Capital City	99.4	99.4	342
Socioeconomic status			
Poor	87.6	87.2	742
Below Average	95.3	95.1	1532
Above Average	97.7	97.7	1256
Better Off	99.3	99.3	1092
Literacy			
Not at all	90.4	90.1	1525
With difficulty	97.0	97.0	1282
Easily	99.2	99.2	1804
Years of Schooling			
0	89.7	89.4	1348
1-3	97.0	97.0	1482
4-6	98.9	98.9	1100
7+	99.1	99.1	693
Total[2]	95.6	95.5	4623

[1]Daily pill, Chinese pill, IUD, injectables, vaginal methods (diaphragm/foam/jelly), condom, female sterilization, male sterilization, and implants.

[2]Includes 17 blind women

9.3 Use of Birth-spacing

For each method known, women were asked if they had ever used the method. Then, in a subsequent question, they were asked if they were currently using any method .

Every effort was made to provide privacy for the interviews, but the cultural and environmental realities are such that it was not always possible to avoid being overheard by curious family members and neighbors. Therefore, the possibility of some underreporting due to a reluctance to let others know cannot be ruled out.

9.2.a.Ever Use of Birth Spacing

Percentage of all women and currently married women who have ever used any birth spacing method, by specific method and age

Age Group	Any Method	Any Modern Method	Pill (Daily)	Monthly Pill (Chinese)	IUD	Injectable	Condom	Female Sterilization	Other Modern	Any Traditional Method	Periodic Abstinence	Withdrawal	Folkloric Methods	Any Traditional or Folkloric Method	No. of Women
								All Women							
15-19	2.5	1.1	0.4	0.1	0.1	0.4	0.3	0.0	0.0	1.5	1.0	0.9	0.0	1.5	1797
20-24	15.8	12.1	5.4	2.0	1.1	5.1	0.8	0.1	0.0	6.0	4.9	3.7	0.1	6.1	1015
25-29	27.9	21.1	7.3	3.8	2.4	11.0	1.5	0.1	0.3	10.9	8.1	6.1	0.0	10.9	1226
30-34	34.5	28.9	11.1	4.8	4.8	14.0	2.3	0.8	0.0	11.4	9.4	5.8	0.2	11.6	1113
35-39	34.1	27.2	10.5	4.3	4.1	12.8	1.8	1.4	0.2	10.8	8.7	4.9	0.3	11.0	1013
40-44	28.1	20.8	6.4	2.9	2.2	13.0	2.4	1.5	0.2	10.3	7.8	3.8	0.2	10.6	800
45-49	16.3	10.5	3.4	0.9	2.1	5.4	0.7	0.9	0.1	8.4	7.2	4.6	0.5	8.6	666
All ages	21.1	16.2	6.0	2.6	2.2	8.1	1.3	0.6	0.1	7.8	6.2	4.0	0.1	7.9	7630
								Currently Married Women							
15-19	17.3	7.3	2.7	0.8	0.6	2.7	1.4	0.0	0.0	10.6	7.4	6.3	0.0	10.6	245
20-24	26.5	20.4	9.1	3.5	2.0	8.6	1.3	0.1	0.0	10.1	8.2	6.1	0.0	10.1	593
25-29	35.2	26.5	9.4	4.8	3.0	13.7	1.8	0.2	0.4	14.0	10.5	7.8	0.0	14.0	950
30-34	41.5	35.3	13.5	5.9	6.0	17.0	2.9	0.9	0.0	13.3	11.1	6.9	0.2	13.5	901
35-39	40.9	33.1	12.7	5.3	5.0	15.7	2.1	1.7	0.2	12.4	10.1	5.8	0.3	12.7	821
40-44	34.0	25.4	8.2	3.5	2.8	15.7	3.0	1.7	0.2	12.2	9.0	4.7	0.3	12.5	631
45-49	21.1	13.6	4.3	1.3	2.9	6.9	1.0	1.0	0.2	10.9	9.2	5.9	0.7	11.3	482
All ages	33.7	26.1	9.7	4.2	3.6	13.0	2.1	0.9	0.2	12.3	9.7	6.3	0.2	12.5	4623

[1]Includes implants, vaginal methods, and male sterilization.

NOTE: The columns in this table for specific methods do not add up to 100%. For every birth spacing method they had heard of, women were asked whether they had ever used So one woman can appear in more than one column. In effect, every column is independent. .Similarly, the total of individual columns (e.g., periodic abstinence, withdrawal, a folkloric methods) does not equal the value in the summary column (e.g., any traditional or folkloric method). Again, the same woman may appear more than once; so while she c appear in both the periodic abstinence column and the withdrawal column, she can appear only once in the any traditional or folkloric method column. The result is individ columns that are greater than the sum of their parts.

9.2.b Current Method Use

Percent distribution of all women and of currently married women by birth spacing method currently used, according to age

Age Group	Any Method	Any Modern Method[1]	Any Traditional Method[2]	Pill (Daily)	Monthly Pill (Chinese)	IUD	Injectable	Condom	Female Sterilization	Periodic Abstinence	Withdrawal	Folkloric Method	Not Using a Method	Total Percent	Number of Women[3]
All Women															
15-19	1.1	0.6	0.5	0.3	0.1	0.1	0.2	0.0	0.0	0.3	0.2	0.0	98.9	100.0	1797
20-24	10.0	8.0	1.9	2.5	1.4	1.0	2.8	0.3	0.1	0.6	1.3	0.1	90.0	100.0	1015
25-29	17.1	11.9	5.2	3.3	1.3	1.2	5.4	0.5	0.1	3.3	1.9	0.0	82.9	100.0	1226
30-34	23.3	18.6	4.7	4.5	2.2	2.0	8.1	1.1	0.8	3.5	1.1	0.1	76.7	100.0	1113
35-39	22.6	16.9	5.5	4.1	1.8	2.3	7.0	0.1	1.4	3.9	1.5	0.2	77.4	100.0	1013
40-44	17.2	12.4	4.8	1.6	1.0	0.8	6.6	0.8	1.5	2.9	1.9	0.0	82.8	100.0	800
45-49	8.9	5.0	3.5	1.2	0.4	0.8	1.7	0.1	0.9	2.0	1.5	0.4	91.1	100.0	666
All Ages	13.3	9.8	3.4	2.4	1.1	1.1	4.2	0.4	0.6	2.2	1.2	0.1	86.7	100.0	7630
Currently Married Women															
15-19	7.9	4.6	3.3	1.9	0.5	0.6	1.6	0.0	0.0	1.8	1.5	0.0	92.1	100.0	245
20-24	17.0	13.8	3.2	4.3	2.3	1.7	4.8	0.5	0.1	1.0	2.2	0.0	83.0	100.0	593
25-29	22.1	15.3	6.7	4.3	1.7	1.6	6.9	0.6	0.2	4.3	2.4	0.0	77.9	100.0	950
30-34	28.8	23.0	5.8	5.5	2.7	2.5	10.0	1.3	0.9	4.4	1.4	0.1	71.2	100.0	901
35-39	27.8	20.8	6.8	5.1	2.3	2.9	8.7	0.1	1.7	4.9	1.9	0.3	72.2	100.0	821
40-44	21.4	15.4	6.0	2.1	1.1	1.1	8.4	1.1	1.7	3.7	2.4	0.0	78.6	100.0	631
45-49	11.8	6.4	4.8	1.6	0.6	1.1	2.0	0.1	1.0	2.8	2.0	0.5	88.2	100.0	482
All Ages	21.8	16.1	5.6	4.0	1.8	1.8	7.0	0.6	0.9	3.6	2.0	0.1	78.2	100.0	4623

[1] Includes users of the daily pill, the monthly pill, the IUD, injectables, condoms, female sterilization, implants, and male sterilization.
[2] Includes users of periodic abstinence and withdrawal.
[3] Includes users of implants (0.02%) and male sterilization (0.01%).

As can be seen from the previous two tables, over one-quarter (26.1%) of currently married women have used a modern method of birth-spacing at some point in time, and 16.1% are currently using a modern method. Total use of birth-spacing, modern and traditional methods combined, is currently 21.8 – more than a fifth of all currently married women. While these figures are not high overall, they are quite high for a country that introduced birth-spacing into its program only six years ago.

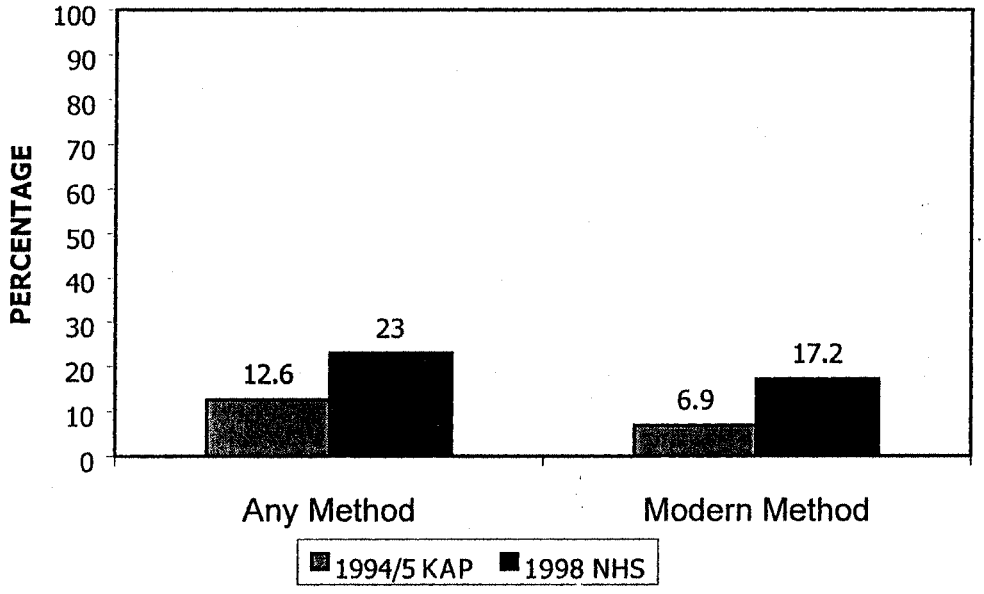
In 1995, the KAP Survey (NMCHC 1995) documented a use rate of only 6.9% for modern methods, 12.6% for any method and this for a study population limited to women aged 15-44 years (more likely to contracept than those 15-49 years) and to the more accessible parts of the country. The actual use rate in 1995 for a nationally representative sample of women aged 15-49 years (as represented in our survey) would have been much lower.

Figure 9.2 compares results of these two surveys. In order to facilitate comparison, the figure shows a 1998 current use rate calculated for the age group 15-44 years only, the same age group covered in the 1995 survey. This yields a higher contraceptive prevalence rate than the one given in table 9.2.b, and is for comparative purposes only. Even with this adjustment, it should be remembered that the 1995 survey excluded many provinces due to security problems at that time. It is not possible to adjust the current sample to match the 1995 study population geographically, but it can be assumed that the effect of the difference is to underestimate the magnitude of increase, since the women excluded from the 1995 study population by reason of residence in inaccessible areas would almost certainly have had lower rates of birth-spacing use.

As shown in Figure 9.2, **the use of modern methods of birth-spacing has more than doubled in the space of only 3 years in Cambodia** --- a remarkably fast increase by international standards.

FIGURE 9.2:

CONTRACEPTIVE PREVALENCE RATES FOR CURRENTLY MARRIED WOMEN AGED 15 – 44 YEARS



9.4 Factors Influencing Use of Birth-Spacing

Table 9.5 to follow shows current use of birth-spacing by background characteristics. Use of birth-spacing methods, particularly modern methods, is more common among the higher socioeconomic groups, among literate and educated women, among urban dwellers in general and those living in the capital city in particular. The difference is greatest between socioeconomic groups and between those in the capital and those in the most isolated areas.

The **difference in use between the highest and lowest socioeconomic groups is more than three-fold** (see Figure 9.3).

The difference between use among women in Phnom Penh and those in the isolated provinces is almost as great (see Figure 9.3).

Particularly interesting in Table 9.5 is the pattern of use by number of living children. As one would expect, it is low among women with no or only one child, but it rises sharply with two living children and then remains essentially the same. In other words, a woman with two living children is as likely to contracept as a woman with four or more. The **contraceptive prevalence rate (all methods) among women with two or more living children is over 25%.**

This would tend to suggest that desired family size in Cambodia is already quite small, a possibility further reinforced by findings on reasons for non-use (see table 9.6).

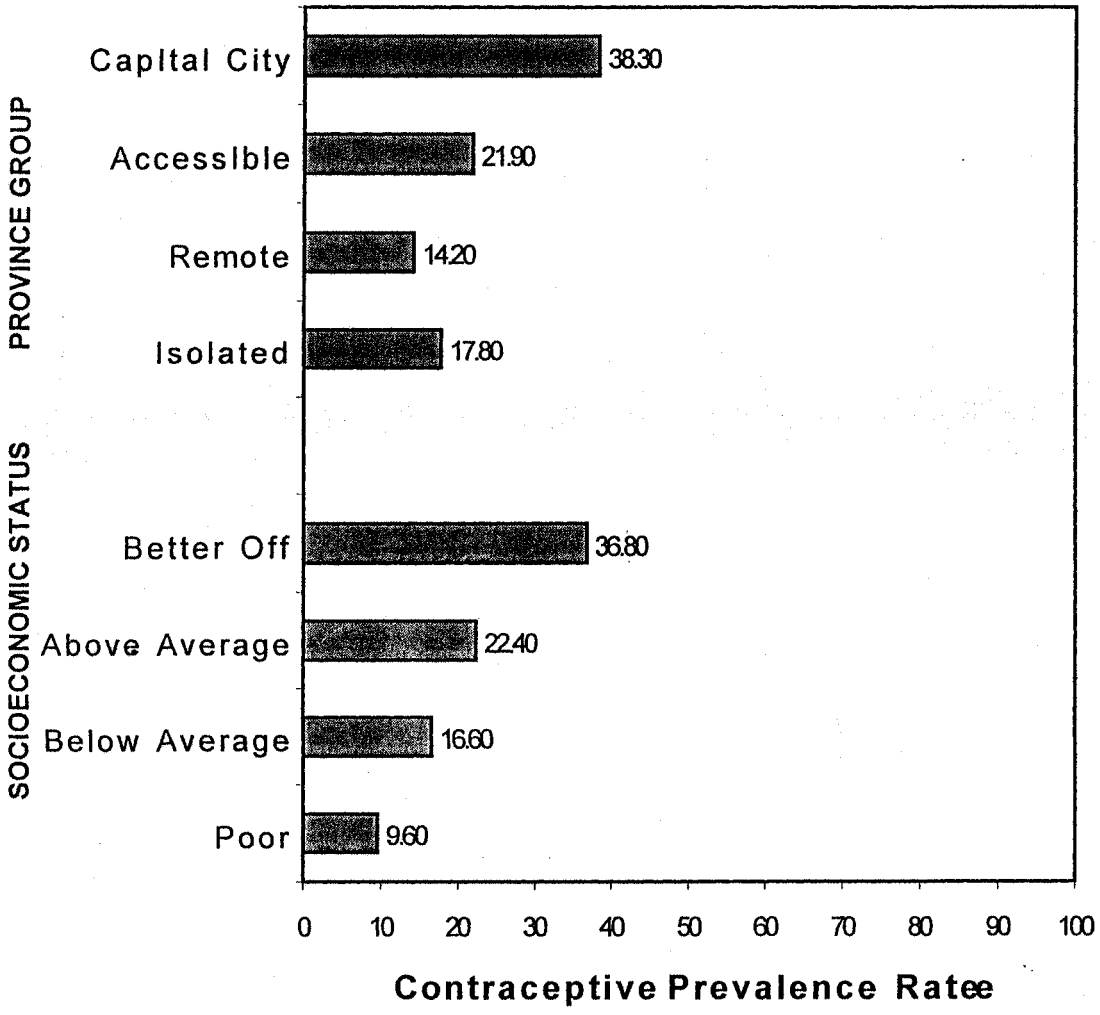
9.3.a. Current Use by Background Characteristics: Percent distribution of currently married women by birth spacing method currently used, according to selected background characteristics

	Any Method	Any Modern Method[1]	Any Traditional Method[2]	Pill (Daily)	Monthly Pill (Chinese)	IUD	Injectable	Condom	Female Sterilization	Periodic Abstinence	Withdrawal	Folkloric Method	Not Using a Method	Total Percent[3]	Number of Women[3]
Residence															
Urban	26.9	21.9	5.1	3.5	1.0	6.3	7.4	2.1	1.5	3.0	2.1	0.0	73.1	100.0	618
Rural	21.0	15.2	5.7	4.0	1.9	1.2	6.9	0.4	0.8	3.7	2.0	0.1	79.0	100.0	4005
Project Areas															
CDCP	22.4	16.7	5.6	3.0	1.8	2.3	7.3	0.9	1.4	3.6	2.0	0.1	77.6	100.0	2353
BHSP	21.1	15.3	5.8	4.2	1.9	1.5	7.2	0.3	0.1	3.9	1.9	0.1	78.9	100.0	1886
Province Group															
Isolated	17.8	13.6	3.8	5.6	1.8	0.8	4.8	0.4	0.2	1.7	2.1	0.4	82.2	100.0	437
Remote	14.2	13.2	1.0	2.9	1.3	0.9	6.9	0.5	0.9	0.9	0.1	0.0	85.8	100.0	524
Accessible	21.9	15.4	6.4	3.9	1.8	1.3	7.4	0.4	0.8	4.2	2.1	0.1	78.1	100.0	3320
Capital City	38.3	30.1	7.9	4.3	3.1	10.2	6.1	3.3	2.7	4.3	3.6	0.3	61.7	100.0	342
Socioeconomic status															
Poor	9.6	7.6	1.8	2.5	0.9	0.2	3.6	0.1	0.3	1.1	0.7	0.2	90.4	100.0	742
Below Average	16.6	13.4	3.1	4.0	1.6	0.3	6.8	0.3	0.5	1.5	1.6	0.1	83.4	100.0	1532
Above Average	22.4	17.0	5.3	4.8	1.9	0.9	8.4	0.5	0.5	3.7	1.6	0.1	77.6	100.0	1256
Better Off	36.8	24.6	12.1	3.9	2.7	6.3	7.9	1.6	2.2	8.1	4.0	0.1	63.2	100.0	1092
Literacy															
Not at all	14.7	12.1	2.6	3.6	1.0	0.6	6.0	0.1	0.7	1.6	1.0	0.0	85.3	100.0	1525
With difficulty	20.9	15.8	4.8	4.2	2.4	1.3	7.0	0.4	0.5	2.9	1.9	0.4	79.1	100.0	1282
Easily	28.5	19.8	8.7	4.0	2.1	3.3	7.8	1.2	1.2	5.8	2.9	0.0	71.5	100.0	1804
Years of Schooling															
0	14.6	11.8	2.8	3.6	1.0	0.6	5.7	0.0	0.8	1.7	1.1	0.0	85.4	100.0	1348
1-3	20.7	15.8	4.5	3.5	2.5	1.5	7.0	0.7	0.5	2.9	1.7	0.3	79.3	100.0	1482
4-6	26.1	18.0	8.0	4.1	2.2	2.5	7.7	0.5	0.9	5.5	2.6	0.1	73.9	100.0	1100
7+	31.7	22.1	9.6	5.2	1.3	3.8	8.3	1.6	1.6	6.1	3.6	0.0	68.3	100.0	693
Number of Living Children															
0	3.3	2.1	1.3	1.1	0.3	0.0	0.0	0.5	0.2	0.2	1.0	0.0	96.7	100.0	380
1	13.8	8.3	5.1	2.6	0.8	0.7	3.4	0.4	0.4	3.2	2.0	0.3	86.2	100.0	691
2	25.2	20.2	5.1	6.4	1.8	3.9	6.8	0.7	0.5	3.5	1.6	0.0	74.8	100.0	895
3	25.5	17.3	8.1	3.3	3.0	1.8	7.7	0.8	0.7	5.2	2.8	0.1	74.5	100.0	757
4+	25.4	19.3	5.9	4.1	2.0	1.7	9.4	0.6	1.4	3.9	2.1	0.1	74.6	100.0	1899
Risk Category[4]															
High Risk	22.5	16.5	5.9	3.4	1.9	1.7	7.7	0.5	1.3	3.8	2.1	0.2	77.5	100.0	2677
Low Risk	20.9	15.6	5.3	4.7	1.7	2.1	6.0	0.8	0.3	3.4	1.9	0.0	79.1	100.0	1946
Total[5]	21.8	16.1	5.6	4.0	1.8	1.8	7.0	0.6	0.9	3.6	2.0	0.1	78.2	100.0	4623

[1]Includes users of the daily pill, the monthly pill, the IUD, injectables, condoms, female sterilization, implants, vaginal methods, and male sterilization.
[2]Includes users of periodic abstinence and withdrawal.
[3]Includes users of implants, vaginal methods, and male sterilization.
[4]High risk includes women younger than 18, older than 34, or whose parity is 4 or higher.
[5]Includes all provinces in the sample and 17 blind women.

FIGURE 9.3

CONTRACEPTIVE USE AMONG CURRENTLY MARRIED WOMEN AGED 15-49 BY SOCIOECONOMIC STATUS AND PROVINCE GROUP



Currently married women who were not using any method of birth-spacing at present were asked what the main reason for their non-use was:

9.3.b Reason for Nonuse of Birth Spacing: Percent distribution of currently married women who are not using any birth spacing method by reason for not using, according to age

Reason for Nonuse	Age		
	Under 30	30 and Over	All Ages
Wants (more) children	49.2	15.7	29.0
Perceived Lack of Risk: • no or infrequent sex • husband absent • menopause or hysterectomy • infecund/subfecund • postpartum breast-feeding	17.8	22.1	20.3
Accessibility Problem: • knows no method • knows no source • lack of access/too far • costs too much	10.4	17.5	14.7
Opposition to Birth-Spacing: • Woman opposed • Husband Opposed • Religious Prohibition • Interferes with body	1.3	2.6	2.1
Health Concerns/Side Effects	19.8	40.4	32.2
Other reasons	1.1	1.5	1.3
Don't Know/Missing	0.6	0.2	0.4
Total Percent	100.0	100.0	100.0
Number of Women	1392	2115	3507

The above table is striking both for what it shows and what it *does not* show:

- Opposition to birth-spacing is virtually nil in Cambodia, in keeping with the cultural and religious country context.

- A desire for more children is **not** a major factor in non-use of birth-spacing. Less than a third of women gave that reply, and two-thirds of these were women under age 30; furthermore, the majority of them had less than two living children, as demonstrated below:

Table 9.3.c Mean Number of Living Children for all currently married women, all currently married women not using birth-spacing, and all currently married women not using birth-spacing due to desire for more children

	Mean Number of Living Children	Number of Women
All Currently Married Women	3.23	4623
All Non-Users	2.17	3507
Non-Users Giving "want more children" as reason for non-use	1.36	1017

Taken together with the findings in Table 9.3.a. that use of birth-spacing rises sharply once a woman has two living children and then levels off, it would appear that desired family size in Cambodia may already be something on the order of only two children. This desire for small families is a spontaneous occurrence and has not been promoted by the government or other outside agencies.

The combination of an innate desire for small families and lack of cultural or religious barriers may account for the exceptionally rapid rise in contraceptive prevalence over the last three years. It also bodes well for a continued rise as services become more accessible.

While opposition to birth-spacing and desire for more children (except among young women with no or one child, where it is to be expected) are not significant constraints to the use of birth-spacing, other factors amenable to program intervention are:

- a very significant percentage of women cited fear of side effects or other health-related worries as a reason for non-use. This warrants further investigation and appropriate interventions. This survey does not provide data on the nature of these health concerns, but anecdotal field impressions and conversations with Cambodian women frequently elicit concerns about the menstrual side effects of the IUD and injectable, and complaints of nausea and resultant weight loss from the pill. Weight loss is viewed in Cambodia as a serious indicator of ill health, to be avoided wherever possible. In this regard, it is noteworthy that the majority of pill users obtain their supply commercially (see section 9.5)

- Approximately 15% of women cited access problems as a reason for non-use. This may be an underrepresentation of the magnitude of access constraints since, as noted in Section 9.1, about one third of all women lack access as defined by knowledge of a method and a source of supply for it.

9.5 Source of Supply Among Users of Birth-Spacing

Every woman currently using a method of birth-spacing was asked where she obtained the method. In the case of methods requiring resupply (pills, condoms, injectables), she was asked to name the most recent source of supply:

9.4 Source of Supply Percent distribution of current users of modern birth spacing methods by most recent source of supply, according to specific method

	Current Method					
Source of current method	Pill (Daily)	Monthly Pill (Chinese)	IUD	Injectable	Condom	All Methods[1]
TOTAL PUBLIC SECTOR	33.0	11.7	53.9	72.2	26.4	50.7
Provincial Hospital[2]	5.2	1.3	34.1	9.6	12.4	10.5
District Hospital	15.7	2.6	11.8	20.3	3.7	15.3
Health Center	1.2	1.6	0.0	5.9	4.3	3.4
Khum Nurse	7.6	4.5	1.7	28.4	2.5	15.9
Khum Midwife	1.5	1.7	1.3	7.0	0.0	4.0
Other Public Medical	1.8	0.0	5.0	1.0	3.5	1.6
TOTAL PRIVATE SECTOR	66.6	88.3	46.2	27.8	73.5	49.2
Private Trained health Worker	10.4	12.3	46.2	23.4	6.6	20.8
Other Private Medical	0.8	0.0	0.0	0.0	0.0	0.2
Pharmacy/Market	55.4	76.0	0.0	4.4	66.9	28.2
Other	0.4	0.0	0.0	0.0	0.0	0.1
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0
Number of Women	183	85	85	324	29	705

[1]Includes one user of implants.

[2]Includes government hospitals in Phnom Penh.

Although the overall source of supply for birth-spacing is more or less evenly split between public and private sector sources, there is considerable variation by method. Most IUD and injectable users obtain their supply from the public sector, while most pill and condom users utilize the private sector, specifically, direct purchase from markets or pharmacies. The contribution of private health workers and hospitals/clinics is primarily limited to the IUD and injectable. (Note: "private" in this context includes both profit and non-profit; i.e., NGO-run clinics would be included in the private category).

Remembering that health concerns/side effects are a major reason for non-use of birth-spacing, the fact that most pill users self-purchase their supply may be significant. Experience suggests that little or no instruction in use and side effects is provided by commercial drug vendors in Cambodia. It might be worth considering both training of

commercial outlet providers and educational messages aimed at consumers regarding common side effects of oral contraceptives and means of handling them.

Given the apparent high demand and lack of religious or cultural barriers, such measures, combined with increased access to sources of supply, are bound to enhance the increasing rate of use of birth-spacing in Cambodia.

APPENDIX A

SAMPLE DESIGN

1 ORIGINAL SAMPLE DESIGN[1]

1.1 Survey objectives

The survey objectives defining the sample size and basic sample design are as follows.

The survey is required to produce a specified range of health indicators with a specified sampling precision.

Indicators

1. Under 5 mortality rate
2. Infant mortality rate
3. Total fertility rate
4. TT coverage rate (% of women of reproductive age who have had at least 2 TT)
5. EPI coverage (children 12 - 23 months)
6. For deliveries within the last 12 months:
   - % pregnancies with 1 or more antenatal consultations by trained personnel
   - % deliveries attended by trained personnel
   - % deliveries by place of delivery
7. VAC coverage
8. Among mothers of children under 5:
   - % with correct knowledge of ORT
   - % with correct knowledge of ARI (warning signs for referral to health worker
9. Socioeconomic status indicator.

Some additional indicators are still under discussion.

Sampling precision

A relative sampling standard error not greater than 10% of the estimate is desired for each indicator. For example, if the survey estimate shows that, among mothers of children under age 5, the percentage knowing of ORT is 40%, the sampling error of this estimate has to be less than $\pm$ 4 percentage points.

Geographical detail

For an indicator computed at the level of the whole country, a modest sample will usually suffice. But if the same statistical precision is required for an indicator at province level (i.e. for each province individually), the total sample necessary will be much larger. Furthermore some indicators require a larger sample than others. Finally, for some indicators it is possible to enlarge the sample in the time dimension while keeping the number of households in the sample unchanged. For example, if infant mortality data are collected using a recall period of 5 years for each household instead of 1 year, the sample for a fixed number of households is effectively expanded fivefold. It follows that the number of households required in the sample depends on how far one is willing to extend the questionnaire reference period.

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[1]Report by Macro International consultant Chris Scott in October 1997.

After careful examination of the options, an order of priority was set as follows:

1) All indicators should be available at the desired precision for:

The national level;
The national level, rural sector;
The aggregate of the 5 ADB provinces;
The aggregate of the 10 WB provinces.

This will require a total of at least 2000 sample women at each of the above levels.

2) The key indicator 2 (infant mortality rate) should be available for the urban and rural sectors separately.

3) Most of the other indicators give satisfactory precision on a sample of about 400 - 500 women. Having decided the total sample size on the basis of requirements 1) and 2) above, it was decided to redistribute the sample among the provinces so that these "easy" indicators could be produced at the level of individual provinces, for as many provinces as possible.

1.2 Sample allocation

These constraints suggest a sample allocation on the following basis.

We begin by refining the "province" definition. Phnom Penh will be counted as a province; Kampot and Krong Kep will be combined, and Prey Vihear will be excluded altogether. The resulting list of 20 "provinces" appears in the left hand stub of Table 1. We also exclude, within these, any areas considered by the Population Census Office to be inaccessible (in most cases for security reasons). Column (1) shows the current population as estimated by the Census Office. The number of households, from the same source, appears in column (2), separately for urban and rural. Column (3) shows the proportions urban and rural in terms of household numbers.

Turning now to the sample itself, we begin by allocating the targeted number of households for interview (column 4). We enter 450 wherever "possible". (The derivation of this figure will be given in Section 7 below.) This is considered the smallest number of interviewed households on which to base province-level estimates of acceptable sampling precision. By allocating this minimum wherever possible we allow province estimates for the largest number of provinces. Resource and time constraints on the total sample size permit us to interview about 9000 women in all. Within this constraint calculation shows that we can afford to allocate 450 interviewed households to all provinces with a population greater than 300,000. This covers all 5 of the ADB provinces, 8 of the 10 WB provinces and 1 of the 5 other provinces. Together, we cover in this manner 94% of the survey population. For the remaining 6% there will be no province-level results: these provinces are included only to complete the national sample. We therefore give them collectively a sampling rate equal to the overall average sampling rate of the already allocated sample, namely (450 x 14)/1839465, which leads to a total of 403 sample households to represent this small group. Allocating this total proportionately to population in the remaining provinces we complete column 4 as shown.

1.3 Urban/rural allocation

Agreement has yet to be reached by the Government on a suitable definition of "urban" for Cambodia. The available data from the Population Census Office are based on classifying as urban the 3 municipalities plus, in each province, the capital city/town of the province. It is on this basis that the Census Office estimates the urban population at 15%.

It may be that a more appropriate definition will be promulgated after the 1998 census

(due in March). It is understood that community level data are being collected during the census with a view to this. If so, analysts of the current survey would do well to incorporate any such new classification into their analysis.

For the time being we have only the above, manifestly unsatisfactory, classification. It is proposed therefore to maintain the same sampling rate in the urban as the rural, within each province.

On the other hand, cost considerations suggest that in the urban areas it is more efficient to increase the number of area units selected and reduce the number of households selected per area unit, relative to the rural sector. It is proposed to target an achieved household sample size of 15 in urban areas and 25 in the rural.

1.4 Stratification and sampling stages

The above arrangements imply stratification into 40 strata, with about 40 different sampling fractions. The strata are the 20 provinces shown in the table, each divided into an urban and a rural sector.

The sample will be selected in two stages. In the first stage the unit is the village (*Phum*); in the 2nd stage the unit is the household. There may be a few cases where very small villages have been combined together in order to allow an adequate sample of households to be selected in the chosen village: for simplicity such combined villages will be referred to as a single village.

In the urban sector the same system applies. In Phnom Penh municipality the units are not officially called *Phum* (though in practice the term still seems to be used).

1.5 Sampling frames

The 1st-stage sampling frame is the list of areas provided by the Population Census Office. This is a list hierarchically ordered by *province* (2 digits), *district* (2 digits), *commune* (2 digits) and *village* (2 digits). In the municipalities the "village" units are often listed as □Center N□ where N is a number. Apparently these are simply the "groups" within the communes, which are essentially equivalent to the villages in the rural sector.

The list gives population and household numbers of each unit, updated since February 1997. It also identifies the districts as urban or rural and describes the districts in 5 categories of security/accessibility, as of September 1997. Only areas in category 1 are fully accessible and have the full household count. These are thought to cover about 98% of the current population. The survey will be limited to them. The number of villages and urban units listed is about 12000.

Informants in the ministries, and particularly in the Census Office, told us that every, or practically every, (accessible) village in Cambodia has an up-to-date list of its households, which is kept by the village chief, who sends an updated copy annually to the district office via the commune office. These lists have again been updated in a national exercise beginning February 1997 to provide data for the census. They are not available to us from the Census Office but should be available in the village itself or in the office of the commune or district. Similar lists apparently exist for the urban sector. If this is correct these lists should provide a suitable 2nd stage sampling frame for the survey.

It appears likely that very little original listing work needs to be done by the survey. Listers will be sent to every sample point, if only to check access, but in most cases they will only need to copy out existing lists and bring them back to Phnom Penh for household selection. The position will be checked by field visits in November 1997.

1.6 Sample design: theory

A standard sample design widely used in surveys throughout the world is the "PPS self-weighting" design. In the 2-stage sampling case, this operates as follows. We assume area sampling at the 1st stage and household sampling at the 2nd.

The 1st stage sample is selected with probability proportional to size (PPS), where the "size" of each unit is the number of households it contains. We call the area units primary sampling units (PSUs).

If the i-th PSU contains M_i households, then since sampling at this stage is with PPS, the probability of including the i-th PSU in the sample is

$$p_{1i} = k M_i \qquad (1)$$

where **k** is some constant. The subscript 1 is used to indicate the 1st sampling stage. If **M** is the sum of M_i over the population (not just the sample) then summing equation (1) over the population the left hand side must be equal to **a**, the number of PSUs selected. Thus:

$$a = k M$$

Substituting for **k** in (1) we have:

$$p_{1i} = a M_i / M \qquad (2)$$

Turning to the 2nd stage of sampling, we select b_i households in the i-th PSU. Thus the selection probability at the 2nd stage is:

$$p_{2i} = b_i / M_i \qquad (3)$$

Note that p_{2i} here is the conditional probability, given that the i-th PSU has been selected.

The overall probability F_i for any household in the i-th PSU is the product of the 1st and 2nd stage probabilities:

$$F_i = p_{1i} . p_{2i} = (aM_i/ M).(b_i/ M_i)$$

$$= a b_i / M \qquad (4)$$

From this it is clear that if we select a fixed number **b** of households in each PSU the overall probability of selection is the same for every household in the population. The latter property implies a "self-weighting sample", i.e. a sample for which no weighting is needed. Any rates, means, proportions or percentages in the sample can be read directly as referring to the whole population. Totals can be extrapolated from the sample by multiplying by the simple raising factor $1 / F$.

In the present survey there are around 40 strata with different sampling fractions F_h, where the subscript **h** designates the stratum. Data for these strata have to be weighted by $1 / F_h$ when the strata are put together. The sample is therefore self-weighting only within strata.

An important reservation to the above reasoning often arises in practical applications. It may happen that the count of households M_i used in PPS selection at the 1st stage, and appearing in equation (2), is not the same as the M_i of equation (3) which relates to the household listing operation made just before the survey. In this case we write M_i' for the latter count. M_i' is an updated value for M_i, but this update was not available until after the 1st stage selection so could not be used in the PPS sampling. In this case equation (4) becomes:

$$F_i = (a M_i / M).(b_i / M_i')$$

$$= (a b_i / M).(M_i / M_i') \qquad (5)$$

We can still have a self-weighting sample if we choose b_i in each PSU so that

$$b_i = b M_i' / M_i \qquad (6)$$

where **b** is the targeted mean number of households to be selected per PSU. If the households are selected by systematic sampling with interval L_i, we have

$$L_i = M_i' / b_i = M_i / b \qquad (7)$$

It will be noticed that equation (7) allows us to compute the sampling interval L_i for households in each PSU using only the value of M_i. This quantity is known before we go into the field. This procedure will automatically take account of the update provided by the listing operation when we select the household sample. For example, if the PSU has grown by 10% between the measure of size (M_i) and the household listing (M_i') , formula (6) will give us $b_i / b = 1.1$ when we apply the interval given by formula (7); hence we will find we have selected 10% more households than the target **b** .

An unusual feature of the present Cambodian survey, however, is that the listing is very nearly coincident in time with the operation that provides the measure of size for 1st stage sampling. It may well be that the differences found between the two parameters M_i and M_i' will be negligible. Should this happen we will find that the calculated values b_i turn out almost constant between clusters in the same stratum, so that we have a sample of the kind considered at the beginning of Section 6 above, within each stratum.

1.7 Parameters

Tables A.1 and A.2 give the essential parameters of the sample. In calculating the values shown we have made the following assumptions:

Response rate at household stage: 92%
Response rate at individual woman stage: 98%
Overall response rate: 90%.
Number of women aged 15 - 49 found per household:

Urban: 1.5
Rural: 1.3

The response rates are derived from similar surveys in other countries. The women-per-household data are taken from the Cambodia Demographic Survey of 1996.

The figure of 450 achieved households assumed for most of the provinces is the minimum which allows the total urban sample to reach about 1400, assuming that the urban and rural sectors are sampled at equal rates.

Table 1 col.5: number of clusters to be selected. Computed as:

URBAN: [(Col.2)/15] * Col.3 * 0.92
RURAL: [(Col.2)/25] * Col.3 * 0.92
TOTAL: sum URBAN + RURAL

These figures are rounded in col.5', adjusting U and R to agree with T.

1st stage sampling interval: Col. (6) is computed as (col.2) / (col. 5')

Villages are selected with PPS using this interval. Col.7 gives the random start.

Table 2 col.6: expected households to be interviewed. Multiply col.5' by 15 (urban) or by 25 (rural). Total = urban + rural.

Table 2 col.7: expected women interviewed. Computed as:

URBAN: (Col.6) * 1.5 * 0.98
RURAL: (Col.6) * 1.3 * 0.98
TOTAL: sum URBAN + RURAL

Sampling interval for selecting households in stratum **h** : $\mathbf{M_{hi}}$ / **b**, where
b = households to be selected = URBAN 15 / 0.92
RURAL 25 / 0.92

and $\mathbf{M_{hi}}$ = no. of households for village **hi** in the area sampling frame.

At the time of drafting the present report, data from the most recent update by the Population Census Office are still not available for a number of provinces. These are asterisked in Table 1. The data in the table for these provinces come from an earlier compilation by the Census Office, used for the 1996 Demographic Survey. It is reasonable to expect that when the results come in for the last few provinces there will be a small increase in the overall computed sample size.

Weights should be used in the analysis whenever results are considered which cover more than one stratum. These weights should take account of non-response as well as the varying sampling fractions. Thus the weight $\mathbf{W_h}$ for the stratum **h** should be the ratio of the estimated population size (women aged 15-49) to the achieved sample size (also women 15 - 49) in the stratum. The weight $\mathbf{W_h}$ should be applied to all data in the stratum **h** , whether household or individual data.

A.1 Sample Allocation

	Province Name		Pop (1)	No Household (2)	Proportion household (3)	Allocated hh sample (4)	No Clusters Selected (5)	Clusters Selected Rounded (6)	Interval (A / Stage) (6)	Random Number (7)
	BHSP Provinces									
04	**Kampong Chhnang**	T	370,308	72,695	1.0000	450	17.36	17	-	-
		U	-	5,248	0.072192035	-	1.99	2	2624	2,191
		R	-	67,447	0.927807965	-	15.36	15	4496	791
03	**Kampong Cham**	T	1,556,334	286,277	1.0000	450	16.83	17	-	-
		U	-	7,063	0.024671909	-	0.68	1	7063	4,881
		R	-	279,214	0.975328091	-	16.15	16	17451	9,057
14	**Prey Veng**	T	988,714	188,272	1.0000	450	17.15	17	-	-
		U	-	9,994	0.053082774	-	1.47	1	9994	8,385
		R	-	178,278	0.946917226	-	15.68	16	11142	301
20	**Svay Rieng**	T	483,976	95,326	1.0000	450	17.03	17	-	-
		U	-	4,017	0.042139605	-	1.16	1	4017	3,527
		R	-	91,309	0.957860395	-	15.86	16	5707	4,058
21	**Takeo**	T	779,668	146,192	1.0000	450	17.01	17	-	-
		U	-	6,017	0.041158203	-	1.14	1	6017	4,988
		R	-	140,175	0.958841797	-	15.88	16	8761	429
	BHSP: SUB TOTAL	T	4,179,000	788,762	1.0000	2,250	-	85	-	-
		U		32,339	0.040999693		-	6	-	-
		R		756,423	0.959000307		-	79	-	-
	CDCP Provinces									
02	**Battambang**	T	700,248	132,923	1.0000	450	18.60	19	-	-
		U	-	24,518	0.184452653	-	5.09	5	4904	2,545
		R	-	108,405	0.815547347	-	13.51	14	7743	6,636
08	**Kanpong Spue**	T	562,850	106,538	1.0000	450	17.24	17	-	-
		U	-	6,561	0.06158366	-	1.70	2	3280	1,036
		R	-	99,977	0.93841634	-	15.54	15	6665	3,319
23	**Kampot+Krong Kaep**	T	531,453	101,855	1.0000	450	17.66	18	-	-
		U	-	10,164	0.099788916	-	2.75	3	3388	1,538
		R	-	91,691	0.900211084	-	14.91	15	6113	1,076
09	**Kandal**	T	1,028,956	196,632	1.0000	450	17.03	17	-	-
		U	-	8,405	0.042744823	-	1.18	1	8405	7,783
		R	-	188,227	0.957255177	-	15.85	16	11764	8,705
10	**Kompong Thom**	T	580,621	102,516	1.0000	450	17.81	18	-	-
		U	-	11,594	0.113094541	-	3.12	3	3865	1,272
		R	-	90,922	0.886905459	-	14.69	15	6061	4,438
12	**Kratie**	T	223,520	41,227	1.0000	144	6.33	6	-	-
		U	-	12,003	0.291144153	-	2.57	2	6002	5,650
		R	-	29,224	0.708855847	-	3.76	4	7306	4,032
13	**Phnom Penh**	T	811,969	138,215	1.0000	450	22.76	23	-	-
		U	-	77,560	0.561154723	-	15.49	16	4848	2,308
		R	-	60,655	0.438845277	-	7.27	7	8665	3,830

Prov. No. Cen-sus	Province Name		Pop. (1)	No. Households (2)	Proportion households U/R (3)	Allocated hh. sample (4)	No. Clusters Selected (5)	Clusters selected Rounded (5)	Interval 1st stage (6)	Random Number (7)
15	Pursat	T	334,428	62,778	1.0000	450	18.33	18	-	-
		U	-	10,046	0.160024212	-	4.42	4	2511	123
		R	-	52,732	0.839975788	-	13.91	14	3767	1,130
16	Rattanakiri	T	84,289	16,382	1.0000	54	2.19	2	-	-
		U	-	2,531	0.15449884	-	0.51	1	2531	2,268
		R	-	13,851	0.84550116	-	1.68	1	13851	7,878
17	Siem Reap	T	643,503	114,186	1.0000	450	18.16	18	-	-
		U	-	16,537	0.14482511	-	4.00	4	4134	2,811
		R	-	97,649	0.85517489	-	14.16	14	6975	6,368
CDCP: SUB TOTAL		T	5,501,837	1,013,252	1.0000	3,798	-	156	-	-
		U		179,919	0.177565897		-	41	-	-
		R		833,333	0.822434103		-	115	-	-
	OTHER PROVINCES									
01	Banteay Meanchey	T	523,322	98,505	1.0000	450	18.45	18	-	-
		U	-	16,826	0.170813664	-	4.71	5	3365	1,834
		R	-	81,679	0.829186336	-	13.73	13	6283	4,304
09	Koh Kong	T	104,955	20,618	1.0000	67	2.80	3	-	-
		U	-	4,196	0.203511495	-	0.84	1	4196	451
		R	-	16,422	0.796488505	-	1.96	2	8211	4,490
11	Mondul Kiri	T	29,194	5,915	1.0000	19	0.81	1	-	-
		U	-	1,385	0.234150465	-	0.27	0	-	-
		R	-	4,530	0.765849535	-	0.54	1	4530	2,396
18	Sihanouk Ville	T	126,991	22,598	1.0000	82	5.03	5	-	-
		U	-	22,598	1	-	5.03	5	4520	462
		R	-	0	0	-	0.00	0	-	-
19*	Stung Treng*	T	58,029	10,191	1.0000	37	1.63	2	-	-
		U	-	3,031	0.297419292	-	0.67	1	3031	1,024
		R	-	7,160	0.702580708	-	0.96	1	7160	6,517
OTHER: SUB TOTAL*		T	842,491	157,827	1.0000	655	-	29	-	-
		U		48,036	0.30435857		-	12	-	-
		R		109,791	0.69564143		-	17	-	-
TOTAL*		T	10,523,328	1,959,841	1.0000	6,703	-	270	-	-
		U		260,294	0.132813835		-	59	-	-
		R		1,699,547	0.867186165		-	211	-	-
	EXCLUDED PROVINCES									
13*	Prey Vihear*	T	98,289							
22	Otdar Mean Chey	NA	NA							
	CAMBODIA*		10,621,617							

* Provisional figures

2 Expected Sample Interviewed

V...	Province Name		Pop (1)	No hhs (2)	Proportion hhold in U/R (3)	Allocated hh sample (4)	Clusters selected rounded (5)	Expected hholds interviewed (6)	Sampling fraction (6)/(2)	Expected Women interviewed (7)
	BHSP Provinces									
14	Kampong	T	370,308	72,695	1.0000	450	17	405		522
	Chhnang	U	-	5,248	0.072192035	-	2	30	0.005716463	44
		R	-	67,447	0.927807965	-	15	375	0.005559921	478
03	Kampong	T	1,556,334	286,277	1.0000	450	17	415		532
	Cham	U	-	7,063	0.024671909	-	1	15	0.002123743	22
		R	-	279,214	0.975328091	-	16	400	0.001432593	510
14	Prey Veng	T	988,714	188,272	1.0000	450	17	415		532
		U	-	9,994	0.053082774	-	1	15	0.001500901	22
		R	-	178,278	0.946917226	-	16	400	0.002243687	510
20	Svay Rieng	T	483,976	95,326	1.0000	450	17	415		532
		U	-	4,017	0.042139605	-	1	15	0.00373413	22
		R	-	91,309	0.957860395	-	16	400	0.004380729	510
21	Takeo	T	779,668	146,192	1.0000	450	17	415		532
		U	-	6,017	0.041158203	-	1	15	0.002492937	22
		R	-	140,175	0.958841797	-	16	400	0.002853576	510
ABHSP: SUB TOTAL*		T	4,179,000	788,762	1.0000	2,250	85	2,065		2,648
		U		32,339	0.040999693		6	90		132
		R		756,423	0.959000307		79	1,975		2,516
	CDCP Provinces									
02	Battambang	T	700,248	132,923	1.0000	450	19	425		556
		U	-	24,518	0.184452653	-	5	75	0.003058977	110
		R	-	108,405	0.815547347	-	14	350	0.003228633	446
05	Kampong	T	562,850	106,538	1.0000	450	17	405		522
	Spue	U	-	6,561	0.06158366	-	2	30	0.004572474	44
		R	-	99,977	0.93841634	-	15	375	0.003750863	478
7/23	Kampot+	T	531,453	101,855	1.0000	450	18	420		544
	Krong Kaep	U	-	10,164	0.099788916	-	3	45	0.004427391	66
		R	-	91,691	0.900211084	-	15	375	0.004089823	478
08	Kandal	T	1,028,956	196,632	1.0000	450	17	415		532
		U	-	8,405	0.042744823	-	1	15	0.001784652	22
		R	-	188,227	0.957255177	-	16	400	0.002125094	510
06	Kompong	T	580,621	102,516	1.0000	450	18	420		544
	Thom	U	-	11,594	0.113094541	-	3	45	0.003881318	66
		R	-	90,922	0.886905459	-	15	375	0.004124414	478
10	Kratie	T	223,520	41,227	1.0000	144	6	130		172
		U	-	12,003	0.291144153	-	2	30	0.002499375	44
		R	-	29,224	0.708855847	-	4	100	0.003421845	127
12	Phnom	T	811,969	138,215	1.0000	450	23	415		576
	Penh	U	-	77,560	0.561154723	-	16	240	0.003094379	353
		R	-	60,655	0.438845277	-	7	175	0.00288517	223

Prov. No. Census	Province Name		Pop (1)	No. Hhs (2)	Proportion households U/R (3)	Allocated hh sample (4)	Clusters selected rounded (5)	Expected households interviewed (6)	Sampling fraction (6)/(2)	Expected Women interviewed (7)
15	Pursat	T	334,428	62,778	1.0000	450	18	410		534
		U	-	10,046	0.160024212	-	4	60	0.005972526	88
		R	-	52,732	0.839975788	-	14	350	0.006637336	446
16	Rattanakiri	T	84,289	16,382	1.0000	54	2	40		54
		U	-	2,531	0.15449884	-	1	15	0.005926511	22
		R	-	13,851	0.84550116	-	1	25	0.001804924	32
17	Siem Reap	T	643,503	114,186	1.0000	450	18	410		534
		U	-	16,537	0.14482511	-	4	60	0.003628228	88
		R	-	97,649	0.85517489	-	14	350	0.003584266	446
CDCP: SUB TOTAL*		T	5,501,837	1,013,252	1.0000	3,798	156	3,490		4,567
		U		179,919	0.177565897		41	615		904
		R		833,333	0.822434103		115	2,875		3,663
	OTHER PROVINCES									
01	Banteay Meanchey	T	523,322	98,505	1.0000	450	18	400		524
		U	-	16,826	0.170813664	-	5	75	0.004457387	110
		R	-	81,679	0.829186336	-	13	325	0.003978991	414
09	Koh Kong	T	104,955	20,618	1.0000	67	3	65		86
		U	-	4,196	0.203511495	-	1	15	0.003574833	22
		R	-	16,422	0.796488505	-	2	50	0.003044696	64
11	Mondul Kiri	T	29,194	5,915	1.0000	19	1	25		32
		U	-	1,385	0.234150465	-	0	0		0
		R	-	4,530	0.765849535	-	1	25	0.005518764	32
18	Sihanouk Ville	T	126,991	22,598	1.0000	82	5	75		110
		U	-	22,598	1	-	5	75	0.003318878	110
		R	-	0	0	-	0	0		0
19*	Stung Treng*	T	58,029	10,191	1.0000	37	2	40		54
		U	-	3,031	0.297419292	-	1	15	0.004948862	22
		R	-	7,160	0.702580708	-	1	25	0.00349162	32
OTHER: SUB TOTAL*		T	842,491	157,827	1.0000	655	29	605		808
		U		48,036	0.30435857		12	180		268
		R		109,791	0.69564143		17	425		541
TOTAL*		T	10,523,328	1,959,841	1.0000	6,703	270	6,160		8,021
		U		260,294	0.132813835		59	885		1,301
		R		1,699,547	0.867186165		211	5,275		6,720
	PROVINCES EXCLUDED									
13*	Prey Vihear*	T	98,289							
22	Otdar Mean Chey	NA	NA							
	CAMBODIA*		10,621,617							

* Provisional figures

2 SUPPLEMENT TO THE ORIGINAL SAMPLE DESIGN[2]

2.1 Background

An initial report on the sample design for this survey was produced in October 1997. At the end of the report the sample allocations were given in two tables. Following this, the 1st stage sample of clusters was selected. The clusters were villages (*Phum*) in the rural sector and groups or "centers" in the urban. They will be referred to in the rest of this report as "phum", whether rural or urban (as appears to be the common practice in Cambodia). The selected phums were listed with the number of households of each phum - figures provided by the Population Census Office.

It had been planned that the next step would be to have the lister copy the list of households held by the phoum chief in each selected phum and to use this as a sampling frame for selection of households. It was thought that even if some of these lists were long it would still be simpler to copy them out in full rather than to introduce a subsampling stage.

However, two findings led to a reversal of this last decision. First, the proportion of large phums was much greater than expected. In the sample (selected with probability proportional to size) about 25% of the phums contained more than 300 households and 11% had 500 or more. The largest had 1696 households.

These numbers implied an altogether excessive amount of listing work, unless some kind of segmentation could be allowed, with only one segment selected for listing.

The second finding favoring segmentation was the discovery that in most of the phums there was already an acceptable subdivision into "groups". This seems to allow segmentation without the need to create a new area unit. Moreover, these groups were already identified in the available phum household lists.

For these reasons it was decided to divide all large phums selected into segments, with a view to selecting only one segment for the survey. It remained to decide where to draw the line between large phums requiring segmentation and small phums acceptable as they are.

Segmentation is an added complication. But once segmentation is accepted as necessary the associated procedures have to be taught to all listers. There is then no strong motive for setting the threshold for segmentation at a very high level with a view to keeping the occurrence of segmentation as rare as possible. This is unnecessary. Thus it was decided to fix the threshold at 300. Any phum with a size (as communicated by the Census Office) in excess of 300 households would be segmented.

This supplementary report describes the method of segmentation with the associated modification in the procedures for household selection.

2.2 Constraint on Segment Size

It was planned to select 25 households in every sample location in rural areas and 15 in urban. If this feature of the sample is maintained the segments must be large enough to contain this number of households. To have a simple rule, allowing a small margin for error, the minimum size for segments was fixed at 30 in all cases.

2.3 Creating Segments or Groups

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[2] Report by Macro International consultant Chris Scott in November 1997.

Let $\mathbf{M_i}$ be the number of households in the i-th phum according to the information supplied by the Census Office. In the event of a large phum ($\mathbf{M_i} > 300$ households), the lister has to create, or identify, a set of groups or segments in the phum. His first task in reaching the phum is to obtain a list of the households. This may come from the phum chief, or the khum chief, or the lister may have to make the list from a collection of household forms (1 per household) shown to him, or even by going round the phum with a guide to list all the households himself. Still assuming a large phum, whatever the method of listing he must determine whether the phum has already been divided into groups and if so identify the groups within the list. If there are no groups he should mark off groups himself at intervals of every 50th household in the list.

The groups should be numbered (by the lister if numbers have not already been allocated), so that finally the groups are all identified with their start and end in the list.

If there are only small groups, perhaps less than 30 households in each, there is no need to worry about the constraint $\mathbf{M_i} \geq \mathbf{30}$. This can be dealt with at the next stage when the segment is selected - see below.

2.4 Selecting the Segment

Selecting a single segment in each large phum, using sampling with probability proportional to size, gives a very simple sample design which is effectively a single-stage sample at the area stage. In small phums the area unit is the phum while in large phums it is the segment. In all cases this unit (whether small phum or segment) is selected with probability proportional to size using the same constant of proportionality throughout the stratum **h** . (See first sampling report: the strata, indexed by **h**, are the provinces each divided into 2 sectors, urban and rural: 20 provinces x 2 = 40 strata.)

The selected phum is indexed **hi** . The number of households according to the Census Office is $\mathbf{M_{hi}}$. The number found by the lister when he counts the list of households provided to him by the chief of the phum, or by the commune (Khum), is $\mathbf{M_{hi}'}$. These two sources are practically contemporaneous; moreover often the household list was prepared, or updated, precisely in order to provide the Census Office with their data. Thus $\mathbf{M_{hi}}$ and $\mathbf{M_{hi}'}$ are likely to be identical or very close in most cases. However, $\mathbf{M_{hi}}$ is available for all phums while $\mathbf{M_{hi}'}$ will be known only for the sample phums. We will not make the assumption that they are identical.

To select the segment, indexed **hij** , with probability proportional to size (the conditional probability for selecting segment **j** within the phum **hi**) we obtain a random number $\mathbf{R_{hi}}$ between 001 and $\mathbf{M_{hi}}$.[3] As soon as he has obtained the complete list of households in the phum, the listers counts through the households from 1 to $\mathbf{M_{hi}'}$. In doing so he notes the household which occupies the R-th place in the list, counting from the start. This is called the KEY household. He then identifies the group in which the KEY household falls. This group is selected. Now if this group has less than 30 households he expands it by taking in the next group. If it still has less than 30 he adds in the next group again - and so on until he reaches a total of 30 households at least. The group or groups thus selected constitute the selected segment **hij**, which has $\mathbf{m_{hij}'}$ households, and always 30 or more.[4]

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[3] Strictly, this should be between 001 and M_{hi}' but for organizational purposes it is convenient to give the value R_{hi} to the lister before he leaves his training course, which means before he knows M_{hi}'. We believe the potential error here small enough to be ignored.

[4] For simplicity in the listing form we use a simpler notation. Note also, that in the unlikely event that this expansion process of the segment hits the end of the household list before reaching 30, the lister is told to turn round and take in another group before the initially selected one.

2.5 Accuracy of Lists

All these arrangements are embodied in a listing document and instructions, attached as an appendix to this report.

Note that this whole procedure depends on the so-called "family lists" of the administrative system. This "family" unit corresponds approximately to the "household" used in most Macro International surveys. But in the present case we do not have the power to introduce any definition of the household: we can only accept the lists as they are. Essentially they are household lists and it would not help to introduce a dwelling or structural unit in the hope of gaining more complete coverage.

Nevertheless it has to be admitted that the household lists could be incomplete. Among the 5 or 6 well-informed people we consulted one gave the opinion that the lists were seriously under-covered in the squatter areas of Phnom-Penh. The others appeared to believe in their substantial accuracy throughout the country. To check this would require a careful study, using time and money that, regrettably, does not appear to be available in the context of the present survey. Meanwhile it is some comfort to know that Phnom-Penh urban accounts for less than 5% of the estimated population of Cambodia. Even a large error in this sector would have little significance at the national level.

2.6 Theory

The design for a small phum has already been described in the initial report. There is no change in this.

In the large phum, an additional stage of sampling is introduced: selection of one segment in each phum. We now give the theoretical background for this. As before, we consider the sampling in any one stratum, omitting the subscript **h** to simplify the presentation.

The 1st stage probability p_i is as in the initial report (see formulas (1) and (2) in that report). Thus:

$$p_{1i} = a\, M_i / M \qquad (1)$$

where $M = 3_i\, M_i$, summed over the whole stratum (not just the sample).
a = number of phums selected.

In the 2nd stage we select 1 segment of size m_{ij}' from a phum of size M_i'. The sampling probability is

$$p_{2ij} = m_{ij}' / M_i' \qquad (2)$$

In the 3rd stage we select b_{ij} households with equal probability from among the m_{ij}' listed. The sampling probability is

$$p_{3ij} = b_{ij} / m_{ij}' \qquad (3)$$

The overall probability F_{ij} for any household is the product of these three probabilities. So:

$$F_{ij} = p_{1i}.p_{2ij}.p_{3ij}$$

$$= (aM_i/M).(m_{ij}'/M_i').(b_{ij}/m_{ij}')$$

$$= (ab_{ij}/M).(M_i/M_i') \qquad (4)$$

For a self-weighting sample we need F_{ij} constant = F = **(ab/M)**.
Hence **(ab/M) = (ab_{ij}/M).(M_i/M_i')**. To achieve this we need to choose b_{ij} so that

$$b_{ij} = b\,(M_i'/M_i) \qquad (5)$$

Now the sampling interval for household selection must be $1/p_3$, so that

$$L_{ij} = m_{ij}' / b_{ij}$$

$$= (M_i/b).(m_{ij}'/M_i') \qquad (6)$$

2.6 Selection of Households

From the above results we conclude the following rules for sample selection of households.

Small clusters Select from the whole phum, with interval $L_i = M_i/b$

Large clusters Select from the segment, with interval $L_{ij} = (M_i/b).(m_{ij}'/M_i')$

where: **b** = RURAL 25/0.92 ; URBAN 15/0.92

M_i = census no. of households in phum **i** .
M_i' = listed no. of households in phum **i** .
m_{ij}' = listed no. of households in segment **j** in phum **i** .

In both small and large clusters the expected number of household interviews achieved in the phum is: RURAL, 25 ; URBAN, 15 .

In the large phums the sample of households is the same number as in the small phums but this number is selected only from one segment within the phum.

The sample remains self-weighting within strata and no weighting is needed to distinguish large from small phums. Weights are needed when making estimates across more than one stratum, as explained in the final paragraph of the initial report.

3 RESULTS OF THE SAMPLE IMPLEMENTATION

The final number of households selected in each Province for the NHS survey are shown in Tables A.3.1 and A.3.2. In table A.3.1, Provinces are grouped according to the Basic Health Services Project (BHSP) and the Cambodia Disease Control and Health Development Project (CDCP).

Table A.3.1 Distribution of the Households by Province

Distribution of the households selected for the sample of the National Health Survey by Province and Project Area

Province	Number of Households	Percent
BHSP Provinces		
Kampong Chhnang	409	6.58
Kampong Cham	431	6.93
Prey Veng	417	6.71
Svay Rieng	423	6.80
Takeo	436	7.01
Total BHSP Provinces	2,116	34.02
CDCP Provinces		
Battambang	400	6.43
Kampong Spue	415	6.67
Kampot + Krong Kaep	425	6.83
Kandal	402	6.46
Kampong Thom	420	6.75
Kratie	130	2.09
Phnom Penh	439	7.06
Pursat	410	6.59
Rattanakiri	48	0.77
Siem Reap	402	6.46
Total CDCP Provinces	3,491	56.13
Other Provinces	387	6.22
Banteay Meanchey	68	1.09
Koh Kong	25	0.40
Mondul Kiri	80	1.29
Sihanouk Ville	52	0.84
Stung Treng	612	9.84
Total Other Provinces	6,219	100.0
TOTAL		

In Table A.3.2, Provinces are grouped according to their accessibility.

Table A.3.2 Distribution of the Households by Province

Distribution of the households selected for the sample of the National Health Survey by Province and Province Group

Province	Number of Households	Percent
Capital City		
Phnom Penh	439	7.06
Total Capital City	439	7.06
Accessible		
Kampong Chhnang	409	6.58
Kampong Cham	431	6.93
Prey Veng	417	6.71
Svay Rieng	423	6.80
Takeo	436	7.01
Battambang	400	6.43
Kampong Spue	415	6.67
Kandal	402	6.46
Pursat	410	6.59
Siem Reap	402	6.46
Sihanouk Ville	80	1.29
Total Accessible	4,225	67.94
Remote	425	6.83
Kampot + Krong Kaep	420	6.75
Kompong Thom	68	1.09
Koh Kong	913	14.68
Total Remote		
Isolated	130	2.09
Kratie	48	0.77
Rattanakiri	387	6.22
Banteay Meanchey	25	0.40
Mondul Kiri	52	0.84
Stung Treng	642	10.32
Total Isolated		
	6,219	100.0
TOTAL		

Results of the sample implementation are shown in Table A.4. The households and women are classified according to their result code. For the household survey, response rate (HRR) is calculated as follows:

$$HRR = \frac{(a)}{(a)+(b)+(e)}$$

Similarly, the individual response rate (IRR) is calculated as follows:

$$IRR = \frac{(1)}{(1)+(2)+(3)+(4)}$$

The overall response rate (ORR) is the product of the household response rate and the individual response rate:

$$ORR = HRRxIRR$$

A.4 Sample Implementation

Percent distribution of households and eligible women in the NHS sample by the result of the interview and overall response rates for households and eligible women, according to place of residence and project areas

Results of Interview and Response Rate	Group of Provinces		Type of Area		Total[1]
	CDCP	BHSP	Urban	Rural	
Selected Households					
Completed (a)	94.9	96.5	92.7	95.8	95.4
Household present but no competent respondent at home (b)	0.1	0.0	0.0	0.1	0.1
Household temporarily absent (c)	1.2	0.9	0.9	1.1	1.1
Household no longer exists, moved permanently (d)	3.7	2.6	6.2	2.9	3.3
Postponed (e)	0.0	0.0	0.0	0.0	0.0
Other (f)	0.1	0.0	0.2	0.1	0.1
Total Percent	100.0	100.0	100.0	100.0	100.0
Number	3491	2116	903	5316	6219
Household Response Rate (HRR)	99.9	100.0	100.0	99.9	99.9
Eligible Women					
Completed (1)	99.9	99.7	99.8	99.7	99.7
Not at home (2)	0.0	0.1	0.0	0.1	0.1
Incapacitated (3)	0.0	0.2	0.2	0.2	0.2
Other (4)	0.0	0.0	0.0	0.1	0.1
Total Percent	100.0	100.0	100.0	100.0	100.0
Number	4366	2601	1209	6445	7654
Eligible Woman Response Rate (EWRR)	99.9	99.7	99.8	99.7	99.7
Overall Response Rate (ORR)	99.8	99.7	99.8	99.6	99.6

[1]Includes all provinces in the sample.

The implementation of the sample exceeded all expectations. The overall response rate was 99 percent in all areas: the sample was designed based on an overall response rate of 90 percent.

APPENDIX B

ESTIMATES OF SAMPLING ERRORS

The estimates from a sample survey are affected by two types of errors: (1) nonsampling errors, and (2) sampling errors. Nonsampling errors are the results of mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the National Health Survey (NHS) to minimize this type of error, nonsampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of respondents selected in the NHS is only one of many samples that could have been selected from the same population, using the same design and expected size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are a measure of the variability between all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

A sampling error is usually measured in terms of the *standard error* for a particular statistic (mean, percentage, etc.), which is the square root of the variance. The standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range of plus or minus two times the standard error of that statistic in 95 percent of all possible samples of identical size and design.

If the sample of respondents had been selected as a simple random sample, it would have been possible to use straightforward formulas for calculating sampling errors. However, the NHS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulae. The computer software used to calculate sampling errors for the NHS is the ISSA Sampling Error Module. This module used the Taylor linearization method of variance estimation for survey estimates that are means or proportions. The Jackknife repeated replication method is used for variance estimation of more complex statistics such as fertility and mortality rates.

The Taylor linearization method treats any percentage or average as a ratio estimate, $r = y/x$, where y represents the total sample value for variable y, and x represents the total number of cases in the group or subgroup under consideration. The variance of r is computed using the formula given below, with the standard error being the square root of the variance:

$$Var(r) = \frac{1-f}{x^2} \sum_{h=1}^{H} \left[\frac{m_h}{m_h - 1} \left(\sum_{i=1}^{m_h} z_{hi}^2 - \frac{z_h^2}{m_h} \right) \right]$$

in which $z_{hi} = y_{hi} - rx_{hi}$, and $z_h = y_h - rx_h$

where h represents the stratum which varies from 1 to H,

m_h is the total number of clusters selected in the h^{th} stratum,

y_{hi} is the weighted sum of the values of variable y in the i^{th} cluster in the h^{th} stratum,

x_{hi} is the weighted sum of the number of cases in the i^{th} cluster in the h^{th} stratum, and

f is the overall sampling fraction, which is so small that it is ignored.

The Jackknife repeated replication method derives estimates of complex rates from each of several replications of the parent sample, and calculates standard errors for these estimates using simple formulae. Each replication considers *all but one* clusters in the calculation of the estimates. Pseudo-independent replications are thus created. In the NHS, there were 269 non-empty clusters. Hence, 269 replications were created. The variance of a rate r is calculated as follows:

$$Var(r) = \frac{1}{k(k-1)} \sum_{i=1}^{k} (r_i - r)^2$$

in which $r_i = kr - (k-1)r_{(i)}$ is the value estimate of the i^{th} peudo-independent replication and where

r is the estimate computed from the full sample of 205 clusters,

$r_{(i)}$ is the estimate computed from the reduced sample of 204 clusters (i^{th} cluster excluded), and

k is the total number of clusters.

Sampling errors for the NHS are calculated for selected variables considered to be of primary interest. The results are presented in this appendix for the country as a whole, for urban and rural areas, and for two groups of provinces. For each variable, the type of statistic (proportion or rate) and the base population are given in Table B.1. Tables B.2 to B.6 present the value of the statistic (R), its standard error (SE), the number of unweighted (N) and weighted (WN) cases, and the 95 percent confidence limits (R±2SE), for each variable. In the case of the total fertility rate, the number of unweighted cases is not relevant, as there is no known unweighted value for woman-years of exposure to child-bearing.

The confidence interval (e.g., as calculated for *fully immunized children aged 12-23 months*) can be interpreted as follows: the proportion from the national sample is 0.389 and its standard error is 0.022. Therefore, to obtain the 95 percent confidence limits, one adds and subtracts twice the standard error to the sample estimate, i.e.,. 0.389±2×0.022. There is a high probability (95 percent) that the *true* proportion of children aged 12-23 months who are fully vaccinated is between 34.6 percent and 43.3 percent.

Table B.1 List of selected variables for sampling errors, Cambodia 1998

Variable	Description	Base Population
	WOMEN	
Total Fertility rate (3 years)	Rate	Woman-years of exposure to childbearing
Infant mortality rate (0-9 years)	Rate	Number of births
Under 5 mortality rate (0-9 years)	Rate	Number of births
Had diarrhea in the last two weeks	Proportion	Children under 5
Treated with ORS or RHS	Proportion	Children under 5 with diarrhea in the last 2 weeks
Fully immunized	Proportion	Children 12-23 months
Treated in a public facility	Proportion	Ill household members treated by a trained health worker
Currently using a modern method	Proportion	Currently married women 15-49
Exclusively breastfed	Proportion	Children 0-3 months
Received supplemental foods	Proportion	Children 4-6 months
Received tetanus toxoid injection	Proportion	Births in the last 5 years
Received vitamin A capsule	Proportion	Children under 5
Mothers received medical antenatal care	Proportion	Births in the last 5 years
Mothers received medical care at birth	Proportion	Births in the last 5 years
Knowing Oralyte	Proportion	Women 15-49

Table B.2 Sampling errors – National Sample: Cambodia 1998

Variable	Value (R)	Standard Error (SE)	Number of cases		Confidence limits	
			Unweighted (N)	Weighted (WN)	R-2SE	R+2SE
Total Fertility rate (3 years)	4.113	0.098	NA	21269	3.916	4.310
Infant mortality rate (0-9 years)	79.851	4.253	10238	10051	71.345	88.356
Under 5 mortality rate (0-9 years)	107.028	5.016	10238	10051	96.996	117.060
Had diarrhea in the last two weeks	0.287	0.012	4358	4288	0.264	0.310
Treated with ORS or RHS	0.211	0.017	1270	1231	0.178	0.245
Fully immunized	0.389	0.022	818	804	0.346	0.433
Treated in a public facility	0.306	0.014	2460	2541	0.277	0.335
Currently using a modern method	0.161	0.008	4616	4623	0.144	0.177
Exclusively breastfed	0.156	0.023	292	279	0.110	0.203
Received supplemental foods	0.425	0.038	220	227	0.349	0.500
Received tetanus toxoid injection	0.397	0.014	4826	4754	0.369	0.425
Received vitamin A capsule	0.486	0.013	4358	4288	0.460	0.513
Mothers received medical antenatal care	0.343	0.015	4826	4754	0.312	0.373
Mothers received medical care at birth	0.340	0.017	4826	4754	0.305	0.374
Knowing Oralyte	0.491	0.016	7630	7630	0.458	0.524

NA = Not applicable

Table B.3 Sampling errors – Urban Sample: Cambodia 1998

Variable	Value (R)	Standard Error (SE)	Number of cases		Confidence limits	
			Unweighted (N)	Weighted (WN)	R-2SE	R+2SE
Total Fertility rate (3 years)	3.310	0.236	NA	3071	2.838	3.782
Infant mortality rate (0-4 years)	64.424	9.927	1379	1221	44.570	84.279
Under 5 mortality rate (0-4 years)	88.038	10.495	1379	1221	67.048	109.028
Had diarrhea in the last two weeks	0.258	0.023	584	515	0.211	0.304
Treated with ORS or RHS	0.258	0.050	155	133	0.159	0.358
Fully immunized	0.448	0.056	103	89	0.337	0.560
Treated in a public facility	0.409	0.038	314	292	0.333	0.484
Currently using a modern method	0.219	0.024	684	618	0.172	0.266
Exclusively breastfed	0.202	0.061	47	40	0.080	0.324
Received supplemental foods	0.498	0.091	29	28	0.316	0.681
Received tetanus toxoid injection	0.542	0.038	634	561	0.467	0.617
Received vitamin A capsule	0.482	0.028	584	515	0.426	0.539
Mothers received medical antenatal care	0.543	0.041	634	561	0.461	0.625
Mothers received medical care at birth	0.559	0.051	634	561	0.457	0.660
Knowing Oralyte	0.669	0.024	1206	1110	0.621	0.717

NA = Not applicable

Table B.4 Sampling errors – Rural Sample: Cambodia 1998

Variable	Value (R)	Standard Error (SE)	Number of cases		Confidence limits	
			Unweighted (N)	Weighted (WN)	R-2SE	R+2SE
Total Fertility rate (3 years)	4.253	0.106	NA	18198	4.042	4.465
Infant mortality rate (0-4 years)	82.147	4.634	8859	8830	72.879	91.414
Under 5 mortality rate (0-4 years)	109.611	5.504	8859	8830	98.603	120.620
Had diarrhea in the last two weeks	0.291	0.013	3774	3772	0.266	0.317
Treated with ORS or RHS	0.206	0.018	1115	1098	0.170	0.242
Fully immunized	0.382	0.024	715	715	0.335	0.429
Treated in a public facility	0.293	0.015	2146	2248	0.262	0.324
Currently using a modern method	0.152	0.009	3932	4005	0.134	0.170
Exclusively breastfed	0.149	0.025	245	239	0.098	0.199
Received supplemental foods	0.414	0.041	191	199	0.332	0.497
Received tetanus toxoid injection	0.377	0.015	4192	4193	0.347	0.408
Received vitamin A capsule	0.487	0.015	3774	3772	0.457	0.516
Mothers received medical antenatal care	0.316	0.016	4192	4193	0.284	0.348
Mothers received medical care at birth	0.311	0.018	4192	4193	0.274	0.347
Knowing Oralyte	0.461	0.019	6424	6520	0.423	0.499

NA = Not applicable

Table B.5 Sampling errors – CDCP Sample: Cambodia 1998

Variable	Value (R)	Standard Error (SE)	Number of cases		Confidence limits	
			Unweighted (N)	Weighted (WN)	R-2SE	R+2SE
Total Fertility rate (3 years)	4.287	0.130	NA	11017	4.026	4.547
Infant mortality rate (0-4 years)	75.294	5.225	5923	5295	64.843	85.745
Under 5 mortality rate (0-4 years)	98.019	5.902	5923	5295	86.215	109.823
Had diarrhea in the last two weeks	0.271	0.014	2524	2264	0.243	0.300
Treated with ORS or RHS	0.214	0.023	678	615	0.169	0.260
Fully immunized	0.461	0.029	495	444	0.402	0.520
Treated in a public facility	0.345	0.019	1275	1220	0.308	0.383
Currently using a modern method	0.167	0.011	2588	2353	0.144	0.189
Exclusively breastfed	0.204	0.035	166	143	0.133	0.274
Received supplemental foods	0.422	0.055	121	109	0.312	0.533
Received tetanus toxoid injection	0.417	0.019	2769	2486	0.378	0.456
Received vitamin A capsule	0.518	0.016	2524	2264	0.485	0.550
Mothers received medical antenatal care	0.376	0.023	2769	2486	0.329	0.423
Mothers received medical care at birth	0.369	0.023	2769	2486	0.323	0.415
Knowing Oralyte	0.545	0.019	4362	3976	0.506	0.583

NA = Not applicable

Table B.6 Sampling errors – BHSP Sample: Cambodia 1998

Variable	Value (R)	Standard Error (SE)	Number of cases		Confidence limits	
			Unweighted (N)	Weighted (WN)	R-2SE	R+2SE
Total Fertility rate (3 years)	3.762	0.160	NA	8688	3.442	4.082
Infant mortality rate (0-4 years)	84.179	7.858	3258	3883	68.463	99.896
Under 5 mortality rate (0-4 years)	113.906	9.639	3258	3883	94.628	133.185
Had diarrhea in the last two weeks	0.289	0.022	1364	1633	0.245	0.334
Treated with ORS or RHS	0.220	0.031	415	473	0.158	0.283
Fully immunized	0.333	0.035	243	294	0.262	0.403
Treated in a public facility	0.250	0.023	893	1081	0.204	0.295
Currently using a modern method	0.153	0.014	1562	1886	0.125	0.181
Exclusively breastfed	0.082	0.032	78	96	0.017	0.146
Received supplemental foods	0.474	0.055	82	104	0.364	0.583
Received tetanus toxoid injection	0.372	0.023	1523	1825	0.327	0.418
Received vitamin A capsule	0.473	0.025	1364	1633	0.423	0.522
Mothers received medical antenatal care	0.311	0.020	1523	1825	0.271	0.352
Mothers received medical care at birth	0.304	0.029	1523	1825	0.246	0.363
Knowing Oralyte	0.433	0.032	2592	3101	0.369	0.497

NA = Not applicable

APPENDIX C:

DATA QUALITY TABLES

C.1 Household Age Distribution: Single-year age distribution of the *De Facto* household population by sex (weighted)

Age	Males		Females		Age	Males		Females	
	No.	%	No.	%		No.	%	No.	%
0	409.3	2.6	397.2	2.4	**36**	178.2	1.2	225.3	1.4
1	409.5	2.6	398.3	2.4	**37**	165.6	1.1	190.8	1.1
2	410.7	2.7	402.4	2.4	**38**	180.2	1.2	190.2	1.1
3	489.9	3.2	462.5	2.8	**39**	122.4	.8	165.0	1.0
4	512.4	3.3	536.8	3.2	**40**	141.9	.9	213.4	1.3
5	532.1	3.4	572.4	3.4	**41**	119.5	.8	136.2	.8
6	568.4	3.7	493.2	3.0	**42**	116.7	.8	176.0	1.1
7	579.0	3.7	514.4	3.1	**43**	117.4	.8	135.4	.8
8	482.0	3.1	493.1	3.0	**44**	80.0	.5	141.1	.8
9	479.3	3.1	452.9	2.7	**45**	127.7	.8	168.0	1.0
10	527.4	3.4	486.7	2.9	**46**	89.5	.6	124.6	.7
11	437.7	2.8	428.5	2.6	**47**	94.1	.6	135.0	.8
12	502.2	3.2	451.6	2.7	**48**	130.3	.8	135.3	.8
13	456.0	2.9	501.0	3.0	**49**	94.7	.6	78.0	.5
14	398.0	2.6	408.6	2.4	**50**	112.6	.7	129.8	.8
15	436.9	2.8	381.8	2.3	**51**	62.0	.4	99.4	.6
16	423.1	2.7	469.6	2.8	**52**	73.0	.5	128.3	.8
17	371.4	2.4	366.2	2.2	**53**	87.8	.6	99.5	.6
18	360.4	2.3	389.4	2.3	**54**	61.2	.4	83.5	.5
19	245.6	1.6	246.1	1.5	**55**	93.4	.6	125.6	.8
20	203.4	1.3	204.1	1.2	**56**	55.5	.4	77.1	.5
21	160.1	1.0	178.2	1.1	**57**	67.9	.4	76.6	.5
22	147.2	1.0	188.3	1.1	**58**	64.3	.4	69.4	.4
23	176.2	1.1	229.8	1.4	**59**	37.1	.2	49.5	.3
24	187.1	1.2	231.8	1.4	**60**	92.9	.6	117.8	.7
25	253.2	1.6	282.6	1.7	**61**	33.0	.2	50.6	.3
26	201.3	1.3	218.5	1.3	**62**	54.9	.4	58.9	.4
27	211.6	1.4	259.0	1.6	**63**	59.2	.4	80.3	.5
28	233.3	1.5	267.3	1.6	**64**	34.7	.2	48.4	.3
29	191.1	1.2	200.5	1.2	**65**	67.7	.4	87.3	.5
30	226.0	1.5	248.6	1.5	**66**	31.8	.2	49.3	.3
31	232.3	1.5	233.2	1.4	**67**	42.8	.3	63.4	.4
32	192.9	1.2	221.8	1.3	**68**	44.5	.3	47.4	.3
33	199.9	1.3	230.5	1.4	**69**	22.8	.1	27.0	.2
34	158.7	1.0	189.8	1.1	**70+**	291.3	1.9	420.2	2.5
35	234.8	1.5	246.1	1.5	**Total**	15489.1	100.0	16686.6	100.0

Note: The *de facto* population includes all residents and non-residents who slept in the household the night before the interview.

C.2 Births by Calendar Year: Distribution of births by calendar years for living (L), dead (D), and all (T) children, according to reporting completeness, sex ratio at birth, and ratio of births by calendar year (weighted)

Calendar Year	Number of Births			Percent with Complete Birth Date[1]			Sex Ratio at Birth[2]			Calendar Year Ratio[3]		
	L	D	T	L	D	T	L	D	T	L	D	T
1998	434.7	27.8	462.5	99.6	100.0	99.6	1.04	.93	1.04	NA	NA	NA
1997	801.7	106.7	908.4	99.8	100.0	99.8	.98	1.01	.98	97.7	123.8	100.2
1996	795.5	101.5	897.0	99.7	96.1	99.3	1.02	1.27	1.05	94.9	100.4	95.5
1995	875.4	95.5	970.9	99.7	98.5	99.6	.99	1.14	1.00	100.8	95.1	100.3
1994	940.6	99.3	1039.9	99.9	93.5	99.3	1.02	.96	1.02	103.1	109.0	103.6
1993	949.1	86.7	1035.9	99.6	98.5	99.5	.95	1.23	.97	97.9	77.0	95.7
1992	999.2	125.9	1125.1	99.4	98.3	99.3	1.03	1.16	1.04	108.0	133.3	110.3
1991	901.8	102.3	1004.1	99.4	94.1	98.8	1.08	1.20	1.09	88.8	80.1	87.8
1990	1031.8	129.5	1161.4	99.1	95.2	98.6	1.01	1.06	1.02	120.2	131.7	121.4
1989	814.7	94.4	909.2	99.2	93.3	98.6	.98	.97	.97	86.5	86.1	86.5
1988	852.0	89.9	941.8	99.7	100.0	99.8	1.01	1.02	1.01	107.4	91.4	105.6
1987	772.4	102.2	874.6	99.1	94.8	98.6	1.02	1.32	1.05	95.8	120.1	98.1
1986	760.6	80.3	840.8	99.4	99.0	99.4	1.01	.99	1.00	99.6	81.6	97.6
1985	754.1	94.7	848.8	99.3	98.5	99.2	1.08	1.16	1.09	105.9	105.0	105.8
1984	664.1	100.2	764.3	99.3	94.9	98.8	.95	1.22	.98	93.8	111.1	95.8
1998-1993	3848.0	430.7	4278.7	99.8	97.2	99.5	1.01	1.08	1.01	NA	NA	NA
1993-1988	4696.7	538.9	5235.6	99.3	95.9	99.0	1.01	1.12	1.02	NA	NA	NA
1988-1983	3803.2	467.2	4270.3	99.4	97.3	99.2	1.01	1.15	1.03	NA	NA	NA
1983-1978	2801.3	375.9	3177.2	99.4	95.4	98.9	1.04	1.10	1.05	NA	NA	NA
< 1978	1372.6	416.4	1788.9	98.6	94.7	97.7	1.00	1.13	1.03	NA	NA	NA
All	16521.7	2229.0	18750.7	99.4	96.2	99.0	1.01	1.12	1.03	NA	NA	NA

[1]Both year and month of birth given.
[2]$(B_m/B_f)x100$, where B_m and B_f are the numbers of male and female births, respectively.
[3]$[2B_x/(B_{x-1}+B_{x+1})]x100$, where B_x is the number of births in the calendar year x. The formula $[1.5B_x/(B_{x-1}+B_{x+1})]x100$ was used for 1997 to compensate for the partial information in 1998.

C.3 Reporting of Age at Death in Days: Distribution of reported deaths under 1 month of age by age at death in days and the percentage of neonatal deaths reported to occur at ages 0-6 days, for five-year periods of birth preceding the survey (weighted)

Age at Death (days)	Years Preceding the Survey				
	0-4	5-9	10-14	15-19	0-19
0	16	16	14	8	54
1	67	53	38	30	187
2	17	9	11	3	40
3	13	13	17	11	55
4	4	2	2	0	8
5	8	9	5	2	24
6	0	4	3	5	12
7	16	42	34	37	129
8	4	5	4	3	16
9	6	4	2	2	14
10	1	3	9	8	21
11	2	0	2	0	4
12	1	2	0	3	6
14	0	1	1	1	2
15	13	14	8	2	37
16	0	1	0	0	1
17	0	0	1	0	1
19	0	0	1	0	1
20	3	3	4	1	11
23	1	1	0	0	2
25	0	1	0	0	1
27	0	1	0	0	1
28	5	2	0	0	7
29	0	1	4	0	5
30	0	0	1	0	1
31	1	2	1	0	3
Total	176	188	162	116	642
Percent Early Neonatal[1]	70.8	56.8	55.7	49.8	59.1

[1]0-6 days/0-30 days.

C.4 Reporting of Age at Death in Months: Distribution of reported deaths under 2 years of age by age at death in months and the percentage of infant deaths reported to occur at ages under one month, for five-year periods of birth preceding the survey (weighted)

Age at Death (months)	Years Preceding Survey				
	0-4	5-9	10-14	15-19	0-19
0[a]	176	188	162	116	642
1	54	37	25	8	124
2	48	28	11	12	99
3	52	28	17	9	106
4	24	18	6	4	51
5	13	12	8	11	44
6	10	8	8	2	28
7	17	14	10	10	51
8	12	13	4	6	34
9	6	9	8	5	29
10	11	6	10	10	38
11	5	3	14	7	30
12	12	17	10	7	46
13	9	10	9	5	32
14	7	5	3	1	15
15	3	4	6	2	15
16	5	1	0	1	6
17	2	5	1	1	8
18	2	3	3	3	11
19	4	1	0	0	5
20	3	3	3	0	9
21	0	0	1	0	1
22	1	1	0	0	2
23	1	5	1	2	10
Total	476	419	321	222	1438
Percent Neonatal[1]	41.0	51.7	57.0	58.0	50.3

[a]Includes deaths under 1 month reported in days.
[1]Under 1 month/under 1 year.

INTERVIEWER=S OBSERVATIONS

To be filled in after completing interview

Comments about Respondent: _____

_____

_____

Comments on Specific Questions: _____

_____

_____

Any other Comments: _____

_____

_____

SUPERVISOR=S OBSERVATIONS

_____

_____

_____

Name of Supervisor: _____ Date: _____

EDITOR=S OBSERVATIONS

_____

_____

_____

Name of Editor: _____ Date: _____

Attachment of the national EPI Coverage Summary for the last three years

The Official national EPI coverage for the last three years is as follows:

VACCINE	1996	1997	1998
BCG	90%	82%	76%
OPV3	76%	70%	64%
DPT3	75%	70%	64%
MEASLES	72%	68%	63%
PAB	NA	NA	48%

These estimates are determined by dividing the total number of doses of each vaccine administered during the year by the estimated number of children under the age of 1, during the same year (Currently estimated at 4% of the total national population).

Lower than expected coverage for Polio 3: The immunization coverage estimates given in tabie6.6 are derived from 2 sources; the immunization card, and (in cases where there was no card available) the mother's recall. Naturally the mother's recall is less accurate than the card, and it may be especially inaccurate with regard to the exact number of doses a child received. For BCG, DPT 1-3 and Rouvax, more than half of the immunization reported is verified by card. However, in the case of polio only, less than half the reported immunizations had a card to verify; most were reported by the mother in the absence of a card (perhaps because some of the special polio eradication sessions didn't issue cards?). Since there is higher proportion of non-card verification for the OPV figures, it is reasonable to suppose that this makes those figures a little less accurate than the BCG, DPT and Rouvax figures. It is possible, although there is no way of proving it, that mothers have a tendency to underreport the number of doses when reporting by memory; for example, they might tend to say 2 times when in fact it was 3; or, the mothers might have been unable to recall exactly and.said something like " a few times" o@' 2 or 3 times" and the interview may have recorded that as 2 since the mother could not be sure about the third time. It is noteworthy that the drop-out rate between OPV2 and OPV3 is minimal for children with a card to verify the number of doses received (29.4% of cards showed receipt of only 2 doses while 26.6% showed receipt of 3- a difference that is not even statistically significant)'The big difference, both for DPT and OPV , come from non-card verified mothe@s recall. Since a greater percentages of OPV doses where based on mother's recall only, the effect on OPV drop out rate estimates is greater than that of DPT.

Difference between DPT and Rouvax receipt:

- The appearance difference between receipt of DPT3 and Rovax is not statistically significant. The 95% confidence interval for those two figures overlap, making it quite possible that the actual DPT receipt is somewhat higher than Rouvax. A slightly higher coverage of DPT than Rouvax is not incompatible with the findings in table 6.6 when the fact that these are sample estimates subject to a 95% Confidence Interval of about +/-4 percentage points is taken into account.

- The possible factor of mother's recall tending to be biased towards fewer doses than actually received may also be a factor here. In the case of Rouvax this does not come into play since there is only one dose given; a child either received it or never received it. But, in the case of DPT, where a card was not available the mother had had to say from memory not only if the child ever got it, but how many times. It is noteworthy that , where there was a card available, the percentage receiving DPT3 was slightly higher than the percentage receiving

Rouvax. (26.6 and 25.7% respectively) and the dropout rate between 2nd and 3rd dose was low. This difference reverses itself only when mother's recall is added as by mother's recall there is a much higher dropout rate between DPT2 and DPT3 than there is for children with a card:

Drop-out rate DPT2-3 by card = 8.8%
Drop-out @ate DPT2-3 by mother's recall = 22.8%
Drop-out rate total (both sources combined)= 15.3%

So much of the recorded drop between DPT2 and DPT3 is due to cases where the number of doses received was from the mother's memory rather than copied from immunization card. There isn't anything we can do about this since a very large number of children reported to have been immunized did not have a card to show, and in such cases we have to accept what the mother told us. But the difference between dropout rate by recall as opposed to by card does tend to suggest the possibility that mother's recall of number of doses may have been biased towards underestimation.

Provincial level estimates: due to the sample size for children aged 12-23 months it is not possible to provide statistically meaningfully estimates from this survey by individual province, only by urban/rural strata and by province groupings (Capital, Accessible Rural, Remote Rural, and Isolated Rural). As shown in table 6.7, there is a huge difference with the Isolated and Remote provinces having only half the immunization coverage of the more accessible areas, and Phnom Penh is way ahead of the rest of the country. The groups of Isolated and Remote Provinces are:

Mondulkiri
Ratanakiri
Stung Treng
Kratie
Koh Kong
Banteay Meanchey
Kampot
Kampong Thorn

Taken as a whole, these eight provinces have an immunization coverage rate of under 20%. However it is not possible to determine from this survey what the specific rates for individual provinces are.

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APPENDIX D: SURVEY QUESTIONNAIRES

KINGDOM OF CAMBODIA

NATIONAL INSTITUTE OF PUBLIC HEALTH

SAWA-CAMBODIA (MINISTRY OF HEALTH) MACRO INTERNATIONAL

NATIONAL HEALTH SURVEY

HOUSEHOLD SCHEDULE

IDENTIFICATION

CLUSTER NUMBER.....

PROVINCE/MUNICIPALITY _____

DISTRICT (SROK/KHAN) _____

COMMUNE (KHUM/SANG KATH) _____

VILLAGE (PHOUM) _____

URBAN/RURAL (URBAN=1, RURAL=2).....

HOUSEHOLD NUMBER.....

NAME OF HOUSEHOLD HEAD _____

INTERVIEWER VISITS

	1	2	3	FINAL VISIT
DATE				DAY / MONTH / YEAR
INTERVIEWER=S NAME				INT. CODE
RESULT*				RESULT
NEXT VISIT: DATE				TOTAL NO. OF VISITS
TIME				

*RESULT CODES:

1 COMPLETED
2 NO HOUSEHOLD MEMBER AT HOME OR NO COMPETENT RESPONDENT AT HOME AT TIME OF VISIT
3 HOUSEHOLD TEMPORARILY ABSENT FROM THE PHUM
4 ENTIRE HOUSEHOLD NO LONGER EXISTS, MOVED OUT PERMANENTLY
5 POSTPONED
6 REFUSED
7 OTHER _____ (SPECIFY)

TOTAL IN HOUSEHOLD

TOTAL ELIGIBLE WOMEN

LINE NO. OF RESP. TO HOUSEHOLD SCHEDULE

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME _____ DATE _____	NAME _____ DATE _____		

HOUSEHOLD SCHEDULE

Now we would like some information about the people who usually live in your household or who are staying with you now.

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD*	RESIDENCE		SEX	AGE	PARENTAL SURVIVORSHIP AND RESIDENCE FOR PERSONS LESS THAN 15 YEARS OLD**				ELIGIBILITY
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household.	What is the relationship of (NAME) to the head of the household?	Does (NAME) usually live here?	Did (NAME) stay here last night?	Is (NAME) male of female?	How old is (NAME)?	Is (NAME)=s natural mother alive?	IF ALIVE: Does (NAME)=s natural mother live in this household? IF YES: What is her name? RECORD MOTHER=S LINE NUMBER	Is (NAME)=s natural father alive?	IF ALIVE: Does (NAME)=s natural father live in this household? IF YES: What is his name? RECORD FATHER=S LINE NUMBER	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			YES NO	YES NO	M F	IN YEARS	YES NO DK		YES NO DK		
01			1 2	1 2	1 2		1 2 8		1 2 8		01
02			1 2	1 2	1 2		1 2 8		1 2 8		02
03			1 2	1 2	1 2		1 2 8		1 2 8		03
04			1 2	1 2	1 2		1 2 8		1 2 8		04
05			1 2	1 2	1 2		1 2 8		1 2 8		05
06			1 2	1 2	1 2		1 2 8		1 2 8		06
07			1 2	1 2	1 2		1 2 8		1 2 8		07

HOUSEHOLD SCHEDULE

08			1	2	1	2	1	2		1	2	8		1	2	8		08
09			1	2	1	2	1	2		1	2	8		1	2	8		09
10			1	2	1	2	1	2		1	2	8		1	2	8		10
11			1	2	1	2	1	2		1	2	8		1	2	8		11
12			1	2	1	2	1	2		1	2	8		1	2	8		12
13			1	2	1	2	1	2		1	2	8		1	2	8		13
14			1	2	1	2	1	2		1	2	8		1	2	8		14

TICK HERE IF CONTINUATION SHEET USED ☐

Just to make sure that I have a complete listing:

1)	Are there any other persons such as small children or infants that we have not listed?	YES ☐ →	ENTER EACH IN TABLE	NO ☐
2)	In addition, are there any other people who may not be members of your family, such as domestic servants, lodgers or friends who usually live here?	YES ☐ →	ENTER EACH IN TABLE	NO ☐
3)	Are there any guests or temporary visitors staying here, or anyone else who slept here last night that have not been listed?	YES ☐ →	ENTER EACH IN TABLE	NO ☐

*CODES FOR Q.3
RELATIONSHIP TO HEAD OF HOUSEHOLD:
01 = HEAD
02 = WIFE OR HUSBAND
03 = SON OR DAUGHTER
04 = SON-IN-LAW OR DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHER OR SISTER
09 = OTHER RELATIVE
10 = ADOPTED/FOSTER/STEP CHILD
11 = NOT RELATED
98 = DON=T KNOW

** Q.8 THROUGH Q.11:
These questions refer to the biological parents of the child. Record 00 if parent not member of household.

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
13	Please tell me if any member of your household is sick, has an illness or an injury now or at any time in the last 30 days?	YES .... 1 NO 2	 →27
14	Now I would like to ask you some questions about each person who is sick/injured now or at any time in the last 30 days. Could you tell me his/her/their name(s)? Then we will talk about one person at a time. ENTER THE NAME AND LINE NUMBER OF EACH PERSON SICK/INJURED. ASK ALL QUESTIONS ABOUT ALL OF THESE PEOPLE. (IF THERE ARE MORE THAN 3 PEOPLE, USE ADDITIONAL QUESTIONNAIRES).		

15	NAME AND LINE NUMBER FROM Q.1 AND Q.2	NAME ______ LINE NUMBER [ ][ ]	NAME ______ LINE NUMBER [ ][ ]	NAME ______ LINE NUMBER [ ][ ]
16	In your opinion, was (NAME)'s illness/injury serious, moderate, or slight?	SERIOUS .... 1 MODERATE .... 2 SLIGHT .... 3 DON'T KNOW 8	SERIOUS .... 1 MODERATE .... 2 SLIGHT .... 3 DON'T KNOW 8	SERIOUS .... 1 MODERATE .... 2 SLIGHT .... 3 DON'T KNOW 8
17	Did (NAME) receive any treatment for this illness/injury?	YES .... 1 NO .... 2 (SKIP TO 19) ↲	YES .... 1 NO .... 2 (SKIP TO 19) ↲	YES .... 1 NO .... 2 (SKIP TO 19) ↲
18	From whom did (NAME) receive treatment?	TRADITIONAL Kru Khmer .... 11 Traditional Birth Attendant .... 12 Magician .... 13 Monk/Religious Leader .... 14 Other ______ 15 (SPECIFY) TRAINED HEALTH WORKER .... 21 BOUGHT MEDICINE From Pharmacy/Market .... 31 TOOK HOME REMEDY .... 41 DON'T KNOW 98	TRADITIONAL Kru Khmer .... 11 Traditional Birth Attendant .... 12 Magician .... 13 Monk/Religious Leader .... 14 Other ______ 15 (SPECIFY) TRAINED HEALTH WORKER .... 21 BOUGHT MEDICINE From Pharmacy/Market .... 31 TOOK HOME REMEDY .... 41 DON'T KNOW 98	TRADITIONAL Kru Khmer .... 11 Traditional Birth Attendant .... 12 Magician .... 13 Monk/Religious Leader .... 14 Other ______ 15 (SPECIFY) TRAINED HEALTH WORKER .... 21 BOUGHT MEDICINE From Pharmacy/Market .... 31 TOOK HOME REMEDY .... 41 DON'T KNOW 98
19	CHECK Q.18 CODE 21 CIRCLED?	CODE 21 NOT CIRCLED .... [ ] CODE 21 CIRCLED .... [ ] (SKIP TO 21) ↲	CODE 21 NOT CIRCLED .... [ ] CODE 21 CIRCLED .... [ ] (SKIP TO 21) ↲	CODE 21 NOT CIRCLED .... [ ] CODE 21 CIRCLED .... [ ] (SKIP TO 21) ↲
20	Just to be sure, did (NAME) see a trained health worker at any time for this problem? IF YES, CORRECT Q.18 AND Q.19. IF Q.17 IS NO, CORRECT Q.17 AS WELL	YES .... 1 NO .... 2 (SKIP TO 26) ↲	YES .... 1 NO .... 2 (SKIP TO 26) ↲	YES .... 1 NO .... 2 (SKIP TO 26) ↲

21	Where did (NAME) meet the trained health worker? PROBE full description IF ANSWERS "HOSPITAL" PROBE: Do you mean a permanent building where health workers are present every day? (IF NO, CORRECT RESPONSE) (IF YES, Was it a Provincial Hospital, District Hospital, or Health Center?)	PUBLIC FACILITY Provincial Hospital............11 District Hospital..................12 Gov. Hosp in P.P.................13 Health Center......................14 Other Public ____________16 (SPECIFY) PRIVATE CLINIC/HOSPITAL............21 PRIVATE HOME Own Home..........................31 Health Worker's Home......32 Other Home.........................33 OUTREACH LOCATION..41 OTHER 96	PUBLIC FACILITY Provincial Hospital............11 District Hospital..................12 Gov. Hosp in P.P.................13 Health Center......................14 Other Public ____________16 (SPECIFY) PRIVATE CLINIC/HOSPITAL............21 PRIVATE HOME Own Home..........................31 Health Worker's Home......32 Other Home.........................33 OUTREACH LOCATION..41 OTHER 96	PUBLIC FACILITY Provincial Hospital............11 District Hospital..................12 Gov. Hosp in P.P.................13 Health Center......................14 Other Public ____________16 (SPECIFY) PRIVATE CLINIC/HOSPITAL............21 PRIVATE HOME Own Home..........................31 Health Worker's Home......32 Other Home.........................33 OUTREACH LOCATION..41 OTHER 96
22	CHECK Q.21 CODE 31 CIRCLED?	CODE 31 NOT CIRCLED .... ☐ CODE 31 CIRCLED .... ☐ (SKIP TO 26)	CODE 31 NOT CIRCLED .... ☐ CODE 31 CIRCLED .... ☐ (SKIP TO 26)	CODE 31 NOT CIRCLED .... ☐ CODE 31 CIRCLED .... ☐ (SKIP TO 26)
23	When (NAME) met the trained health worker, how did he/she get there?	WALKED/ CARRIED ON FOOT..........11 OWN TRANSPORT Bicycle...............................21 Motorcycle.........................22 Oxcart................................23 Boat...................................24 Horse/Pony.........................25 Car.....................................26 Other ________________27 MOTODOP..........................31 CYCLO................................41 CAR TAXI...........................51 COMMERCIAL BOAT.......61 OTHER...............................96 DON'T KNOW....................98	WALKED/ CARRIED ON FOOT..........11 OWN TRANSPORT Bicycle...............................21 Motorcycle.........................22 Oxcart................................23 Boat...................................24 Horse/Pony.........................25 Car.....................................26 Other ________________27 MOTODOP..........................31 CYCLO................................41 CAR TAXI...........................51 COMMERCIAL BOAT.......61 OTHER...............................96 DON'T KNOW....................98	WALKED/ CARRIED ON FOOT..........11 OWN TRANSPORT Bicycle...............................21 Motorcycle.........................22 Oxcart................................23 Boat...................................24 Horse/Pony.........................25 Car.....................................26 Other ________________27 MOTODOP..........................31 CYCLO................................41 CAR TAXI...........................51 COMMERCIAL BOAT.......61 OTHER...............................96 DON'T KNOW....................98
24	How long did it take (NAME) to get there?	less than 15 minutes...............1 15 to 29 minutes.....................2 30 to 59 minutes.....................3 1 hour to 1 hour+59 minutes. 4 2 hours or more......................5 Don't Know...........................8	less than 15 minutes...............1 15 to 29 minutes.....................2 30 to 59 minutes.....................3 1 hour to 1 hour+59 minutes. 4 2 hours or more......................5 Don't Know...........................8	less than 15 minutes...............1 15 to 29 minutes.....................2 30 to 59 minutes.....................3 1 hour to 1 hour+59 minutes. 4 2 hours or more......................5 Don't Know...........................8
25	How much total money did it cost for (NAME) to get to (PLACE)?	NON-CASH/IN KIND.........11 CASH 100-500 riels.......................21 600-1,000 riels....................22 1,100-2,000 riels................23 2,100-5,000 riels/$1...........24 5,100-10,000 riels/$2.........25 More than 10,000 riels/$3. 26 FREE/NO COST..................31 DON"T KNOW....................98	NON-CASH/IN KIND.........11 CASH 100-500 riels.......................21 600-1,000 riels....................22 1,100-2,000 riels................23 2,100-5,000 riels/$1...........24 5,100-10,000 riels/$2.........25 More than 10,000 riels/$3. 26 FREE/NO COST..................31 DON"T KNOW....................98	NON-CASH/IN KIND.........11 CASH 100-500 riels.......................21 600-1,000 riels....................22 1,100-2,000 riels................23 2,100-5,000 riels/$1...........24 5,100-10,000 riels/$2.........25 More than 10,000 riels/$3. 26 FREE/NO COST..................31 DON"T KNOW....................98
26		GO BACK TO Q.15 IN NEXT COLUMN; OR IF NO MORE PEOPLE, GO TO Q.27	GO BACK TO Q.15 IN NEXT COLUMN; OR IF NO MORE PEOPLE, GO TO Q.27	GO BACK TO Q.15 IN NEXT COLUMN; OR IF NO MORE PEOPLE, GO TO Q.27

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
27	DOES YOUR HOUSEHOLD HAVE	YES NO	
	Electricity?	1 2	
	Wardrobe?	1 2	
	Sewing Machine or loom?	1 2	
	Plough?	1 2	
	Radio/Tape Recorder?	1 2	
	Television?	1 2	
28	MAIN MATERIALS OF THE WALLS RECORD OBSERVATION	NO WALLS....1 PLASTIC/TENT....2 THATCH/PALM/BAMBOO/BARK.3 WOOD....4 MUD....5 TILES OR CEMENT....6 OTHER _____ 7 (SPECIFY)	
29	MAIN MATERIALS OF THE ROOF RECORD OBSERVATION	PLASTIC/TENT....1 THATCH/PALM/BAMBOO/BARK.2 CORRUGATED IRON....3 TILES/CEMENT/FIBROCEMENT..4 OTHER _____ 6 (SPECIFY)	
30	DOES YOUR HOUSEHOLD OWN A	YES NO	
	Bicycle/Cyclo?	1 2	
	Motorcycle?	1 2	
	Car?	1 2	
	Boat without motor?	1 2	
	Boat with motor?	1 2	
31	Does your household raise animals/fish/poultry to sell to others?	YES....1 NO....2	

KINGDOM OF CAMBODIA

NATIONAL INSTITUTE OF PUBLIC HEALTH

SAWA-CAMBODIA (MINISTRY OF HEALTH) MACRO INTERNATIONAL

NATIONAL HEALTH SURVEY

INDIVIDUAL QUESTIONNAIRE

IDENTIFICATION	
CLUSTER NUMBER.....	☐☐☐
PROVINCE/MUNICIPALITY_____	☐☐
DISTRICT (SROK/KHAN)_____	☐☐
COMMUNE (KHUM/SANG KATH)_____	☐☐
VILLAGE (PHOUM)_____	☐☐
URBAN/RURAL (URBAN=1, RURAL=2) _____	☐
HOUSEHOLD NUMBER.....	☐☐☐
NAME OF HOUSEHOLD HEAD_____	
NAME AND LINE NUMBER OF WOMAN_____	☐☐

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
DATE	_____	_____	_____	DAY ☐☐
				MONTH ☐☐
				YEAR ☐☐☐☐
INTERVIEWER=S NAME	_____	_____	_____	INT. CODE ☐☐
RESULT*	_____	_____	_____	RESULT ☐
NEXT VISIT: DATE	_____	_____		TOTAL NO. OF VISITS ☐
TIME	_____	_____		

*RESULT CODES:

1	COMPLETED	4	REFUSED	7	OTHER
2	NOT AT HOME	5	PARTLY COMPLETED		_____
3	POSTPONED	6	INCAPACITATED		(SPECIFY)

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	KEYED BY
NAME _____ ☐☐	NAME _____ ☐☐	☐☐	☐☐
DATE _____	DATE _____		

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
101	RECORD THE TIME.	HOUR ☐☐ MINUTES ☐☐	
102	In what month and year were you born? **CODES FOR GREG. MONTHS:** JANUARY....01 FEBRUARY....02 MARCH....03 APRIL....04 MAY....05 JUNE....06 JULY....07 AUGUST....08 SEPTEMBER....09 OCTOBER....10 NOVEMBER....11 DECEMBER....12 **CODES FOR KHMER YEARS:** RABBIT....01 DRAGON....02 SNAKE....03 HORSE....04 GOAT....05 MONKEY....06 ROOSTER....07 DOG....08 PIG....09 RAT....10 COW....11 TIGER....12	GREG, MONTH ☐☐ DON=T KNOW GREG. MONTH....98 KHMER YEAR ☐☐ DON=T KNOW KHMER YEAR....98 GREGORIAN YEAR ☐☐☐☐ DON=T KNOW GREG. YEAR....9998	
103	How many years ago where you born? COMPARE AND CORRECT 102 AND/OR 103 IF INCONSISTENT.	AGE IN COMPLETED YEARS ☐☐	
104	Have you ever attended school?	YES....1 NO....2 →	106
105	How many years of schooling did you complete?	COMPLETED YEARS ☐☐	
106	Can you read this sentence? SHOW WRITTEN SENTENCE TO RESPONDENT EVALUATE AND CIRCLE THE APPROPRIATE CODE	EASILY....1 WITH DIFFICULT....2 NOT AT ALL....3 CANNOT SEE/BLIND....4	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
201	Now I would like to ask about all the live births you have had during your life. Have you ever given birth?	YES ..... 1 NO ..... 2 →	206
202	Do you have any sons or daughters to whom you have given birth who are now living with you?	YES ..... 1 NO ..... 2 →	204
203	How many sons live with you? And how many daughters live with you? IF NONE, RECORD >00'.	SONS AT HOME ..... ☐☐ DAUGHTERS AT HOME ..... ☐☐	
204	Do you have any sons or daughters to whom you have given birth who are still alive but do not live with you?	YES ..... 1 NO ..... 2 →	206
205	How many sons are alive but do not live with you? And how many daughters are alive but do not live with you? IF NONE, RECORD >00'.	SONS ELSEWHERE ..... ☐☐ DAUGHTERS ELSEWHERE .. ☐☐	
206	Have you ever given birth to a boy or girl who was born alive but later died? IF NO, PROBE: Any baby who cried or showed signs of life at birth but survived only a few minutes, hours or days?	YES ..... 1 NO ..... 2 →	208
207	How many boys have died? And how many girls have died? IF NONE, RECORD >00'.	BOYS DEAD ..... ☐☐ GIRLS DEAD ..... ☐☐	
208	SUM ANSWERS TO 203, 205, AND 207, AND ENTER TOTAL. IF NONE, RECORD >00'.	TOTAL ..... ☐☐	
209	Besides the pregnancies ended by live births we have spoken about, have you had any other pregnancies that ended during your life?	YES ..... 1 NO ..... 2 →	212
210	How many other pregnancies have you had?	TOTAL ..... ☐☐	
211	What happened to each of these pregnancies? RECORD HOW MANY BIRTHS ENDED IN EACH CATEGORY. IF NONE, RECORD '00'. IF ANY PREGNANCY ENDED BY A BIRTH WHO DIED SOON AFTER BIRTH, PROBE AND CORRECT 206, 207, AND 208 AS NECESSARY.	STILLBIRTH ..... ☐☐ MISCARRIAGE/ABORTION ... ☐☐ DIED SOON AFTER BIRTH ... ☐☐	
212	CHECK 208: Just to make sure that I have this right: you have had in TOTAL ____ live births during your life. Is that correct? YES ☐ ↓ NO ☐ → PROBE AND CORRECT 201-208 AS NECESSARY.		
213	CHECK 208: ONE OR MORE LIVE BIRTHS ☐ ↓ NO LIVE BIRTHS ☐ →	SKIP TO Q229, RECORD '0', AND CONTINUE WITH Q,230	

214Now I would like to record the names of all your births, whether still alive or not, starting with the first one you had.
RECORD NAMES OF ALL THE BIRTHS IN 212. RECORD TWINS AND TRIPLETS ON SEPARATE LINES.

215 What name was given to your (first/next) baby? (NAME)	216 Were any of these births multiple ?	217 Is (NAME) a boy or a girl?	218 In what month and year was (NAME) born? PROBE: What is his/her birthday? OR: In what season was he/she born?	219 Is (NAME) still alive?	220 IF ALIVE: How much time has passed since (NAME)'s birthday? RECORD AGE IN COMPLETED YEARS.	221 IF ALIVE: Is (NAME) living with you?	222 IF DEAD: How much time has passed between (NAME)'s birth and death? IF >1 YR.= PROBE: How many months have passed between (NAME)'s birth and death? RECORD DAYS IF LESS THAN 1 MONTH; MONTHS IF LESS THAN TWO YEARS; OR YEARS.	223 IF DEAD In what month and year did (NAME) die? CHECK CONSISTENY WITH 222 AND PROBE TO RECONCILE IF NECESSARY	224 FROM YEAR OF BIRTH OF (NAME) SUBTRACT YEAR OF PREVIOUS BIRTH. IS THE DIFFERENCE 4 OR MORE?	225 Were there any other li births between (NAME OF PREVIOUS BIRTH) and (NAME)?
01	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES...1 NO.....2 222	AGE IN YEARS	YES....1 NO.....2 (NEXT BIRTH)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR		
02	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES...1 NO.....2 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO.....2 (NEXT BIRTH)	YES.....1 NO.....2

KHMER MONTHS	CORRESPONDING GREGORIAN MONTHS
01.....BOSS	JANUARY.....01
02.....MEAK	FEBRUARY.....02
03.....PHAKUN	MARCH.....03
04.....CHETH	APRIL.....04
05.....PISAK	MAY.....05
06.....CHES	JUNE.....06
07.....ASATH/PRATHAM ASATH	JULY.....07
08.....TUTIYASATH	AUGUST.....08
09.....SRAP	AUGUST.....08
10.....PHOTROBAT	SEPTEMBER.....09
11.....ASSOCH	OCTOBER.....10
12.....KADEK	NOVEMBER.....11
13.....MIKASE	DECEMBER.....12
98.....DON'T KNOW	DON'T KNOW.....98

CODES FOR KHMER YEARS	
RABBIT	01
DRAGON	02
SNAKE	03
HORSE	04
GOAT	05
MONKEY	06
ROOSTER	07
DOG	08
PIG	09
RAT	10
COW	11
TIGER	12
DON'T KNOW	98

RECORD NAMES OF ALL THE BIRTHS IN 212. RECORD TWINS AND TRIPLETS ON SEPARATE LINES.

215 What name was given to your (first/next) baby? (NAME)	216 Were any of these births multiple ?	217 Is (NAME) a boy or a girl?	218 In what month and year was (NAME) born? PROBE: What is his/her birthday? OR: In what season was he/she born?	219 Is (NAME) still alive?	220 IF ALIVE: How much time has passed since (NAME)'s birthday? RECORD AGE IN COMPLETED YEARS.	221 IF ALIVE: Is (NAME) living with you?	222 IF DEAD: How much time has passed between (NAME)'s birth and death? IF >1 YR.= PROBE: How many months have passed between (NAME)'s birth and death? RECORD DAYS IF LESS THAN 1 MONTH; MONTHS IF LESS THAN TWO YEARS; OR YEARS.	223 IF DEAD In what month and year did (NAME) die? CHECK GONSISTENY WITH 222 AND PROBE TO RECONCILE IF NECESSARY	224 FROM YEAR OF BIRTH OF (NAME) SUBTRACT YEAR OF PREVIOUS BIRTH. IS THE DIFFERENCE 4 OR MORE?	225 Were there any other live births between (NAME OF PREVIOUS BIRTH) and (NAME)?
03	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH ☐☐ GREG. MONTH ☐☐ KHMER YEAR ☐☐ GREG. YEAR ☐☐☐☐	YES...1 NO.....2 → 222	AGE IN YEARS ☐☐	YES....1 NO.....2 (GO TO 224)	DAYS ☐☐ MONTHS ☐☐ YEARS ☐☐	KHMER MONTH ☐☐ GREG. MONTH ☐☐ KHMER YEAR ☐☐ GREG. YEAR ☐☐☐☐	YES.....1 NO.....2 → (NEXT BIRTH)	YES.....1 NO.....2
04	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH ☐☐ GREG. MONTH ☐☐ KHMER YEAR ☐☐ GREG. YEAR ☐☐☐☐	YES...1 NO.....2 → 222	AGE IN YEARS ☐☐	YES....1 NO.....2 (GO TO 224)	DAYS ☐☐ MONTHS ☐☐ YEARS ☐☐	KHMER MONTH ☐☐ GREG. MONTH ☐☐ KHMER YEAR ☐☐ GREG. YEAR ☐☐☐☐	YES.....1 NO.....2 → (NEXT BIRTH)	YES.....1 NO.....2

KHMER MONTHS	
01	BOSS
02	MEAK
03	PHAKUN
04	CHETH
05	PISAK
06	CHES
07	ASATH/PRATHAM ASATH
08	TUTIYASATH
09	SRAP
10	PHOTROBAT
11	ASSOCH
12	KADEK
13	MIKASE
98	DON'T KNOW

CORRESPONDING GREGORIAN MONTHS	
JANUARY	01
FEBRUARY	02
MARCH	03
APRIL	04
MAY	05
JUNE	06
JULY	07
AUGUST	08
AUGUST	08
SEPTEMBER	09
OCTOBER	10
NOVEMBER	11
DECEMBER	12
DON'T KNOW	98

CODES FOR KHMER YEARS	
RABBIT	01
DRAGON	02
SNAKE	03
HORSE	04
GOAT	05
MONKEY	06
ROOSTER	07
DOG	08
PIG	09
RAT	10
COW	11
TIGER	12
DON'T KNOW	98

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RECORD NAMES OF ALL THE BIRTHS IN 212. RECORD TWINS AND TRIPLETS ON SEPARATE LINES.

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05	SING..1 MULT.2	BOY .. 1 GIRL . 2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES ...1 NO.....2 → 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO .....2 → (NEXT BIRTH)	YES.....1 NO.....2
06	SING..1 MULT.2	BOY .. 1 GIRL . 2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES ...1 NO.....2 → 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO .....2 → (NEXT BIRTH)	YES.....1 NO.....2

KHMER MONTHS	
01	BOSS
02	MEAK
03	PHAKUN
04	CHETH
05	PISAK
06	CHES
07	ASATH/PRATHAM ASATH
08	TUTIYASATH
09	SRAP
10	PHOTROBAT
11	ASSOCH
12	KADEK
13	MIKASE

CORRESPONDING GREGORIAN MONTHS	
JANUARY	01
FEBRUARY	02
MARCH	03
APRIL	04
MAY	05
JUNE	06
JULY	07
AUGUST	08
AUGUST	08
SEPTEMBER	09
OCTOBER	10
NOVEMBER	11
DECEMBER	12

CODES FOR KHMER YEARS	
RABBIT	01
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07	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES...1 NO.....2 → 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO.....2 → (NEXT BIRTH)	YES.....1 NO.....2
08	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES...1 NO.....2 → 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO.....2 → (NEXT BIRTH)	YES.....1 NO.....2

KHMER MONTHS	
01	BOSS
02	MEAK
03	PHAKUN
04	CHETH
05	PISAK
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JANUARY	01
FEBRUARY	02
MARCH	03
APRIL	04
MAY	05
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JULY	07
AUGUST	08
AUGUST	08
SEPTEMBER	09
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DRAGON	02
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09	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES...1 NO.....2 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO.....2 (NEXT BIRTH)	YES..... NO.....
10	SING..1 MULT.2	BOY..1 GIRL.2	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR.....	YES...1 NO.....2 222	AGE IN YEARS	YES....1 NO.....2 (GO TO 224)	DAYS.....1 MONTHS.....2 YEARS.....3	KHMER MONTH..... GREG. MONTH..... KHMER YEAR..... GREG. YEAR	YES.....1 NO.....2 (NEXT BIRTH)	YES.....1 NO.....

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01.....BOSS	JANUARY.....01
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CODES FOR KHMER YEARS	
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RAT	10
COW	11
TIGER	12
DON'T KNOW	

226	FROM YEAR OF INTERVIEW SUBTRACT YEAR OF LAST BIRTH. IS THE DIFFERENCE 4 YEARS OR MORE?	YES.....1 NO.....2 →	228
227	Have you had any live births since the birth of (NAME OF LAST BIRTH)?	YES.....1 NO.....2	
228	COMPARE 208 WITH NUMBER OF BIRTHS IN HISTORY ABOVE AND MARK: NUMBERS ARE SAME ☐ NUMBER DIFFERE ☐ → (PROBE AND RECONCILE) CHECK: FOR EACH BIRTH: YEAR OF BIRTH IS RECORDED. FOR EACH LIVING CHILD: CURRENT AGE IS RECORDED. FOR EACH DEAD CHILD: AGE AT DEATH IS RECORDED. FOR AGE AT DEATH 1 YR. OR 2 YRS: PROBE TO DETERMINE EXACT NUMBER OF MONTHS.		☐
229	CHECK 218 AND ENTER THE NUMBER OF BIRTHS SINCE JANUARY 1993. IF NONE, RECORD >0'.		☐

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
230	Are you pregnant?	YES.....1. NO.....2. UNSURE.....8.	
231	When did your last menstrual period start? _____ (DATE, IF GIVEN)	DAYS AGO.....1 ☐☐ WEEKS AGO.....2 ☐☐ MONTHS AGO.....3 ☐☐ YEARS AGO.....4 ☐☐ IN MENOPAUSE.....994 BEFORE LAST BIRTH.....995 NEVER MENSTRUATED.....996	

Now I would like to talk about family planning - the various ways or methods that a couple can use to delay or avoid a pregnancy.

CIRCLE CODE 1 IN 301 FOR EACH METHOD MENTIONED SPONTANEOUSLY.
THEN PROCEED DOWN COLUMN 302, READING THE NAME AND DESCRIPTION OF EACH METHOD NOT MENTIONED SPONTANEOUSLY. CIRCLE CODE 2 IF METHOD IS RECOGNIZ AND CODE 3 IF NOT RECOGNIZED.
THEN, FOR EACH METHOD WITH CODE 1 OR 2 CIRCLED IN 301 OR 302, ASK 303 AND 304.

301	Which ways or methods have you heard about?	SPONTANEOUS YES	302 Have you ever heard of (METHOD)? PROBED YES	NO	303 Have you ever used (METHOD)?	304 Do you know a place you could obtain (METHOD)? IF YES: What is the main place where you could go to obtain (METHOD)? RECORD THE PLACE
01	PILL (DAILY) Women can take a pill every day.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....
02	MONTHLY PILL (CHINESE PILL) Women can take a pill every month.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....
03	IUD Women can have a loop or coil placed inside them by a doctor or a nurse.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....
04	INJECTIONS Women can have an injection by a doctor or nurse which stops them from becoming pregnant for several months.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....
05	IMPLANTS Women can have several small rods placed in their upper arm by a doctor or nurse which can prevent pregnancy for several years.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....
06	DIAPHRAGM, FOAM, JELLY Women can place a sponge, suppository, diaphragm, jelly, or cream inside themselves before intercourse.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....
07	CONDOM Men can put a rubber sheath on their penis during sexual intercourse.	1	2	3	YES ..... 1 NO 2	YES, PLACE ..... 1 [ ][ ] NO .....

8	FEMALE STERILIZATION Women can have an operation to avoid having any more children.	1 2 3	Have you ever had an operation to avoid having any more children? YES ..... 1 NO 2	Do you know a place a woman could be sterilized? YES, PLACE ..... 1 ☐☐ NO 2
9	MALE STERILIZATION Men can have an operation to avoid having any more children.	1 2 3	Have you ever had a partner who had an operation to avoid having children? YES ..... 1 NO 2	Do you know a place a man could be sterilized? YES, PLACE ..... 1 ☐☐ NO 2
0	RHYTHM, PERIODIC ABSTINENCE Every month that a woman is sexually active she can avoid having sexual intercourse on the days of the month she is most likely to get pregnant.	1 2 3	YES ..... 1 NO 2	
1	WITHDRAWAL Men can be careful and pull out before climax.	1 2 3	YES ..... 1 NO 2	
2	Have you heard of any other ways or methods that women or men can use to avoid pregnancy?	1 3 _____ (SPECIFY) _____ (SPECIFY)	YES ..... 1 NO ..... 2 YES ..... 1 NO 2	
305	CHECK 303: NOT A SINGLE YES OR Q303 NEVER ASKED (NEVER USED) ☐	AT LEAST ONE AYES≅ (EVER USED) ☐ → SKIP TO 308		

Q304: CODES FOR PLACE:

PUBLIC SECTOR
- PROVINCIAL HOSPITAL 11
- DISTRICT HOSPITAL 12
- GOV. HOSP. IN PHNOM PENH 13
- HEALTH CENTER 14
- KHUM NURSE 15
- KHUM MIDWIFE 16
- OTHER PUBLIC 17

PRIVATE MEDICAL SECTOR
- TRAINED HEALTH WORKER 21
- OTHER PRIVATE MEDICAL 26

BOUGHT FROM
- PHARMACY/MARKET 31

TRADITIONAL
- KRU KHMER 41
- MONK/RELIGIOUS LEADER 42
- TRADITIONNAL BIRTH ATTENDANT 43
- MAGICIAN 44
- OTHER 46

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
306	Have you ever used anything or tried in any way to delay or avoid getting pregnant?	YES.....1. NO.....2.	313
307	What have you used or done? CORRECT 303, 304 AND 305 (AND 302 IF NECESSARY).		
308	CHECK 303: WOMAN NOT STERILIZED WOMAN STERILIZED		311
309	CHECK 230: NOT PREGNANT OR UNSURE PREGNANT		401
310	Are you currently doing something or using any method to delay or avoid getting pregnant?	YES.....1. NO.....2.	313
311	Which method are you using? CIRCLE >08' FOR FEMALE STERILIZATION.	PILL (DAILY).....01 PILL (MONTHLY -CHINESE PILL).....02 IUD.....03 INJECTIONS.....04 IMPLANTS.....05 DIAPHRAGM/FOAM/JELLY.....06 CONDOM.....07 FEMALE STERILIZATION.....08 MALE STERILIZATION.....09 PERIODIC ABSTINENCE.....10 WITHDRAWAL.....11 TRADITIONAL MEDICINE.....12 MAGIC CHARMS/AMULETES.....13 OTHER _____ 96 (SPECIFY)	401
312	Where did you obtain (METHOD) the last time? PROBE full description IF ANSWERS "HOSPITAL" PROBE: Do you mean a permanent building where health workers are present every day? (IF NO, CORRECT RESPONSE) (IF YES, Was it a Provincial Hospital, District Hospital, or Health Center?)	PUBLIC SECTOR PROVINCIAL HOSPITAL.....11 DISTRICT HOSPITAL.....12 GOV. HOSP. IN PHNOM PENH.....13 HEALTH CENTER.....14 KHUM NURSE.....15 KHUM MIDWIFE.....16 OTHER PUBLIC _____ 17 (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER.....21 OTHER PRIVATE MEDICAL _____ 26 (SPECIFY) BOUGHT FROM PHARMACY/MARKET.....31 TRADITIONAL KRU KHMER.....41 MONK/RELIGIOUS LEADER.....42 TRADITIONAL BIRTH ATTENDANT.....43 MAGICIAN.....44 OTHER _____ 96 (SPECIFY)	401

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
313	What is the main reason you are not using a method of contraception to avoid pregnancy?	NOT MARRIED.....11 FERTILITY-RELATED REASONS NOT HAVING SEX.....21 INFREQUENT SEX.....22 HUSBAND ABSENT/DEAD.....23 MENOPAUSAL/HYSTERECTOMY..24 SUBFECUND/INFECUND.....25 POSTPARTUM/BREASTFEEDING.26 WANTS (MORE) CHILDREN.....27 OPPOSITION TO USE RESPONDENT OPPOSED.....31 HUSBAND OPPOSED.....32 OTHERS OPPOSED.....33 RELIGIOUS PROHIBITION.....34 LACK OF KNOWLEDGE KNOWS NO METHOD.....41 KNOWS NO SOURCE.....42 METHOD-RELATED REASONS HEALTH CONCERNS.....51 FEAR OF SIDE EFFECTS.....52 LACK OF ACCESS/TOO FAR.....53 COST TOO MUCH.....54 INCONVENIENT TO USE.....55 INTERFERES WITH BODY=S NATURAL PROCESSES.....56 OTHER _____ 96 (SPECIFY) DON=T KNOW.....98	

SECTION 4A. PREGNANCY AND BREASTFEEDING

401	CHECK 229: ONE OR MORE BIRTHS SINCE JAN. 1993 [ ] ↓ NO BIRTHS SINCE JAN. 1993 [ ] → (SKIP TO 449)			
402	ENTER THE NAME, LINE NUMBER, AND SURVIVAL STATUS OF EACH BIRTH SINCE JANUARY 1993 IN THE TABLE. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS. BEGIN WITH THE LAST BIRTH. (IF THERE ARE MORE THAN 3 BIRTHS, USE ADDITIONAL QUESTIONNAIRES). Now I would like to ask you some questions about the health of all your children born in the last five years. **We will talk about one child at a time.**			
403	LINE NUMBER FROM Q215	LAST BIRTH LINE NUMBER [ ][ ]	NEXT-TO-LAST BIRTH LINE NUMBER [ ][ ]	SECOND-FROM-LAST BIRTH LINE NUMBER [ ][ ]
404	FROM Q215 AND Q219	NAME ______ ALIVE [ ] DEAD [ ]	NAME ______ ALIVE [ ] DEAD [ ]	NAME ______ ALIVE [ ] DEAD [ ]
405	When you were pregnant with (NAME), did you see anyone for antenatal care for this pregnancy? IF YES: Whom did you see? Anyone else? PROBE FOR THE TYPE OF PERSON AND RECORD ALL PERSONS SEEN.	HEALTH PROFESSIONAL DOCTOR....A NURSE....B MIDWIFE....C OTHER PERSON TRADITIONAL BIRTH ATTENDANT....D OTHER______X (SPECIFY) NO ONE....Y → (SKIP TO 409)	HEALTH PROFESSIONAL DOCTOR....A NURSE....B MIDWIFE....C OTHER PERSON TRADITIONAL BIRTH ATTENDANT....D OTHER______X (SPECIFY) NO ONE....Y → (SKIP TO 409)	HEALTH PROFESSIONAL DOCTOR....A NURSE....B MIDWIFE....C OTHER PERSON TRADITIONAL BIRTH ATTENDANT....D OTHER______X (SPECIFY) NO ONE....Y → (SKIP TO 409)
406	Were you given a white card for this pregnancy? IF YES: May I see it please?	YES, SEEN....1 YES, NOT SEEN....2 NO CARD....3	YES, SEEN....1 YES, NOT SEEN....2 NO CARD....3	YES, SEEN....1 YES, NOT SEEN....2 NO CARD....3
407	How many months pregnant were you when you first received antenatal care?	MONTHS [ ][ ] DON=T KNOW....98	MONTHS [ ][ ] DON=T KNOW....98	MONTHS [ ][ ] DON=T KNOW....98
408	How many times did you receive antenatal care during this pregnancy?	NO. OF TIMES [ ][ ] DON=T KNOW....98	NO. OF TIMES [ ][ ] DON=T KNOW....98	NO. OF TIMES [ ][ ] DON=T KNOW....98
409	When you were pregnant with (NAME) were you given an injection in the right arm to prevent the baby from getting tetanus, that is, spasms after birth?	YES....1 NO....2 → (SKIP TO 411) DON=T KNOW....8	YES....1 NO....2 → (SKIP TO 411) DON=T KNOW....8	YES....1 NO....2 → (SKIP TO 411) DON=T KNOW....8
410	During this pregnancy, how many times did you get this injection?	TIMES [ ] DON=T KNOW....8	TIMES [ ] DON=T KNOW....8	TIMES [ ] DON=T KNOW....8

		LAST BIRTH NAME ______	NEXT-TO-LAST BIRTH NAME ______	SEOND-FROM-LAST BIRTH NAME ______
411	Where did you give birth to (NAME)? PROBE full description IF ANSWERS "HOSPITAL" PROBE: Do you mean a permanent building where health workers are present every day? (IF NO, CORRECT RESPONSE) (IF YES, Was it a Provincial Hospital, District Hospital, or Health Center?)	HOME YOUR HOME....11 OTHER HOME....12 PUBLIC SECTOR PROVINCIAL HOSPITAL...21 DISTRICT HOSPITAL....22 GOV. HOSP. IN P.P....23 HEALTH CENTER....24 OTHER PUBLIC______26 (SPECIFY) PRIVATE MEDICAL SECTOR PRIVATE CLINIC....31 OTHER PRIVATE MEDICAL______36 (SPECIFY) OTHER______96 (SPECIFY)	HOME YOUR HOME....11 OTHER HOME....12 PUBLIC SECTOR PROVINCIAL HOSPITAL...21 DISTRICT HOSPITAL....22 GOV. HOSP. IN P.P....23 HEALTH CENTER....24 OTHER PUBLIC______26 (SPECIFY) PRIVATE MEDICAL SECTOR PRIVATE CLINIC....31 OTHER PRIVATE MEDICAL______36 (SPECIFY) OTHER______96 (SPECIFY)	HOME YOUR HOME....11 OTHER HOME....12 PUBLIC SECTOR PROVINCIAL HOSPITAL...21 DISTRICT HOSPITAL....22 GOV. HOSP. IN P.P....23 HEALTH CENTER....24 OTHER PUBLIC______26 (SPECIFY) PRIVATE MEDICAL SECTOR PRIVATE CLINIC....31 OTHER PRIVATE MEDICAL______36 (SPECIFY) OTHER______96 (SPECIFY)
412	Who assisted with the delivery of (NAME)? Anyone else? PROBE FOR THE TYPE OF PERSON AND RECORD ALL PERSONS ASSISTING.	HEALTH PROFESSIONAL DOCTOR....A NURSE....B MIDWFE....C OTHER PERSON TRADITIONAL BIRTH ATTENDANT....D RELATIVE/FRIEND....E OTHER______X (SPECIFY) NO ONE....Y	HEALTH PROFESSIONAL DOCTOR....A NURSE....B MIDWFE....C OTHER PERSON TRADITIONAL BIRTH ATTENDANT....D RELATIVE/FRIEND....E OTHER______X (SPECIFY) NO ONE....Y	HEALTH PROFESSIONAL DOCTOR....A NURSE....B MIDWFE....C OTHER PERSON TRADITIONAL BIRTH ATTENDANT....D RELATIVE/FRIEND....E OTHER______X (SPECIFY) NO ONE....Y
413	Did you ever breastfeed (NAME)?	YES....1 NO....2 (SKIP TO 418)	YES....1 NO....2 (SKIP TO 418)	YES....1 NO....2 (SKIP TO 418)
414	How long after birth did you first put (NAME) to the breast?	WITHIN FIRST HOUR....1 1 TO 24 HOURS....2 25 HOURS OR LATER....3	WITHIN FIRST HOUR....1 1 TO 24 HOURS....2 25 HOURS OR LATER....3	WITHIN FIRST HOUR....1 1 TO 24 HOURS....2 25 HOURS OR LATER....3
415	CHECK 404: CHILD ALIVE?	ALIVE ☐ ☐ DEAD (SKIP TO 417)	ALIVE ☐ ☐ DEAD (SKIP TO 417)	ALIVE ☐ ☐ DEAD (SKIP TO 417)
416	Are you still breastfeeding (NAME)?	YES....1 (SKIP TO 419) NO....2	YES....1 (SKIP TO 419) NO....2	YES....1 (SKIP TO 419) NO....2
417	For how many months did you breastfeed (NAME)?	MONTHS....☐☐.... DON=T KNOW....98	MONTHS....☐☐.... DON=T KNOW....98	MONTHS....☐☐.... DON=T KNOW....98
418	CHECK 404: CHILD ALIVE?	ALIVE ☐ DEAD ☐ (GO BACK TO 405 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 424)	ALIVE ☐ DEAD ☐ (GO BACK TO 405 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 424)	ALIVE ☐ DEAD ☐ (GO BACK TO 405 IN NEXT COLUMN OR, IF NO MORE BIRTHS, GO TO 424)

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____	SEOND-FROM-LAST BIRTH NAME _____
419	Did (NAME) drink anything from a bottle with a nipple yesterday or last night?	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8
420	At any time yesterday or last night, was (NAME) given any of the following: Water? Other liquids (not including breast milk)? Solid or semi-solid foods?	YES NO DK WATER.....1 2 8 OTHER LIQUIDS.....1 2 8 SOLID/SEMI-SOLID FOODS.....1 2 8	YES NO DK WATER.....1 2 8 OTHER LIQUIDS.....1 2 8 SOLID/SEMI-SOLID FOODS.....1 2 8	YES NO DK WATER.....1 2 8 OTHER LIQUIDS.....1 2 8 SOLID/SEMI-SOLID FOODS.....1 2 8
421		GO BACK TO 405 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 424.	GO BACK TO 405 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 424.	GO BACK TO 405 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 424.

SECTION 4B. IMMUNIZATION AND HEALTH

424	ENTER THE NAME, LINE NUMBER, AND SURVIVAL STATUS OF EACH BIRTH SINCE JANUARY 1993 IN THE TABLE. ASK THE QUESTIONS ABOUT ALL OF THESE BIRTHS. BEGIN WITH THE LAST BIRTH. (IF THERE ARE MORE THAN 3 BIRTHS, USE ADDITIONAL QUESTIONNAIRES).			
425	LINE NUMBER FROM Q215	LAST BIRTH LINE NUMBER.....	LAST BIRTH LINE NUMBER.....	LAST BIRTH LINE NUMBER.....
426	FROM Q215 AND Q219	NAME _____ ALIVE ☐ DEAD ☐ (GO TO 426 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 449)	NAME _____ ALIVE ☐ DEAD ☐ (GO TO 426 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 449)	NAME _____ ALIVE ☐ DEAD ☐ (GO TO 426 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 449)
427	Do you have a yellow card where (NAME=S) vaccinations are written down? IF YES: May I see it please?	YES, SEEN.....1 (SKIP TO 429) YES, NOT SEEN.....2 (SKIP TO 431) NO CARD.....3	YES, SEEN.....1 (SKIP TO 429) YES, NOT SEEN.....2 (SKIP TO 431) NO CARD.....3	YES, SEEN.....1 (SKIP TO 429) YES, NOT SEEN.....2 (SKIP TO 431) NO CARD.....3
428	Did you ever have a vaccination card for (NAME)?	YES.....1 (SKIP TO 431) NO.....2	YES.....1 (SKIP TO 431) NO.....2	YES.....1 (SKIP TO 431) NO.....2
429	(1) COPY VACCINATION DATE FOR EACH VACCINE FROM THE CARD. (2) WRITE >44' IN >DAY= COLUMN IF CARD SHOWS THAT A VACCINATION WAS GIVEN, BUT NO DATE IS RECORDED.	DAY MONTH YEAR	DAY MONTH YEAR	DAY MONTH YEAR
	BCG	BCG	BCG	BCG
	Polio 0	P0	P0	P0
	Polio 1	P1	P1	P1
	Polio 2	P2	P2	P2
	Polio 3	P3	P3	P3
	DPT 1	D1	D1	D1
	DPT 2	D2	D2	D2
	DPT 3	D3	D3	D3
	Measles	MEA	MEA	MEA

430	Has (NAME) received any vaccinations that are not recorded on this card? RECORD >YES= ONLY IF RESPONDENT MENTIONS BCG, POLIO 1-3, DPT 1-3, AND/OR MEASLES VACCINE(S).	YES.....1 ← (PROBE FOR VACCINA-TIONS AND WRITE >66' IN THE CORRESPONDING DAY COLUMN IN 429, THEN) → (SKIP TO 433) NO.....2 ← (SKIP TO 433) DON=T KNOW.....8	YES.....1 ← (PROBE FOR VACCINA-TIONS AND WRITE >66' IN THE CORRESPONDING DAY COLUMN IN 429, THEN) → (SKIP TO 433) NO.....2 ← (SKIP TO 433) DON=T KNOW.....8	YES.....1 ← (PROBE FOR VACCINA-TIONS AND WRITE >66' IN THE CORRESPONDING DA COLUMN IN 429, THEN) → (SKIP TO 433 NO.....2 (SKIP TO 433) ← DON=T KNOW.....8

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____	SECOND-FROM-LAST BIRTH NAME _____
431	Did (NAME) ever receive any vaccinations to prevent him/her from getting diseases?	YES.....1 NO.....2 (SKIP TO 433) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 433) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 433) DON=T KNOW.....8
432	Please tell me if (NAME) received any of the following vaccinations:			
432A	A BCG vaccination against tuberculosis, that is, an injection in the left shoulder that caused a scar?	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8
432B	Polio vaccine, that is, drops in the mouth?	YES.....1 NO.....2 (SKIP TO 432E) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 432E) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 432E) DON=T KNOW.....8
432C	How many times?	NUMBER OF TIMES.....	NUMBER OF TIMES.....	NUMBER OF TIMES.....
432D	When was the first polio vaccine given, just after birth or later?	JUST AFTER BIRTH.....1 LATER.....2	JUST AFTER BIRTH.....1 LATER.....2	JUST AFTER BIRTH.....1 LATER.....2
432E	DPT vaccination, that is, an injection usually given at the same time as polio drops?	YES.....1 NO.....2 (SKIP TO 432G) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 432G) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 432G) DON=T KNOW.....8
432F	How many times?	NUMBER OF TIMES.....	NUMBER OF TIMES.....	NUMBER OF TIMES.....
432G	An injection to prevent measles?	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8
433	Did (NAME) receive a capsule of vitamin A like this during the last 12 months? SHOW THE CAPSULE	YES.....1 NO.....2 (SKIP TO 435) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 435) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 435) DON=T KNOW.....8
434	How many times?	NUMBER OF TIMES.....	NUMBER OF TIMES.....	NUMBER OF TIMES.....
435	Has (NAME) been ill with a cough at any time in the last 2 weeks?	YES.....1 NO.....2 (SKIP TO 439) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 439) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 439) DON=T KNOW.....8
436	When (NAME) was ill with a cough, did he/she have trouble breathing?	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8
437	Did you seek treatment for the cough?	YES.....1 NO.....2 (SKIP TO 439) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 439) DON=T KNOW.....8	YES.....1 NO.....2 (SKIP TO 439) DON=T KNOW.....8

		LAST BIRTH NAME _____	NEXT-TO-LAST BIRTH NAME _____	SECOND-FROM-LAST BIRTH NAME _____
438	Where did you seek advice or treatment? Anywhere else? RECORD ALL MENTIONED. PROBE full description IF ANSWERS "HOSPITAL" PROBE: Do you mean a permanent building where health workers are present every day? (IF NO, CORRECT RESPONSE) (IF YES, Was it a Provincial Hospital, District Hospital, or Health Center?)	PUBLIC SECTOR PROVINCIAL HOSPITAL.....A DISTRICT HOSPITAL.....B GOV. HOSP. IN P.P.....C HEALTH CENTER.....D KHUM NURSE.....E OTHER PUBLIC_____F (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER.....G PHARMACY/MARKET.....H OTHER PRIVATE MEDICAL_____I (SPECIFY) TRADITIONAL KRU KHMER.....J MONK/RELIG. LEADER.....K TRADITIONNAL BIRTH ATTENDANT.....L MAGICIAN.....M OTHER_____N (SPECIFY)	PUBLIC SECTOR PROVINCIAL HOSPITAL.....A DISTRICT HOSPITAL.....B GOV. HOSP. IN P.P.....C HEALTH CENTER.....D KHUM NURSE.....E OTHER PUBLIC_____F (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER.....G PHARMACY/MARKET.....H OTHER PRIVATE MEDICAL_____I (SPECIFY) TRADITIONAL KRU KHMER.....J MONK/RELIG. LEADER.....K TRADITIONNAL BIRTH ATTENDANT.....L MAGICIAN.....M OTHER_____N (SPECIFY)	PUBLIC SECTOR PROVINCIAL HOSPITAL.....A DISTRICT HOSPITAL.....B GOV. HOSP. IN P.P.....C HEALTH CENTER.....D KHUM NURSE.....I OTHER PUBLIC_____F (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER.....G PHARMACY/MARKET.....H OTHER PRIVATE MEDICAL_____J (SPECIFY) TRADITIONAL KRU KHMER.....J MONK/RELIG. LEADER.....K TRADITIONNAL BIRTH ATTENDANT.....L MAGICIAN.....M OTHER_____N (SPECIFY)
439	Has (NAME) had watery diarrhea in the last 2 weeks?	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8
440	Has (NAME) had diarrhea with blood in the last 2 weeks?	YES.....1 NO.....2 DON=T KNOW.....8	YES.....1 NO.....2 DON=T KNOW.....8	YES..... NO..... DON=T KNOW.....
440A	FROM Q.439 to Q.440	IF NO OR DON'T KNOW TO Q.439 AND Q.440, GO TO Q.448; IF YES TO EITHER, GO TO Q.441	IF NO OR DON'T KNOW TO Q.439 AND Q.440, GO TO Q.448; IF YES TO EITHER, GO TO Q.441	IF NO OR DON'T KNOW TO Q.439 AND Q.440, GO TO Q.44 IF YES TO EITHER, GO TO Q.441
441	On the worst day of the watery diarrhea/ dysentery, how many bowel movements did (NAME) have?	NUMBER OF BOWEL MOVEMENTS..... [ ][ ] DON=T KNOW.....98	NUMBER OF BOWEL MOVEMENTS..... [ ][ ] DON=T KNOW.....98	NUMBER OF BOWEL MOVEMENTS..... [ ][ ] DON=T KNOW.....98
442	Was he/she given the same amount to drink as before the watery diarrhea/dysentery, or more, or less?	SAME.....1 MORE.....2 LESS.....3 DON=T KNOW.....8	SAME.....1 MORE.....2 LESS.....3 DON=T KNOW.....8	SAME..... MORE..... LESS..... DON=T KNOW.....
443	When (NAME) had watery diarrhea/ dysentery, was he/she given any of the following to drink:	YES NO DK	YES NO DK	YES NO D
	A fluid, made from a Special packet Called Oralyte?	FLUID FROM ORALYTE PKT.....1 2 8	FLUID FROM ORALYTE PKT.....1 2 8	FLUID FROM ORALYTE PKT.....1 2 8
	Thin watery gruel made from rice or carrots?	THIN WATERY GRUEL.....1 2 8	THIN WATERY GRUEL.....1 2 8	THIN WATERY GRUEL.....1 2
	Soup?	SOUP.....1 2 8	SOUP.....1 2 8	SOUP.....1 2
	Home-made sugar-salt-water solution?	SUG.-SALT-WATER SOLUTION.....1 2 8	SUG.-SALT-WATER SOLUTION.....1 2 8	SUG.-SALT-WATER SOLUTION.....1 2
	Milk or infant Formula?	MILK/INFANT FORM...1 2 8	MILK/INFANT FORM...1 2 8	MILK/INFANT FORM.....1 2
	Coconut water?	COCONUT WATER.....1 2 8	COCONUT WATER.....1 2 8	COCONUT WATER.....1 2
	Water?	WATER.....1 2 8	WATER.....1 2 8	WATER.....1 2
	Any other liquid?	OTHER LIQUID.....1 2 8	OTHER LIQUID.....1 2 8	OTHER LIQUID.....1 2

		LAST BIRTH NAME ________	NEXT-TO-LAST BIRTH NAME ________	SECOND-FROM-LAST BIRTH NAME ________
444	Was anything (else) given to treat the watery diarrhea/ dysentery?	YES....1 NO....2 (SKIP TO 446) DON=T KNOW....8	YES....1 NO....2 (SKIP TO 446) DON=T KNOW....8	YES....1 NO....2 (SKIP TO 446) DON=T KNOW....8
445	What was given to treat the watery diarrhea/ dysentery? Anything else? RECORD ALL MENTIONED.	RECOMMENDED HOME FLUID....A PILL/LIQUID MEDECINE....B INJECTION....C (I.V.) INTRAVENOUS....D HOME REMEDIES/ HERBAL MEDICINES....E OTHER ________ X (SPECIFY)	RECOMMENDED HOME FLUID....A PILL/LIQUID MEDECINE....B INJECTION....C (I.V.) INTRAVENOUS....D HOME REMEDIES/ HERBAL MEDICINES....E OTHER ________ X (SPECIFY)	RECOMMENDED HOME FLUID....A PILL/LIQUID MEDECINE....B INJECTION....C (I.V.) INTRAVENOUS....D HOME REMEDIES/ HERBAL MEDICINES....E OTHER ________ X (SPECIFY)
446	Did you seek advice or treatment for the watery diarrhea/ dysentery?	YES....1 NO....2 DON'T KNOW....8 (SKIP TO 448)	YES....1 NO....2 DON'T KNOW....8 (SKIP TO 448)	YES....1 NO....2 DON'T KNOW....8 (SKIP TO 448)
447	Where did you seek advice or treatment? Anywhere else? RECORD ALL MENTIONED. PROBE full description IF ANSWERS "HOSPITAL" PROBE: Do you mean a permanent building where health workers are present every day? (IF NO, CORRECT RESPONSE) (IF YES, Was it a Provincial Hospital, District Hospital, or Health Center?)	PUBLIC SECTOR PROVINCIAL HOSPITAL....A DISTRICT HOSPITAL....B GOV. HOSP. IN P.P....C HEALTH CENTER....D KHUM NURSE....E OTHER PUBLIC ________ F (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER....G PHARMACY/MARKET....H OTHER PRIVATE MEDICAL ________ I (SPECIFY) TRADITIONAL KRU KHMER....J MONK/RELIG. LEADER....K TRADITIONNAL BIRTH ATTENDANT....L MAGICIAN....M OTHER ________ N (SPECIFY)	PUBLIC SECTOR PROVINCIAL HOSPITAL....A DISTRICT HOSPITAL....B GOV. HOSP. IN P.P....C HEALTH CENTER....D KHUM NURSE....E OTHER PUBLIC ________ F (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER....G PHARMACY/MARKET....H OTHER PRIVATE MEDICAL ________ I (SPECIFY) TRADITIONAL KRU KHMER....J MONK/RELIG. LEADER....K TRADITIONNAL BIRTH ATTENDANT....L MAGICIAN....M OTHER ________ N (SPECIFY)	PUBLIC SECTOR PROVINCIAL HOSPITAL....A DISTRICT HOSPITAL....B GOV. HOSP. IN P.P....C HEALTH CENTER....D KHUM NURSE....E OTHER PUBLIC ________ F (SPECIFY) PRIVATE MEDICAL SECTOR TRAINED HEALTH WORKER....G PHARMACY/MARKET....H OTHER PRIVATE MEDICAL ________ I (SPECIFY) TRADITIONAL KRU KHMER....J MONK/RELIG. LEADER....K TRADITIONNAL BIRTH ATTENDANT....L MAGICIAN....M OTHER ________ N (SPECIFY)
448		GO BACK TO 426 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 449.	GO BACK TO 426 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 449.	GO BACK TO 426 IN NEXT COLUMN; OR, IF NO MORE BIRTHS, GO TO 449.

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
449	When a child is sick with diarrhea, what signs of illness would tell you that he or she should be taken to a health facility or health worker? CIRCLE ALL MENTIONED.	REPEATED WATERY STOOLS.....A ANY WATERY STOOLS.....B REPEATED VOMITING.....C ANY VOMITING.....D BLOOD IN STOOLS.....E FEVER.....F MARKED THIRST.....G NOT EATING/NOT DRINKING WELL.....H GETTING SICKER/VERY SICK.....I NOT GETTING BETTER.....J OTHER _____ X (SPECIFY) DON=T KNOW.....Z	
450	When a child is sick with a cough, what signs of illness would tell you that he or she should be taken to a health facility or health worker? CIRCLE ALL MENTIONED.	FAST BREATHING.....A DIFFICULT BREATHING.....B NOISY BREATHING.....C FEVER.....D UNABLE TO DRINK.....E NOT EATING/NOT DRINKING WELL.....F GETTING SICKER/VERY SICK.....G NOT GETTING BETTER.....H OTHER _____ X (SPECIFY) DON=T KNOW.....Z	
451	CHECK 443, ALL COLUMNS: NO CHILD RECEIVED ORALYTE OR Q.443 NOT ASKED ☐ ANY CHILD RECEIVED ORALYTE ☐ → 453		
452	Have you ever heard of a special product called Oralyte you can get for the treatment of diarrhea?	YES.....1. NO.....2.	
453	Now, I am going to ask you a few more questions about your vaccinations. Do you have a pink and/or white card where vaccinations that you have received are written down? IF YES: May I see it please?	YES, SEEN.....1. YES, NOT SEEN.....2 → 457 NO.....3 → 456	
454	COPY THE NUMBER OF TETANUS VACCINATION INJECTIONS FROM THE PINK AND/OR WHITE CARD	NUMBER OF INJECTIONS..... ☐	
455	Have you received any more tetanus vaccination injections that are not recorded on this card? Don=ttell me about vaccinations that you were given as a child. IF YES? How many?	YES, NUMBER OF TIMES.....1 ☐ YES, DON'T REMEMBER NUMBER OF TIMES.....21 NO.....31 → 501	
456	Did you ever have a card where vaccinations that you have received are written down?	YES.....1. NO.....2.	
457	Have you ever received an injection in the right arm in order to protect against tetanus?	YES.....1. NO.....2. → 501	
458	In total, how many times did you receive this injection?	NUMBER OF TIMES..... ☐ DON'T REMEMBER.....98	

SECTION 5. MARRIAGE

501	Are you currently married?	YES, CURRENTLY MARRIED.....1 NO, NOT IN UNION.....2	→504
502	Have you ever been married?	YES, FORMERLY MARRIED.....1 NO.....2	→504
503	What is your marital status now: are you widowed or divorced?	WIDOWED.....1 DIVORCED.....2	
504	RECORD THE TIME	HOURS..... MINUTES.....	