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The first Southern Sudan Household Health Survey (SHHS) was a joint effort of the Ministry of Health, Government of Southern Sudan (MOH-GOSS) and the Southern Sudan Commission for Census, Statistics and Evaluation (SSCCSE). The survey was part of a wider activity that covered the 25 states of Sudan. Whereas this report focuses on the 10 states of Southern Sudan, it includes findings from the 15 remaining States of Sudan. This was considered necessary by the stakeholders for ease of comparison and reference.

The findings from this survey provide the information needed for evidence based policy formulation and planning geared to rapid improvement of the health situation of the people of Southern Sudan, especially, children and women.

The SHHS management team convey heartfelt thanks to the Vice President of the Government of Southern Sudan, Lt Gen Dr. Riek Machar for launching this document, and to the Minister of Health, Government of Southern Sudan H.E. Dr. Joseph Manytuil Wejang and H.E. Mr. Isaiah Chol Aruai, the Chairperson of Southern Sudan Commission of Census, Statistics and Evaluation for their leadership support, and for ensuring that the survey is completed successfully.

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FOREWORD

The Sudan Household Health Survey is a unique and historic event that has happened after the signing of the Comprehensive Peace Agreement. It is Unique because despite all the challenges and difficulties in Southern Sudan, it still took place. It is historic because it is the first joint activity conducted across the 25 states in Sudan following the Comprehensive Peace Agreement. Much effort to scale up health and social services in Southern Sudan has been affected by the long standing period of civil war in Sudan. With the signing of the CPA, a dynamic process of change and innovation is required to enhance evidence based development planning in order to stimulate the rapid building of Southern Sudan.

The CPA has also availed a unique opportunity to all Sudanese and their partners to re-create and implement a coordinated strategy that addresses the needs of the population. As a result, the GOSS and development partners are continuing to provide the necessary resources for the purpose of addressing health issues and alleviating poverty and deprivation.

The need for information to enhance planning and improvement of health and social services in Southern Sudan cannot be overemphasized, as we work towards the attainment of the MDGs to which, GOSS is highly committed. This calls for an overhaul of the existing health services infrastructure and an entire reorganization of existing current approaches to service delivery.

This SHHS report identifies the current challenges in Southern Sudan and provides the basis for the development of a coherent strategy in addressing these challenges. The Sudan Household Health Survey will continue to fill some of the information gaps and enable us to make policies and plans based on a more precise understanding of the social status and the situation of basic service provision in Southern Sudan. It is my sincere hope that the report will enable the relevant Ministries and their sectoral partners to make more informed decisions in the provision of services and ensure coherence of interventions to avoid duplication of effort and achievement of efficiency gains in the use of human and financial resources.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
AL	Arab League
ANC	Antenatal Care
ARI	Acute Respiratory Infection
ACSI	African Child Survival Initiative
BCG	Bacillis-Cereus-Geuerin (Tuberculosis)
CBS	Central Bureau of Statistics
CPA	Comprehensive Peace Agreement
CPR	Contraceptive Prevalence Rate
CRC	Convention on the Rights of the Child
DHS	Demographic and Health Survey
DPT	Diphtheria Pertussis Tetanus
EPI	Expanded Programme on Immunisation
FGM/C	Female Genital Mutilation/Cutting
FMOH	Federal Ministry of Health
FP	Family Planning
GPI	Gender Parity Index
GONU	Government of National Unity
GOSS	Government of Southern Sudan
HIV	Human Immunodeficiency Virus
HTP	Harmful Traditional Practice
ICPD	International Conference on Population and Development
IDD	Iodine Deficiency Disorders
IDP	Internally Displaced Person
IMR	Infant Mortality Rate
INC	Interim National Constitution
ITN	Insecticide Treated Net
IUD	Intrauterine Device
JAM	Joint Assessment Mission
LAM	Lactational Amenorrhea Method
MD	Millennium Declaration
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MMR	Maternal Mortality Ratio
MMR	Measles, Mumps, Rubella
MOH	Ministry of Health
NAR	Net Attendance Rate
NBG	Northern Bahr El Ghazal
NIDs	National Immunisation Days
NMR	Neonatal Mortality Rate
PAPFAM	Pan Arab Project for Family Health
PHCC	Primary Health Care Centre
PHCU	Primary health Care Unit
ppm	Parts Per Million
PRSP	Poverty Reduction Strategy Paper
RH	Reproductive Health

SHHS	Sudan Household Health Survey
SMS	Safe Motherhood Survey
SPSS	Statistical Package for Social Sciences
SSCCSE	Southern Sudan Commission for Census, Statistics and Evaluation
SSIC	Southern Sudan Interim Constitution
TT	Tetanus Toxoid
UN	United Nations
U5MR	Under-5 Mortality Rate
UNAIDS	United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNGASS	United Nations General Assembly Special Session on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WBG	Western Bahr El Ghazal
WFFC	World Fit for Children
WFP	World Food Programme
WHO	World Health Organization

EXECUTIVE SUMMARY

The Sudan Household Health survey (SHHS) is a joint activity conducted in 2006 by the Ministry of Health (MOH) and the Central Bureau of Statistics (CBS) representing the Government of National Unity (GONU) on one hand, and the Ministry of Health (MOH) and the Southern Sudan Commission for Census, Statistics and Evaluation (SSCCSE), representing the Government of Southern Sudan (GOSS) on the other. The survey is modeled on the structure of the Multi Indicator Cluster Surveys (MICS) and Pan Arab Project for Family (PAPFAM) methodologies.

The survey also received additional financial and technical supported from the United Nations Children's Fund (UNICEF), the World Food Programme (WFP), United Nations Population Fund (UNFPA), United States Agency for International Development (USAID), World Health Organization (WHO), and the League of Arab States (AL).

The survey covered key social development indicators including child health, nutrition, reproductive health and HIV/AIDS. The survey also covered other basic social services such as education, water and sanitation and Agriculture (Report on Agriculture aspect written in a different report). This approach was followed because it ensures a coherence of interventions that will induce synergy of efficiency gains in the national use of resources and enhance the facilitating efforts of all the stakeholders.

The main objectives of the survey was to collect core baseline social indicators for the principle purpose of informing public policy formulation and planning; and providing a starting point from which progress towards MDGS and other quality of life indicators can be measured. The survey was also intended to provide up-to-date information for assessing the situation of children and women in particular and strengthening the institutional capacity needed to carry out some of the aspects of the up-coming Census and other subsequent surveys.

This report provides the historical background and the justification of the survey at the time it was carried out. It details the methodology and approach used in planning and conducting the survey, given the lack of a sampling frame for Southern Sudan, at the time. One of the challenging aspects of planning for the SHHS was compiling a sampling frame with as complete coverage of the Sudan population as possible**.** This arose because the last Census in Sudan was in 1993 which, for purposes of providing a suitable sampling frame, was considered too far and out of date. Besides, 1993 was a period of armed conflict, and only the garrison towns of Juba, Malakal and Wau and other selected areas were actually enumerated in Southern Sudan. Therefore, no maps and lists actually existed for most of Southern Sudan. To get over the shortcoming, various other sources of geographic

information were examined. One of the sources with the best coverage in Southern Sudan was the World Health Organization's list of villages and estimated population developed for the National Immunisation Days (NIDs) campaign. The population estimates were, however, a rough demographic estimate based on the number of under-five children identified by the EPI Programme. The list of villages and estimated population developed for the NIDs campaign was also used for compiling the sampling frame for the three Darfur States. Thus, while for the twelve (12) States of the North, the sampling frame was compiled using the list of villages and estimated population updated by the Central Bureau of Statistics on the basis of the Census enumeration areas, the sampling frames for three Darfur States and for all the ten States in Southern Sudan were compiled using the list of villages and estimated population developed for the NIDs campaign.

The Sudan Household Health survey (SHHS) covered twenty four thousand five hundred twenty seven (24,527) households from which one hundred forty six thousand seven hundred twenty three (146,723) household members were listed. The background characteristics of the households and respondents are provided in Tables HH.1, HH.2, HH.3, HH.4 and HH.5 of Chapter III of this report.

Chapter 4 provides the detailed analysis of selected basic social service indicators that will be the raw material for various users. The also covers basic social services indicators including, child mortality, nutrition, child health, environmental issues, education, child protection and HIV/AIDS, orphaned and vulnerable children.

The report is the first tool to be used within and between sectors to ensure coherence of interventions and to harmonise the use of resources, and thereby enhance efforts of authorities and development partners. It will useful to a variety of users within and outside of the public sector, particularly those with the task to provide assistance to children and women.

The summary findings of the survey with respect to these very social indicators for Southern Sudan are indicated in the Table below:

Table 1: Summary of the Sudan Household Health Survey (SHHS) findings with specific focus on Southern Sudan, 2006

Sudan Household Health Survey (SHHS) and Millennium Development Goals (MDG) Indicators, Southern Sudan, 2006				
Topic	**SHHS Indicator Number**	**MDG Indicator Number**	**Indicator**	**Southern Sudan Value**
CHILD MORTALITY				
Child mortality	1		Neonatal mortality rate	52 (per 1000 live births)
	2		Post neonatal mortality rate	50 (per 1000 live births)
	3	14	Infant mortality rate	102 (per 1000 live births)
	4		Child mortality rate	37 (per 1000 live births)
	5	13	Under-five mortality rate	135 (per 1000 live births)
NUTRITION				
Nutritional status	6	4	Underweight prevalence (moderate and severe)	32.8 percent
			Underweight prevalence (severe)	14.1 percent
	7		Stunting prevalence (moderate and severe)	33.4 percent
			Stunting prevalence (severe)	18.0 percent
	8		Wasting prevalence (moderate and severe)	21.9 percent
			Wasting prevalence (severe)	7.0 percent
	8a		Overweight prevalence	6.7 percent
Breastfeeding	9		Exclusive breastfeeding rate (0-5 months)	21.2 percent
	10		Timely complementary feeding rate (6-9 months)	28.6 percent
	11		Frequency of complementary feeding (6-11 months)	17.6 percent
	12		Continued breastfeeding rate (12-15 months)	71.8 percent
			Continued breastfeeding rate (20-23 months)	15.6 percent
	13		Adequately fed infants (0-11 months)	19.5 percent
Salt iodisation	14		Iodised salt consumption	36.5 percent

Sudan Household Health Survey (SHHS) and Millennium Development Goals (MDG) Indicators, Southern Sudan, 2006				
Topic	**SHHS Indicator Number**	**MDG Indicator Number**	**Indicator**	**Southern Sudan Value**
Vitamin A supplementation	15		Vitamin A supplementation (under-fives)	39.8 percent
	16		Vitamin A supplementation (post-partum mothers)	17.5 percent
CHILD HEALTH				
Immunization	17		Tuberculosis immunization coverage (children aged 12-23 months receiving BCG vaccine before their first birthday)	42.9 percent
	18		Immunization coverage for diphtheria, pertussis and tetanus (DPT) (children aged 12-23 months receiving DPT3 vaccine before their first birthday)	20.2 percent
	19		Polio immunization coverage (children aged 12-23 months receiving polio vaccines before their first birthday))	25.4 percent
	20	15	Measles immunization coverage (children aged 12-23 months receiving measles vaccine before their first birthday)	27.7 percent
	21		Fully immunized children (children aged 12-23 months receiving BCG, DPT1-3, OPV1-3 and measles vaccines before their first birthday)	2.7 percent
Tetanus toxic vaccination	22		Neonatal tetanus protection	30.0 percent
	23		Under fives with diarrhoea in the last two weeks preceding the survey	42.9 percent

Sudan Household Health Survey (SHHS) and Millennium Development Goals (MDG) Indicators, Southern Sudan, 2006				
Topic	**SHHS Indicator Number**	**MDG Indicator Number**	**Indicator**	**Southern Sudan Value**
	24		Use of Oral Rehydration Therapy (ORT)	63.9 percent
	25		Home management of diarrhoea	23.0 percent
	26		Received ORT or increased fluids, and continued feeding	57.7 percent
	27		Under fives with suspected pneumonia in the last two weeks preceding the survey	13.6 percent
	28		Care-seeking for suspected pneumonia	87.8 percent
	29		Knowledge of the two danger signs of pneumonia	24.5 percent
Solid fuel use	30	29	Use of solid fuels	92.6 percent
MALARIA PREVENTION AND TREATMENT				
	31		Household availability of bednets	38.5 percent
	32		Household availability of insecticide-treated nets (ITNs)	11.6 percent
	34		Under fives with fever in the last two weeks preceding the survey	45.5 percent
	35	22	Antimalarial treatment (under-fives)	47.0 percent
	36		Antimalarial treatment -under-fives (within 24 hours of onset of symptoms)	3.6 percent
WATER AND SANITATION				
Water	37	30	Use of improved drinking water sources	48.3 percent
	38		Appropriate water treatment (all drinking water sources)	13.1 percent
	39		Mean time to drinking water source	45.3 minutes
Sanitation	40	31	Use of sanitary means of excreta disposal	6.4 percent
Water and sanitation	41		Use of both improved drinking water sources and sanitary means of excreta disposal	3.3 percent

Sudan Household Health Survey (SHHS) and Millennium Development Goals (MDG) Indicators, Southern Sudan, 2006				
Topic	**SHHS Indicator Number**	**MDG Indicator Number**	**Indicator**	**Southern Sudan Value**
EDUCATION				
Primary and secondary education	42		Net intake rate in primary education	6.6 percent
	43	6	Net attendance rate of primary school-age children	15.8 percent
	44	9	Gender parity index (primary school)	0.85 GPI
	45		Secondary school net attendance rate	2.4 percent
	46		Primary school attendance rate of children of secondary school age	19.6 percent
	47	7	Children reaching grade five	46.9 percent
	48	7b	Primary completion rate	1.9 per cent
CHILD PROTECTION				
Birth registration	50		Birth registration	5.0 percent
Early marriage and polygyny	51		Marriage before age 15	16.7per cent
	51a		Marriage before age 18	40.7 per cent
	52		Young women aged 15-19 currently married/in union	48.1 per cent
	53		Polygyny	42.4 per cent
Children's living arrangements and orphanhood	54		Children's living arrangements (not living with a biological parent)	10.6 per cent
	55		Prevalence of orphans	2.8 percent
Support to orphaned and vulnerable children	56		School attendance of non-orphans (10-14 years)	35.5 percent
	58		Double Orphan to non-orphan school attendance ratio	1.00 (ratio)
REPRODUCTIVE HEALTH				
Contraception	59	19c	Contraceptive prevalence	3.5 percent
	60		Unmet need for family planning	1.2 percent
Maternal and newborn	61		No Antenatal care received	40.6 percent

Sudan Household Health Survey (SHHS) and Millennium Development Goals (MDG) Indicators, Southern Sudan, 2006				
Topic	**SHHS Indicator Number**	**MDG Indicator Number**	**Indicator**	**Southern Sudan Value**
health	62		Antenatal care by skilful health personnel	26.2 percent
	63	17	Births/delivery attended by a skilful health personnel	10.02 percent
	64		Institutional deliveries	13.6 percent
Maternal mortality	65	16	Maternal mortality ratio	2,054 (per 100,000 live births)
HIV/AIDS AND ORPHANED CHILDREN				
HIV/AIDS knowledge	66		Awareness about AIDS among women	45.1 percent
	67	19b	Knowledge about HIV prevention (correctly identifying two ways of avoiding HIV infection)	9.8 percent
	68		Awareness about mother-to-child transmission of HIV	31.7 percent
	69		Knowledge of means of mother-to-child transmission of HIV (all three means of vertical transmission)	11.8 percent

1. INTRODUCTION

1.1 Background

Following the signing of the Comprehensive Peace Agreement (CPA) in January 2005 that set the stage for a new political landscape, the need for information to enhance policy formulation and planning was felt very necessary, as well as the need to improve access to a co-ordinated basic social services strategy that truly addresses the needs of the people.

As such, the findings from the Sudan Household Health Survey have served as key to the development of the Health Policy of the Government of Southern Sudan (2007-2011). The SHHS was therefore necessitated by requirement for information for policy formulation and planning as well as providing baseline data for measurement of progress towards the achievement of MDGS and other quality of life indicators. This is particularly important for Sudan because the MDGS were taken as part of the CPA commitments in recognition of the need to accelerate progress in poverty reduction and human development in all parts of Sudan, and were further enshrined in the Interim National Constitution (INC) (Chapter II, clause 10.1).

The Sudan Household Health Survey report provides valuable information on the basic social service indicators, and establishes their baseline status. This will help monitor progress towards goals and targets of national plans and international declarations: the Millennium Declaration and the Millennium Development Goals (MDGs), adopted by all 191 United Nations Member States in September 2000, and the Plan of Action of A World Fit For Children (WFFC), adopted by 189 Member States at the United Nations Special Session on Children in May 2002 and the ICPD Programme of action (2004).

Earlier data for the MDG interim report in Southern Sudan were drawn primarily from the NCSE, 2004, "Towards a Baseline." The SHHS will therefore be very valuable in the preparation of the next MDG report.

Additionally, Sudan with support of the UNICEF Country Office, reports on matters relating to the Convention on the Rights of the Child every five years. Thus the SHHS report will serve as the major source for the next CRC report.

In signing these international agreements, the Government of Sudan committed itself to improving conditions for children and to monitoring progress towards that end.

A Commitment to Action: National and International Reporting Responsibilities

The governments that signed the Millennium Declaration and the World Fit for Children Declaration and Plan of Action also committed themselves to monitoring progress towards the goals and objectives they contained:

"We will monitor regularly at the national level and, where appropriate, at the regional level and assess progress towards the goals and targets of the present Plan of Action at the national, regional and global levels. Accordingly, we will strengthen our national statistical capacity to collect, analyse and disaggregate data, including by sex, age and other relevant factors that may lead to disparities, and support a wide range of child-focused research. We will enhance international cooperation to support statistical capacity-building efforts and build community capacity for monitoring, assessment and planning." (**A World Fit for Children**, paragraph 60)

"…We will conduct periodic reviews at the national and sub-national levels of progress in order to address obstacles more effectively and accelerate actions.…" (**A World Fit for Children**, paragraph 61)

The Plan of Action (paragraph 61) also calls for the specific involvement of UNICEF in the preparation of periodic progress reports:

"… As the world's lead agency for children, the United Nations Children's Fund is requested to continue to prepare and disseminate, in close collaboration with Governments, relevant funds, Programme and the specialized agencies of the United Nations system, and all other relevant actors, as appropriate, information on the progress made in the implementation of the Declaration and the Plan of Action."

Similarly, the **Millennium Declaration** (paragraph 31) calls for periodic reporting on progress:

"…We request the General Assembly to review on a regular basis the progress made in implementing the provisions of this Declaration, and ask the Secretary-General to issue periodic reports for consideration by the General Assembly and as a basis for further action."

As an integral part of the national efforts to ensure progress towards the MDGs, the GONU and GOSS are also putting strategic emphasis on addressing issues of child survival and development, in line with the African Child Survival (ACS) initiative supported by UNICEF, WHO and the World Bank. Components of this broad strategy include support to policy development, capacity-building and establishment of management information systems; and focussing on a limited number of key priorities and scaling-up of interventions that would make substantial progress towards MDGs attainment. In addition, interventions to enhance the capacity of GONU/GOSS to rapidly respond to emergencies such as conflict-related displacement, drought, floods and epidemics constitute some of the important elements of the Programme to support the disadvantaged and vulnerable populations.

1.2 The objectives of the SHHS

The Sudan Household Health Survey, conducted in 2006, was the first nationwide survey in two decades that covered key social development indicators including child mortality, nutrition, reproductive health and HIV/AIDS. The survey also covered other basic social services such as education, and water and sanitation. This approach was followed because it ensures a coherence of interventions that will achieve efficiency gains in the use of resources and facilitating the efforts of all the stakeholders. The objectives of the SHHS are as follows:

- To provide the data needed for planning and policy making,
- To furnish data needed for monitoring progress towards the achievement of the Millennium Development Goals, the goals of A World Fit For Children (WFFC) and the ICPD Programme of Action,
- To provide up-to-date information for assessing the situation of children and women in particular,
- To contribute to the improvement of data collection, and monitoring systems and to strengthen technical expertise in the design and execution of surveys, and analysis of survey data,
- To build and strengthen the institutional capacity needed to carry out some of the aspects of the up-coming Census (2008) and other subsequent surveys.

2. METHOD AND APPROACH IN CONDUCTING THE SHHS

2.1. Sample Design

The sample for the Sudan Household Health Survey (SHHS) was designed to provide estimates on a large number of indicators on the basic health situation at the national level and for 25 States (Northern , River Nile, Red Sea, Kassala, Gadarif, Khartoum, Gezira, Sinnar, Blue Nile, White Nile, North Kordofan, South Kordofan, North Darfur, West Darfur, South Darfur, Jonglei, Upper Nile, Unity, Warrap, Northern Bahr El Ghazal, Western Bahr El Ghazal, Lakes, Western Equatoria, Central Equatoria, Eastern Equatoria). The target universe for the SHHS included the population living in individual households and the nomadic population camping at a location/place at the time of the survey. The units of analysis for the SHHS, therefore, are the individual households and persons within the households. Some questionnaire modules correspond to particular subgroups of the population, such as that for women between the ages of 15 and 49, and children under the age of 5 years. The population living in institutions and group quarters such as hospitals, military bases and prisons, were excluded from the sampling frame. The States were identified as the main sampling domains and a stratified multi-stage sample design was used for the SHHS.

2.2. Sampling frame and units of analysis

One of the challenging aspects of planning for the SHHS was compiling a sampling frame with as complete coverage of the Sudan population as possible**.** This arose because the last Census in Sudan was in 1993 which, for purposes of providing a suitable sampling frame, was considered too far and out of date. Besides, 1993 was a period of armed conflict, and only the garrison towns of Juba, Malakal and Wau and other selected areas were actually enumerated in Southern Sudan. Therefore, no maps and lists actually existed for most of Southern Sudan.

To circumvent the shortcoming, various other sources of geographic information were examined. One of the sources with the best coverage in Southern Sudan was the World Health Organization's list of villages and estimated population developed for the National Immunisation Days (NIDs) campaign. The population estimates were, however, a rough demographic estimate based on the number of under-five children identified by the EPI Programme. The list of villages and estimated population developed for the NIDs campaign was also used for compiling the sampling frame for the three Darfur States. Thus, while for 12 States (Northern , River Nile, Red Sea, Kassala, Gadarif, Khartoum, Gezira, Sinnar, Blue Nile, White Nile, North Kordofan and South Kordofan), the sampling frame was compiled using the list of villages and estimated population updated by the Central Bureau of Statistics on the basis of the Census enumeration areas, the sampling frames for three Darfur States (North Darfur, West Darfur and South Darfur) and for all the ten

States in Southern Sudan were compiled using the list of villages and estimated population developed for the NIDs campaign.

2.3. Stratification

One of the most important features of the sample design for the SHHS was the stratification of the sampling frame into homogeneous areas. The sample selection was carried out independently within each stratum. The nature of the stratification depended on the most important characteristics to be measured in the survey and the available information, as well as the domains of analysis.

The first level of stratification corresponded to the major geographic domains defined for the SHHS, that is, the 25 States in Sudan. In the case of 12 States, with a town or other relatively large town (for example, with a population of 50,000 or more), it was considered necessary to establish a separate stratum for the towns (urban areas) and for the remainder of the State. In 12 States (the Northern , River Nile, Red Sea, Kassala, Gadarif, Khartoum, Gezira, Sinnar, Blue Nile, White Nile, North Kordofan, South Kordofan), the primary sampling units were distributed to urban and rural domains, proportional to the size of urban and rural populations in these States, but in three States in Darfur and all the ten States in Southern Sudan, stratification on the urban and rural level could not be done and clusters were distributed directly to the State domain proportional to the size of the primary sampling units (PSUs) directly.

Within each State, the PSUs were ordered geographically by locality/county to ensure a good geographic distribution of the sample through implicit stratification when the sample PSUs was selected systematically with PPS.

2.4. Sample Size and Allocation

The sample size for the survey was determined by the accuracy required for the survey estimates for each domain, as well as by the resource and operational constraints. The sample size was also determined by the geographic levels at which the survey data were to be tabulated. Since reliable estimates for key indicators were needed for each of the 25 States of Sudan, it was considered necessary to ensure that each State had a sufficient sample size. The survey budget was based on a sample of 25,000 households for Sudan, or about 1,000 households per State, though an effective sample size of 900 households was considered sufficient for most State-level estimates.

The number of sample PSUs (villages) for the SHHS, and the number of households selected within each sample village/quarter were determined keeping in view the Survey objectives. It was recognized that for estimates at the national level, it would be more efficient to have a proportional allocation of the sample to the States based on their approximate population. However, it was noted that these population estimates were only approximate, and might be over-estimated, and therefore, given

the large variability in the population by State, the sample size for the smallest States based on a proportional allocation would be too small to produce reliable results. Since a similar level of precision was required for the survey results from each State, it was decided to use an equal allocation of 40 sample segments per State. Considering the nature of the survey as well as the logistics, cost of the field operations, and current transportation and communication constraints, it was decided to select 25 households per segment.

2.5. Sample selection procedures

The sample selection methodology for the SHHS was based on a stratified multi-stage sample design. The steps involved in the sample selection included the following:

Selection of Sample Primary Sampling Units (Villages: For the first stage of selection of the sample for the SHHS, a frame of primary sampling units (PSUs) which covered as much of the population as possible was established. The PSU was defined as the smallest area or administrative unit which could be identified in the field with commonly recognised boundaries. Any areas that could not be included in the survey because of problems of security or accessibility were excluded from the frame before the first stage selection of sample PSUs. The villages or quarters constituted the PSUs for the SHHS. Therefore, the list of villages was used as the most effective sampling frame of PSUs for the first stage of sampling. For some States, the list of villages appeared to be fairly complete, and population estimates were available for all villages, so this frame was used for the first stage selection of villages with PPS. In the case of these States, at the first sampling stage, the sample PSUs (villages) within each State were selected with probability proportional to size (PPS) for each stratum, where the measure of size was based on the estimated total population. An Excel file was used for selecting the sample of 40 sample villages in each State for the SHHS, based on the allocation of 40 sample villages per State. The Excel file included a separate spreadsheet for each State, showing the ordered frame of villages with the corresponding information on population estimates. When most of the villages in the State had population estimates but figures were missing for some villages, an average measure of size was imputed for these villages; in this way such villages had an equal probability of selection in the frame. In other words, the sampling frame of villages was compiled separately for each State based on the best available sources. When the estimated population was not available, an average measure of size was imputed; in this way such villages had an equal probability of selection in the frame. In the case of a few States, where the sampling frame did not include population estimates, it was decided to select the sample villages with equal probability. There were four States in Southern Sudan (Upper Nile, Jonglei, Unity and Lakes) which did not have population measures in the frame. In these four States the sample villages were selected systematically with equal probability. The same type of sample selection spreadsheet was used for these States, but each village was assigned a measure of size of 1. In cases where a selected village could not be found in the field or could not be reached because of security or access problems, it was replaced by a neighboring village in the sampling frame. All 40 villages within the

sampled segments in each State were fully covered with the exception of only 12 segments in two States in Southern Sudan (7 segments in Upper Nile and 5 in Western Bahr El Ghazal States) that had to be substituted due to insecurity, influencing accessibility during the fieldwork period.

Segmenting of large sample villages: Some of the villages in the frame had five hundred (200) or more households. In the case of a sample village with a large number of households (for example, greater than 200), the village was subdivided into smaller segments of similar size (with about 80 to 120 households each) with clear defined boundaries in order to facilitate the listing process and avoid coverage problems. Following this, one sample segment was selected at random with equal probability for the listing of households at the second sampling stage.

Listing of households in sample villages or segments: A listing of the households was undertaken in each sample segment prior to the SHHS data collection in order to enumerate all housing units and households within the boundaries of each sample village or segment. At the last sampling stage the households were selected systematically with a random start from this household listing for each sample segment. The supervisor was responsible for verifying the boundaries of the sample village or segment in order to ensure good coverage of the sample households.

Selection of sample households within sample village or segment: At the last sampling stage, a sample of 25 households was selected systematically for enumeration with a random start from the household listing for each sample village or segment. If a village had less than 25 households, all of them were selected. Once the listing was completed, the supervisor referred to the sample selection table to find the row corresponding to the total number of households listed; this row identified the 25 household numbers selected. This table was generated with an Excel spreadsheet.

2.6. Estimation and weighting procedures

For reporting national level results, and to obtain unbiased estimates from the SHHS data, appropriate weights were applied to the sample data based on the probabilities of selection. Measures of sampling variability for key survey estimates were also calculated.

The Sudan Household Health Survey's sample was not self-weighted. Essentially, by allocating equal numbers of households to each of the regions, different sampling fractions were used in each region since the size of the regions varied. For this reason, sample weights were calculated and these were used in the subsequent analyses of the survey data.

2.7. Questionnaires

Five sets of questionnaires were used in the Sudan Household health Survey:

a. ***Household questionnaire:*** used to collect information on all *de jure* household members and the household
b. ***Women's questionnaire:*** administered to all women aged 15-49 years in each household
c. ***Under-five questionnaire:*** administered to mothers or caretakers of all children under 5 years of age living in the household
d. ***Community Questionnaire:*** administered to community leaders (findings this questionnaire is not included in this report)
e. ***Food Security Questionnaire:*** (findings from this last questionnaire are not included in this report).

The first three questionnaires are based on the MICS3 and PAPFAM model questionnaires. The questionnaires were pre-tested and modifications were made to the wording and translation of the questionnaires based on the pre-test. A copy of the SHHS questionnaires is provided in Appendix B. The questionnaires included the following modules:

The household questionnaire included the following modules:

a. Household listing
b. Education
c. Water and Sanitation
d. Household characteristics
e. Household income and resources
f. Malaria
g. Salt Iodization
h. Maternal Mortality

The questionnaire for individual women included the following modules:

a. Child Mortality
b. Child Birth History
c. Tetanus Toxoid
d. Maternal and Newborn Health
e. Marriage and Union
f. Contraception
g. HIV knowledge

The questionnaire for children under five was administered to mothers of under-five children. In cases where the mother was not listed in the household list/roster, a primary caretaker for the child was identified and interviewed. The questionnaire for children Under Five included the following modules:

a. Birth Registration
b. Vitamin A

c. Breastfeeding
d. Care of Illness
e. Immunisation
f. Malaria
g. Anthropometry

In addition to the administration of questionnaires, fieldwork teams tested the salt used for cooking in the households for iodine content, and measured the weights and heights of children age under 5 years. Details and findings of these measurements are provided in the respective sections of the report.

2.8 Training and Fieldwork

Training for the fieldwork was conducted for all the States covered by the SHHS during the month of February and March 2006 and the durations varied between seven to ten (7-10) days. The training was conducted at three levels mainly national, sub-national and State levels. To ensure consistency, training sessions for all trainees in all States were conducted by the same trainers. The training included lectures on interviewing techniques and the contents of the questionnaires, supervision and monitoring of quality of data, and mock interviews between trainees to gain practice in asking questions. Towards the end of the training period, trainees spent 3 days in the field to practice interviewing in selected States indicated below:

<u>Locations for pilot survey and pre-testing of questionnaires in Northern States</u>

- **Althawra (Alhara 7):** Selected because it comprises of various ethnic groups representing the majority of the population in the States in the northern, eastern and central parts of the Sudan with different socioeconomic levels.
- **Umbadda Hamad Elneel (Almansoora):** Represents the majority of the population from the Western parts of the Sudan, including the internally displaced population (IDP).
- **Alsaroarab:** Represents the rural population in Northern States.

<u>Locations for pilot survey and pre-testing of questionnaires in Southern Sudan</u>

- **Rumbek (Rumbek County and Rumbek East):** Selected because of easy accessibility and supervision given the fact that most of the SHHS activities were taking place at the SSCCSE office in Rumbek.
- **Baar Pakieng:** Represents the population at the remote areas of Southern Sudan.

The SHHS data were collected by one hundred and twelve (112) teams in all the twenty five (25) States of Sudan. This comprised of four to six (4-6) teams for each of the ten (10) States in Southern Sudan, and four (4) teams per State for the remaining fifteen (15) States keeping in view the geographical accessibility and division. More than one third of the team comprised of 4 interviewers, one driver, one

editor/measurer and a supervisor. Some of teams in Southern Sudan did not have drivers due to lack of vehicles in the areas and fear of landmines in using vehicles. In total, the data collection involved 850 interviewers, 110 team leaders and supervisors, and 40 national supervisors and leaders.

Fieldwork began in March 2006 in 14 States, in April 2006 in one State and from May to June 2006 in the 10 remaining States. The average period taken to complete the fieldwork in the 25 States of Sudan was 31 days with a minimum duration of 25 days and a maximum duration of 43 days, mainly in most of the areas severely affected by conflict.

2.9 Data Processing

Data were entered using the CSPro software in two locations: Khartoum and Rumbek. The data relating to 15 northern States were entered into 40 microcomputers by a team based in Khartoum comprising 40 data entry operators, 6 data entry supervisors, 10 data editors and 6 Programmers. The data relating to the States in Southern Sudan were entered into 13 microcomputers by a team based at Rumbek comprising 26 data entry operators in two shifts (morning and afternoon shifts), 4 data entry supervisors, 7 data editors and 2 Programmers. In order to ensure quality control, all questionnaires were double-entered for the first six States that were completed (100% double entry). This was followed by double entry of questionnaires from 5 clusters randomly selected within the remaining 19 States. Internal consistency checks were also performed. Procedures and standard Programmes developed under the global MICS3 project and PAPFAM and adapted to the Sudan questionnaire were used throughout. Data entry and editing began simultaneously with data collection. In 15 States, the data processing started in March 2006 and was completed in May 2006 and in the remaining 10 States, data entry started in June 2006 and was completed by early August 2006. Data were analysed using the Statistical Package for Social Sciences (SPSS) software Programme (Version 14), and the model syntax and tabulation plans developed by UNICEF, WHO, WFP, and Pan-Arab Project for Family Health(PAPFAM).

2.10 Sample Coverage

Of the 24,527 households selected for the sample, 24,507 dwellings were found to be occupied. Of these 24,507 households, 24,046 households were successfully interviewed with a household response rate of 98.1 percent. In the interviewed households, 32,599 women aged 15-49 years were identified. Of these, 26,923 were successfully interviewed, yielding a response rate of 82.6 percent. In addition, 22,512 children under age five were listed in the household questionnaire. Questionnaires were completed for 19,870 of these children, which corresponds to a response rate of 88.3 percent. Overall response rates of 81.0 percent and 86.6 percent are calculated for the women's and under-five children's interviews respectively (Table HH.1).

It is important to note that while the average overall response rate for households was 98.1 percent, it ranged between a low of 90 percent in Lakes State to 99.8 percent in Eastern Equatoria. The overall women's response rate was highest in Gezira at 98.6 percent and lowest in Western Bahr El Ghazal at 55.4 percent. The overall women's response rate was over 90 percent in 11 States, between 80 and 90 percent in five States, between 70 and 80 percent in two States, between 60 and 70 percent in three States and between 50 and 60 percent in four States. The overall response rate for under-five children was highest in White Nile State, at 99.5 percent, and lowest in Western Bahr El Ghazal at 57.4 percent. The overall response rate for under-five's interviews was over 90 percent in 16 States, between 80 and 90 percent in three States, between 70 and 80 percent in two States, between 60 and 70 percent in three States and between 50 and 60 percent in one State. In more than half of the States in Southern Sudan, the overall response rate for women and under-five children was low, as indicated in Table HH.1. This was mainly due to the challenging situation of the long decades of civil strife and war, the lack of basic services that overburdens women in most households, and questionnaire fatigue. For example, the majority of eligible women, mothers and caretakers of the under-five children, reported they were either too tired to complete the questionnaires or in a rush to go out and look for food and wood for cooking, in a hurry to go out and fetch water from a borehole, in a rush to take a sick child/children to a distant health facility, or fed up of participating in surveys and assessment without receiving any feedback or direct reward. Another reason was women's lack of trust and their fear for their own security in releasing information, given previous experience.

Table HH.1: Results of household and individual interviews
Number of households, women, and children under 5 by results of the household, women's and under-five's interviews, and household, women's and under five response rates, Sudan, 2006

State	Number of households				Number of women				Number of children under 5			
	Sampled	Occupied	Interviewed	Response rate (%)	Eligible	Interviewed	Response rate (%)	Overall response rate (%)	Eligible	Mother/ Caretaker interviewed	Response rate (%)	Overall response rate (%)
Northern	1,000	1,000	997	99.7	1,380	1,290	93.5	93.2	635	613	96.5	96.2
River Nile	999	999	990	99.1	1,472	1,408	95.7	94.8	636	619	97.3	96.5
Red Sea	993	993	986	99.3	1,175	1,139	96.9	96.3	645	636	98.6	97.9
Kassala	1,000	1,000	994	99.4	1,241	1,200	96.7	96.1	717	712	99.3	98.7
Gadarif	1,000	1,000	991	99.1	1,290	1,207	93.6	92.7	1,018	979	96.2	95.3
Khartoum	1,000	998	965	96.7	1,556	1,324	85.1	82.3	817	784	96.0	92.8
Gezira	1,000	1,000	997	99.7	1,555	1,533	98.6	98.3	794	791	99.6	99.3
Sinnar	998	998	993	99.5	1,386	1,347	97.2	96.7	823	814	98.9	98.4
Blue Nile	999	999	993	99.4	1,337	1,220	91.2	90.7	1,204	1,148	95.3	94.8
White Nile	1,000	1,000	998	99.8	1,534	1,500	97.8	97.6	933	930	99.7	99.5
N. Kordofan	999	999	992	99.3	1,338	1,258	94.0	93.4	893	873	97.8	97.1
S. Kordofan	988	988	963	97.5	1,060	905	85.4	83.2	929	874	94.1	91.7
North Darfur	999	998	982	98.4	1,197	1,055	88.1	86.7	928	900	97.0	95.4
West Darfur	1,000	1,000	993	99.3	902	773	85.7	85.1	814	791	97.2	96.5
South Darfur	995	995	992	99.7	1,084	1,027	94.7	94.5	910	891	97.9	97.6
Jonglei	994	993	956	96.3	1,456	887	60.9	58.7	1,073	758	70.6	68.0
Upper Nile	823	818	771	94.3	954	612	64.2	60.5	701	600	85.6	80.7
Unity	975	972	935	96.2	1,313	906	69.0	66.4	1,259	819	65.1	62.6
Warrap	999	999	988	98.9	1,357	1,046	77.1	76.2	977	844	86.4	85.4
North BEG	937	933	893	95.7	1,498	837	55.9	53.5	910	546	60.0	57.4
West BEG	830	830	815	98.2	1,295	717	55.4	54.4	947	604	63.8	62.6
Lakes	1,000	1,000	980	98.0	1,485	899	60.5	59.3	1,160	885	76.3	74.8
W. Equatoria	999	998	898	90.0	1,195	825	69.0	62.1	694	595	85.7	77.1
C. Equatoria	1,000	997	986	98.9	1,416	1,067	75.4	74.5	1,158	1,006	86.9	85.9
E. Equatoria	1,000	1,000	998	99.8	1,123	941	83.8	83.6	937	858	91.6	91.4
Total	**24,527**	**24,507**	**24,046**	**98.1**	**32,599**	**26,923**	**82.6**	**81.0**	**22,512**	**19,870**	**88.3**	**86.6**

3. BACKGROUND CHARACTERISTICS OF HOUSEHOLDS AND RESPONDENTS

3.1. Background Characteristics of Households

The age and sex distribution of the survey population is provided in Table HH.2. The distribution is also used to produce the population pyramid (Figure HH.1b) for the whole of the Sudan in Figure HH.1.

Table HH.2: Household age distribution by sex

Percent distribution of the household population by five-year age groups and dependency age groups, and number of children aged 0-17 years, by sex, Sudan, 2006

		Males		Females		Total	
		Number	Percent	Number	Percent	Number	Percent
Age	0-4	2,974,891	15.3	2,810,825	14.5	5,785,716	14.9
	5-9	3,247,399	16.7	3,074,139	15.8	6,321,538	16.3
	10-14	2,705,107	13.9	2,744,258	14.1	5,449,365	14.0
	15-19	2,038,172	10.5	1,760,915	9.1	3,799,088	9.8
	20-24	1,428,681	7.3	1,672,706	8.6	3,101,387	8.0
	25-29	1,222,956	6.3	1,738,103	8.9	2,961,058	7.6
	30-34	999,141	5.1	1,213,462	6.2	2,212,602	5.7
	35-39	1,042,735	5.4	1,146,242	5.9	2,188,977	5.6
	40-44	790,718	4.1	666,980	3.4	1,457,698	3.7
	45-49	722,298	3.7	459,745	2.4	1,182,044	3.0
	50-54	559,319	2.9	950,692	4.9	1,510,011	3.9
	55-59	388,400	2.0	374,325	1.9	762,726	2.0
	60-64	468,907	2.4	280,593	1.4	749,501	1.9
	65-69	265,268	1.4	154,936	0.8	420,204	1.1
	70+	482,664	2.5	344,281	1.8	826,945	2.1
	Missing/DK	122,724	0.6	43,412	0.2	166,137	0.4
Dependency age groups	< 15	8,927,397	45.9	8,629,222	44.4	17,556,619	45.1
	15-64	9,661,328	49.6	10,263,764	52.8	19,925,092	51.2
	65 +	747,932	3.8	499,216	2.6	1,247,148	3.2
	Missing/DK	122,724	0.6	43,412	0.2	166,137	0.4
Children and adults	Children aged 0-17	10,216,296	52.5	9,633,230	49.6	19,849,526	51.0
	Adults 18+/Missing/DK	9,243,085	47.5	9,802,385	50.4	19,045,469	49.0
Total		**19,459,381**	**100.0**	**19,435,615**	**100.0**	**38,894,996**	**100.0**

Of the 24,046 households successfully interviewed in the survey, 146,723 household members were listed. Of these, 73,394 were males and 73,329 were females. Based on these figures the average household size was estimated at 6.1.

The total population was estimated at 38,894,996 (male: 19,459,381; female: 19,435,615). The total population in the age group 0-14 years (below age 15) was estimated at 17,556,619 (male: 8,927,397; female: 8,629,222), constituting 45.1 percent of the total estimated population. The total population in the age group 0-17 years was estimated at 19,849,526 (male: 9,633,230; female: 19,849,526). The proportion of the population aged 0-17 constitutes 51 percent of the total population.

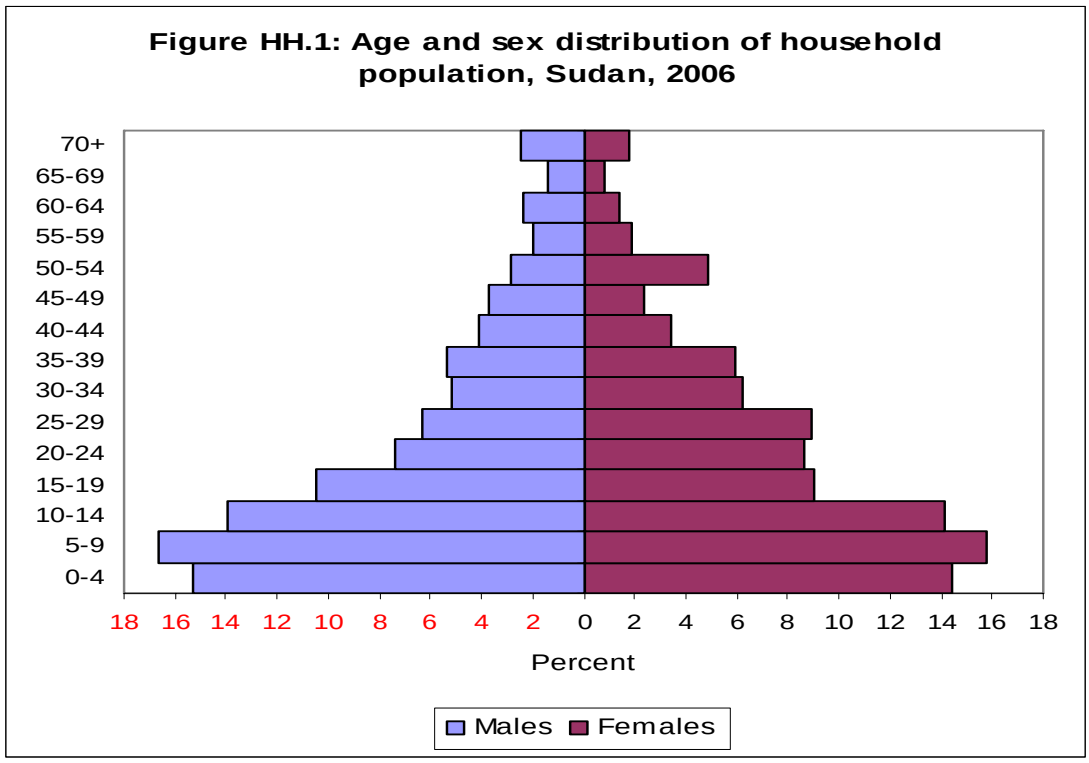

Figure HH.1 Age and sex distribution of household population in Sudan country-wide, 2006

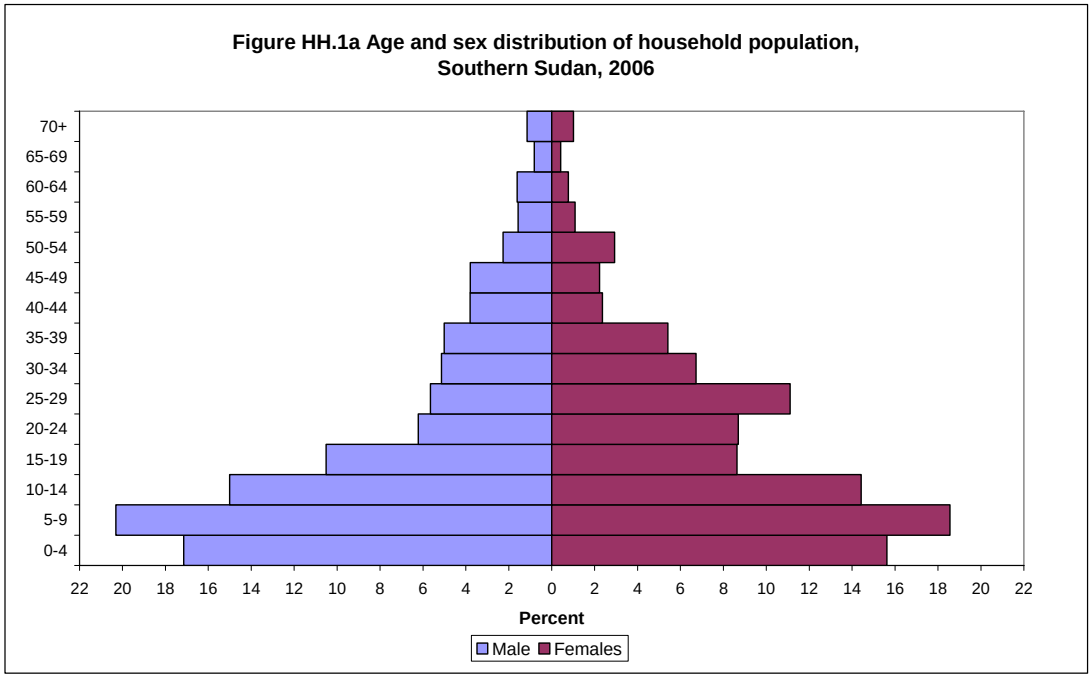

Figure HH.1a Age and sex distribution of household population in Southern Sudan, 2006

Table HH.3 below provides basic background information on the households. It also shows the number of weighted and unweighted households by State, and within households, the sex of the household head and the number of household members. In addition it shows the proportion of households containing at least one child under 18 years of age, at least one child under 5, and at least one eligible woman aged 15-49 years. These background characteristics are used in subsequent tables in this report; the figures in Table HH.3 are also intended to show the numbers of observations by major categories of analysis in the report. Furthermore, the table shows the proportions of households where at least one child under 18, at least one child under 5, and at least one eligible woman in age group 15-49 were found. About 88 percent of the households had at least one child under 18, while 58 percent had at least one child under 5, and 90.3 percent had at least one eligible woman in the age group 15-49 years. The households with 4-5 members constituted the largest proportion (28.0%) of the total households, followed by households with 6-7 members (26.6%).

Table HH.3: Household composition Percent distribution of households by selected characteristics, Sudan, 2006				
		Weighted percent	Number of households	
			Weighted	Unweighted
Sex of household head	Male	86.6	3,273,287	12,557
	Female	13.4	507,686	1,938
State	Northern	1.8	112,522	997
	River Nile	2.6	168,535	990
	Red Sea	2.2	141,271	986
	Kassala	5.0	316,757	994
	Gadarif	4.3	270,533	991
	Khartoum	13.5	860,348	965
	Gezira	9.8	625,927	997
	Sinnar	3.5	222,509	993
	Blue Nile	4.0	254,814	993
	White Nile	1.8	114,704	998
	North Kordofan	4.3	273,088	992
	South Kordofan	3.4	215,781	963
	North Darfur	4.5	284,110	982
	West Darfur	5.8	367,028	993
	South Darfur	8.6	547,828	992
	Jonglei	3.4	216,875	956
	Upper Nile	3.0	188,215	771
	Unity	1.4	89,366	935
	Warrap	3.8	241,439	988
	Northern BEG	3.3	211,241	893
	Western BEG	1.0	64,565	815
	Lakes	2.1	131,682	980
	Western Equatoria	1.7	110,127	898
	Central Equatoria	2.5	161,701	986
	Eastern Equatoria	2.7	173,175	998
Number of household members	1	1.2	77,397	304
	2-3	16.7	1,061,154	3,884
	4-5	28.0	1,784,866	6,915
	6-7	26.6	1,695,691	6,497
	8-9	16.5	1,049,297	3,857
	10+	10.9	695,735	2,589
At least one child aged < 18 years		87.9	6,364,139	24,046
At least one child aged < 5 years		58.0	6,364,139	24,046
At least one woman aged 15-49 years		90.3	6,364,139	24,046
Total		**100.0**	**6,364,139**	**24,046**

3.2. Background Characteristics of Respondents

Tables HH.4 and HH.5 below provide information on the background characteristics of female respondents 15-49 years of age and of children under age 5. In addition to providing useful information on the background characteristics of women and children, the tables also show the numbers of observations in each background category. These categories are used in the subsequent tabulations of this report.

Table HH.4 provides background characteristics of female respondents 15-49 years of age. The table includes information on the distribution of women according to State, age, marital status, motherhood status, education[1], and wealth index quintiles[2].

The women in the age group 25-29 years constituted the largest proportion (21.2%) of the total number of women, followed by women in the age group 20-24 years (18.6%), women in the age group 15-19 years (17.7%), women in the age group 30-34 years (14.9%), and women in the age group 35-39 years (14.1%). About 8 percent of the women were in the age group 40-44 years, while the lowest proportion of women was in the age group 45-49 years (5.5 percent). About 66 percent of the women were then married/in union, and 27.9 percent were formerly married/in union. Never married/in union women constituted 5.5 percent of women. Women with no formal education constituted 50.3 percent of the total women while 40.5 percent of them had primary education and 9.1 percent had secondary or higher education. The wealth index quintiles show that about 18.1 percent of women belong to the poorest households while women from relatively rich households constitute about 23.3 percent.

Children in the age group 24-35 months and 36-47 months constitute the largest proportion (21.4 percent each) of the total number of under-five children, followed by children in the age group 12-23 months (19.6 percent), and those in the age group 48-59 months (16.3 percent). About 11 percent of the children belong to the age group 6-11 months while children below 6 months of age constitute about 10.5 percent of the total population of under-five children.

[1] Unless otherwise Stated, "education" refers to educational level attained by the respondent throughout this report when it is used as a background variable.

[2] Principal components analysis was performed by using information on the ownership of household goods and amenities (assets) to assign weights to each household asset, and obtain wealth scores for each household in the sample (The assets used in these calculations were as follows: household member owns land for farming, fishing or grazing; household member uses land for farming; household member owns livestock; if yes, number of cattle, chickens, goats, milk cows, sheep, horses (or donkeys or mules), and camels owned). Each household was then weighted by the number of household members, and the household population was divided into five groups of equal size, from the poorest quintile to the richest quintile, based on the wealth scores of households they were living in. The wealth index is assumed to capture the underlying long-term wealth through information on the household assets, and is intended to produce a ranking of households by wealth, from poorest to richest. The wealth index does not provide information on absolute poverty, current income or expenditure levels, and the wealth scores calculated are applicable for only the particular data set they are based on. Further information on the construction of the wealth index can be found in Rutstein and Johnson, 2004, and Filmer and Pritchett, 2001.

Table HH.4: Women's background characteristics
Percent distribution of women aged 15-49 years by background characteristics, Sudan, 2006

		Weighted percent	Number of women	
			Weighted	Unweighted
State	Northern	1.8	155,314	1,290
	River Nile	2.9	251,107	1,408
	Red Sea	2.0	172,855	1,139
	Kassala	4.5	388,682	1,200
	Gadarif	4.1	351,812	1,207
	Khartoum	16.1	1,396,068	1,324
	Gezira	11.3	978,435	1,533
	Sinnar	3.6	311,366	1,347
	Blue Nile	4.0	344,439	1,220
	White Nile	2.0	174,217	1,500
	North Kordofan	4.2	367,623	1,258
	South Kordofan	2.7	237,716	905
	North Darfur	4.0	346,313	1,055
	West Darfur	3.9	333,393	773
	South Darfur	6.9	598,635	1,027
	Jonglei	3.8	330,303	887
	Upper Nile	2.7	232,889	612
	Unity	1.4	125,494	906
	Warrap	3.8	331,612	1,046
	Northern BEG	4.1	354,355	837
	Western BEG	1.2	102,590	717
	Lakes	2.3	199,539	899
	Western Equatoria	1.7	146,550	825
	Central Equatoria	2.7	232,219	1,067
	Eastern Equatoria	2.3	194,865	941
Age	15-19 years	17.7	1,529,508	4,677
	20-24 years	18.6	1,611,527	5,005
	25-29 years	21.2	1,835,955	5,847
	30-34 years	14.9	1,291,155	4,037
	35-39 years	14.1	1,217,325	3,778
	40-44 years	8.0	696,905	2,099
	45-49 years	5.5	476,014	1,480
Marital/Union status	Currently married/in union	66.1	5,435,614	17,216
	Formerly married/in union	27.9	2,292,572	6,688
	Never married/in union	6.0	495,020	1,487
Motherhood status	Ever gave birth	64.9	5,615,186	17,882
	Never gave birth	35.1	3,041,795	9,034
Education	None	50.3	4,353,377	14,716
	Primary	40.5	3,508,224	10,383
	Secondary +	9.1	784,808	1,776
	Missing/DK	0.1	11,981	48
Wealth index quintiles	Poorest	18.1	1,570,948	5,541
	Second	18.9	1,633,549	5,725
	Middle	19.0	1,642,739	5,497
	Fourth	20.7	1,790,634	5,452
	Richest	23.3	2,020,520	4,708
Total		**100.0**	**8,658,390**	**26,923**

Some background characteristics of children under 5 are presented in Table HH.5. These include distribution of children by several attributes: sex, State of residence, age in months, mother's or caretaker's education, and wealth index quintiles.

Table HH.5: Children's background characteristics
Percent distribution of children under five years of age by background characteristics, Sudan, 2006

		Weighted percent	Number of under-five children	
			Weighted	Unweighted
Sex	Male	51.4	2,975,850	10,234
	Female	48.6	2,810,452	9,636
State	Northern	1.2	71,281	613
	River Nile	1.9	108,078	619
	Red Sea	1.6	92,640	636
	Kassala	4.0	228,581	712
	Gadarif	4.8	277,710	979
	Khartoum	12.6	728,062	784
	Gezira	8.6	498,259	791
	Sinnar	3.2	184,375	814
	Blue Nile	5.3	305,816	1,148
	White Nile	1.9	108,077	930
	North Kordofan	4.3	245,980	873
	South Kordofan	3.6	208,157	874
	North Darfur	4.6	268,487	900
	West Darfur	5.2	300,867	791
	South Darfur	8.7	502,544	891
	Jonglei	4.2	243,417	758
	Upper Nile	3.0	171,127	600
	Unity	2.1	120,333	819
	Warrap	4.1	238,751	844
	Northern BEG	3.7	215,262	546
	Western BEG	1.3	75,022	604
	Lakes	2.7	155,869	885
	Western Equatoria	1.5	85,109	595
	Central Equatoria	3.3	189,908	1,006
	Eastern Equatoria	2.8	162,590	858
Age	< 6 months	10.5	606,640	2,046
	6-11 months	10.8	622,530	2,075
	12-23 months	19.6	1,136,667	3,969
	24-35 months	21.4	1,238,476	4,229
	36-47 months	21.4	1,238,953	4,257
	48-59 months	16.3	942,265	3,291
Mother's education	None	62.8	3,636,392	13,432
	Primary	23.5	1,357,836	4,319
	Secondary +	11.9	689,365	1,807
	Non-standard curriculum	1.6	90,362	276
	Missing/DK	0.2	12,345	36
Wealth index quintiles	Poorest	21.4	1,239,981	4,927
	Second	22.9	1,324,083	5,052
	Middle	22.1	1,281,182	4,475
	Fourth	19.5	1,130,307	3,404
	Richest	14.0	810,749	2,012
Total		**100.0**	**5,786,302**	**19,870**

Under-five children of mothers with no formal education constituted 62.8 percent, while 23.5 percent of under-five children had mothers with primary education and 11.9 percent had mothers with secondary or higher education. The wealth index quintiles show that about 21.4 percent of under-fives belong to the poorest households while children from the relatively rich households constitute about 14 percent of the total.

4. FINDINGS OF KEY SOCIAL AND MDG INDICATORS

4.1. Child Mortality

One of the goals of the Millennium Development (MDGs) and the World Fit for Children (WFFC) is to reduce infant and under-five mortality. Specifically, the MDGs call for the reduction in under-five mortality by two-thirds between 1990 and 2015. However, monitoring progress towards this important goal is tricky. Measuring childhood mortality may seem easy, but attempts using direct questions, such as "Has anyone in this household died in the last year?" give inaccurate results. Using direct measures of child mortality from birth histories is time consuming, more expensive, and requires greater attention to training and supervision. Alternatively, indirect methods developed to measure child mortality produce robust estimates that are comparable with the ones obtained from other sources. Indirect methods minimize the pitfalls of memory lapses, inexact or misunderstood questions and poor interviewing techniques.

The infant mortality rate is the probability of a child dying before its first birthday. The under-five mortality rate is the probability of the child dying before its fifth birthday. In MICS surveys, infant and under-five mortality rates are calculated based on an indirect estimation technique known as the Brass method (United Nations, 1983; 1990a; 1990b). The data used in the estimation are: the mean number of children ever born for five year age groups of women from age 15 to 49, and the proportion of these children who are dead, also for five-year age groups of women. The technique converts these data into probabilities of dying by taking into account both the mortality risks to which children are exposed and their length of exposure to the risk of dying, assuming a particular model age pattern of mortality.

Table CM.1 below provides estimates of child mortality by various background characteristics and by State; and Figures CM.1a – c show estimates of neonatal, infant and under-five mortality rates for each of the 25 States in Sudan.

Table CM.1: Neonatal, Infant and Child Mortality in the 5 years preceding the survey, by background characteristics. Sudan, 2006

		Neonatal mortality*	Post neonatal mortality**	Infant mortality***	Child mortality****	Under five mortality*****
State	Northern	35	22.4	57.4	13.5	70.1
	River Nile	39.9	28.6	68.6	23.6	90.6
	Red Sea	36.9	36.6	73.4	56.5	125.7
	Kassala	30.5	25.8	56.3	26.5	81.3
	Gadarif	43.1	43.2	86.3	55	136.6
	Khartoum	32.3	36.7	69	18.8	86.5
	Gezira	27.3	25.1	52.4	11	62.8
	Sinnar	32.3	30	62.2	38.8	98.7
	Blue Nile	47.5	51.7	99.2	87.7	178.2
	White Nile	33.8	22.7	56.5	34.6	89.1
	North Kordofan	38.7	21.9	60.6	29.1	87.9
	South Kordofan	47.6	50.4	98	54.5	147.2
	North Darfur	33.6	35.2	68.7	27.7	94.5
	West Darfur	42.2	50.6	92.8	49.9	138.1
	South Darfur	27.9	39.2	67.2	33.2	98.1
	Jonglei	38.3	35.5	73.8	36.7	107.8
	Upper Nile	53.7	28.7	82.4	30.2	110.1
	Unity	30.2	33.8	63.9	19.6	82.2
	Warrap	66.3	71.6	137.9	43.8	175.6
	North BEG	67.4	61.8	129.2	41.1	165
	West BEG	37.1	59.8	96.9	41	134
	Lakes	49.3	40.2	89.5	27.1	114.1
	Western Equatoria	69	81.7	150.7	48.8	192.1
	Central Equatoria	55.6	51.4	107	38.6	141.4
	Eastern Equatoria	39.6	43.1	82.7	38.1	117.6
All States	North	35.5	35.5	71	33	101.6
	South	52.4	50	102.4	36.6	135.3
Sex	Male	40.7	37	77.7	30.2	105.5
	Female	40.8	43.1	83.9	38	118.7
Mother's Education	Illiterate	42.7	42.9	85.6	39	121.3
	Primary	36.6	37	73.6	23.7	95.6
	Secondary+	40.7	20.1	60.8	30.2	89.2
Wealth Index	Poor	45.5	49.3	94.8	37.8	129
	Second	44.4	39.3	83.8	40.7	121.1
	Middle	39.7	41.8	81.5	37.6	116
	Fourth	37.7	32	69.8	26.5	94.4
	Richest	31.3	33.5	64.8	20.2	83.7
Total mean		40.7	40.7	40	80.8	34.1

* SHHS indicator 1: *Neonatal mortality rate* (probability of infants dying during the first 28 completed days of life, per 1000 live births

** SHHS indicator 2: *Post neo-natal mortality rate* (probability of infants dying between one month and exactly one year of age, per 1000 live births)

*** SHHS indicator 3: *Infant mortality rate* (probability of dying between birth and exactly one year of age, per 1000 live births); MDG indicator 14

**** SHHS indicator 4: *Child mortality rate* (probability of dying between the first birth days and exactly one year of age, per 1000 live births)

***** SHHS indicator 5: *Under-five mortality rate* (probability of dying between birth and exactly five years of age, per 1000 live births); MDG indicator 13

The mortality rate per 1,000 live births for the Sudan as a whole is estimated at 41 for neonatals, at 81 for infants under one year old, and at 112 for children below age 5. These estimates have been calculated by averaging mortality estimates obtained from women age groups 25-29 and 30-34, and refer to mid 2006. Also shown in Table CM.1 are the post-neonatal and child mortality rates for the Sudan.

The findings indicate that under-five girls are more likely to die than boys in all but the neonatal age group, where both sexes have similarly high mortality rates. Considering background characteristics, mothers who have received more education are substantially less likely to lose their under-five children in all but the neonatal and child mortality categories where there is no clear pattern according to educational background. The wealth quintile into which the child is born also has a clear and stark effect on the likelihood of mortality in all under-five age groups: children born into the poorest quintile experience indicated higher mortality than those born into the richest quintile.

Focusing on Southern Sudan, findings show that mean figures for most of the under-five mortality categories are roughly 20 percent higher than for the country as a whole (Figures CM.1a-c) with the exception of neonatal mortality rate that is about 10 percent higher. The mortality rate per 1,000 live births is estimated at 52.4 for neonatal, at 102.4 for infants under one year old, and at 135.3 for children below age 5. There is considerable variation in all the under-five mortality rates between the States with Western Equatoria reporting the highest mortality rate, followed by Warrap, Northern Bahr El Ghazal, and Central Equatoria respectively. The States of Unity and Jonglei consistently had relatively low under-five mortality rates compared to the other 8 States.

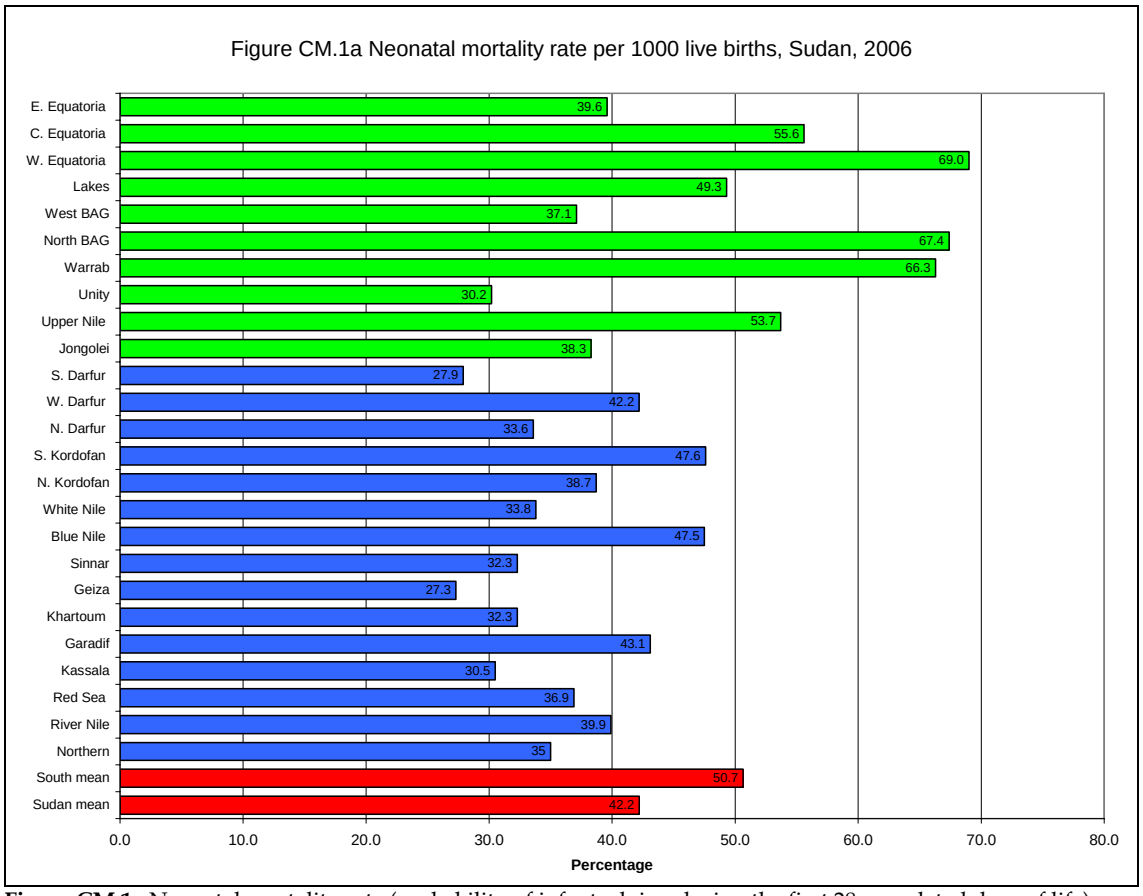

Figure CM.1a Neonatal mortality rate (probability of infants dying during the first 28 completed days of life) per 1000 live births

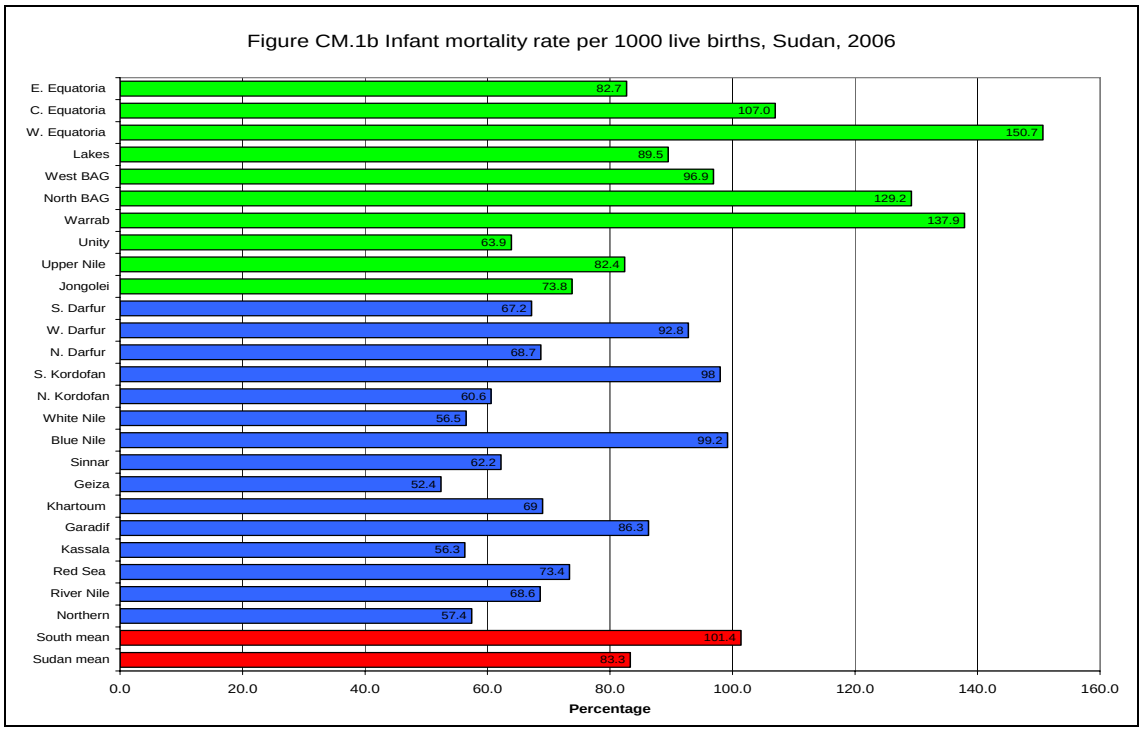

Figure CM.1b Infant mortality rate (probability of dying between birth and exactly one year of age) 1000 live births

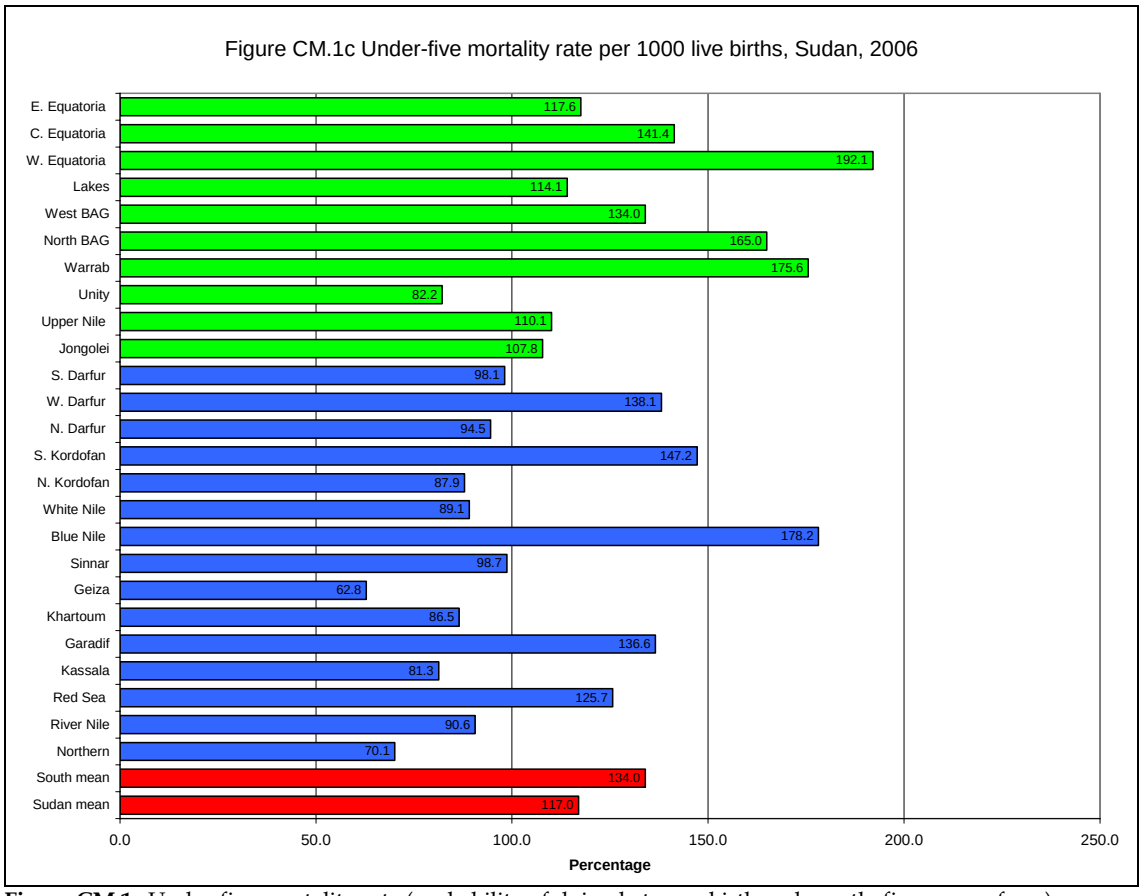

Figure CM.1c Under-five mortality rate (probability of dying between birth and exactly five years of age) per 1000 live births

4.2. Nutrition

Children's nutritional status is a reflection of their overall health. When children have access to an adequate food supply, are not exposed to repeated illness, and are well cared for, they reach their growth potential and are considered well nourished.

Malnutrition is associated with more than half of all child deaths worldwide. Undernourished children are more likely to die from common childhood ailments, and for those who survive, have recurring sicknesses and faltering growth. Three-quarters of the children who die from causes related to malnutrition were only mildly or moderately malnourished – showing no outward sign of their vulnerability. The Millennium Development target is to reduce by half the proportion of people who suffer from hunger between 1990 and 2015. The World Fit for Children goal is to reduce the prevalence of malnutrition among children under five years of age by at least one-third (between 2000 and 2010), with special attention to children under 2 years of age. A reduction in the prevalence of malnutrition will assist in the goal to reduce child mortality.

In a well-nourished population, there is a reference distribution of height and weight for children under age five. Under-nourishment in a population can be gauged by comparing children to a reference population. The reference population used in this report is the WHO/CDC/NCHS reference, which was recommended for use by UNICEF and the World Health Organization at the time the survey was implemented. Each of the three nutritional status indicators can be expressed in standard deviation units (z-scores) from the median of the reference population.

Weight-for-age is a measure of both acute and chronic malnutrition. Children whose weight-for-age is more than two standard deviations below the median of the reference population are considered *moderately or severely underweight* while those whose weight-for-age is more than three standard deviations below the median are classified as *severely underweight.*

Height-for-age is a measure of linear growth. Children whose height-for-age is more than two standard deviations below the median of the reference population are considered short for their age and are classified as *moderately or severely stunted.* Those whose height-for-age is more than three standard deviations below the median are classified as *severely stunted.* Stunting is a reflection of chronic malnutrition as a result of failure to receive adequate nutrition over a long period and recurrent or chronic illness.

Finally, children whose weight-for-height is more than two standard deviations below the median of the reference population are classified as *moderately or severely wasted,* while those who fall more than three standard deviations below the median are *severely wasted*. Wasting is usually the result of a recent nutritional deficiency. The indicator may exhibit significant seasonal shifts associated with changes in the availability of food or disease prevalence.

In MICS, weights and heights of all children under five years of age were measured using anthropometric equipment recommended by UNICEF (UNICEF, 2006). Findings in this section are based on the results of these measurements.

Table NU.1 shows percentages of children classified into each of these categories, based on the anthropometric measurements that were taken during fieldwork. Additionally, the table includes the percentage of children who are overweight, which takes into account those children whose weight for height is above 2 standard deviations from the median of the reference population. In Table NU.1, children who were not weighed and measured (approximately five percent of children) and those whose measurements are outside a plausible range are excluded. In addition, a small number of children whose birth dates are not known are excluded.

Table NU.1 shows that almost 1 in 3 children under age five in the Sudan as a whole are moderately underweight (31 percent), and that 9 percent are classified as severely underweight. There is a similar prevalence of stunting, with 33 percent of Sudanese under-five children too short for their age, and 15 percent of them severely short for their age. At the time of the survey 15 percent of children younger than five were wasted (too thin for their height) and 4 percent being severely wasted.

Table NU.1: Child malnourishment
Percentage of children aged 0-59 months who are severely or moderately malnourished, Sudan, 2006

Background characteristics	Weight-for-age		Height-for-age		Weight-for-height			Number of children aged 0-59 months
	Underweight prevalence (% below – 2 SD)*	Underweight prevalence (% below – 3 SD)*	Stunting prevalence (% below – 2 SD)**	Stunting prevalence (% below – 3 SD)**	Wasting prevalence (% below – 2 SD)***	Wasting prevalence (% below – 3 SD)***	Over weight prevalence (% below + 2 SD)	
Sex								
Male	31.7	9.7	33.7	15.4	15.4	3.6	3.2	2,541,696
Female	30.3	9.0	31.2	14.9	14.1	3.4	4.0	2,423,976
State								
Northern	30.1	11.5	26.6	12.1	19.0	7.3	7.5	60,710
River Nile	27.1	7.4	27.5	12.5	13.1	2.1	1.8	98,617
Red Sea	32.4	10.9	31.1	14.1	15.1	4.7	2.6	83,264
Kassala	38.4	15.5	42.9	25.6	19.2	4.5	5.1	195,091
Gadarif	33.8	8.7	38.4	16.8	9.9	1.5	1.3	265,819
Khartoum	21.0	3.5	25.5	11.7	11.2	1.9	4.0	661,541
Gezira	24.2	4.3	29.3	12.0	8.2	1.5	1.7	470,892
Sinnar	29.1	8.9	33.7	16.7	11.3	2.7	3.2	170,892
Blue Nile	36.5	10.0	40.2	19.6	11.8	2.7	3.3	126,337
White Nile	31.5	8.7	34.4	14.3	11.9	3.4	3.3	225,517
N. Kordofan	35.0	7.9	35.6	15.4	13.0	2.5	3.0	348,349
S. Kordofan	28.1	7.2	30.1	12.9	12.4	2.5	4.1	251,060
N. Darfur	39.6	15.4	32.6	16.0	22.5	6.0	1.4	239,848
W. Darfur	38.0	13.3	30.8	14.0	19.7	3.5	2.2	260,548
S. Darfur	33.2	8.4	34.4	12.9	10.7	0.7	1.3	470,395
Jonglei	39.5	16.9	32.5	17.8	28.0	9.5	4.5	142,261
Upper Nile	35.6	16.6	31.1	16.9	30.3	9.0	8.4	108,095
Unity	42.9	22.1	38.6	26.8	30.9	12.2	5.6	68,468
Warrap	33.6	14.1	28.9	17.1	24.6	8.4	10.2	138,894
NBG	41.6	18.7	37.8	21.8	30.9	8.4	5.3	103,294
WBG	37.2	18.4	41.3	21.7	23.7	9.4	6.4	48,690
Lakes	19.0	6.4	29.8	13.8	13.0	3.5	9.4	104,617
W. Equatoria	21.6	10.7	38.0	20.2	10.4	4.0	9.1	64,368
C. Equatoria	25.2	5.3	32.8	13.1	9.8	1.4	3.9	146,867
E. Equatoria	33.6	12.4	33.6	18.9	18.7	6.6	5.1	111,236
SUDAN	**31.0**	**9.4**	**32.5**	**15.2**	**14.8**	**3.5**	**3.6**	**4,965,672**
Age								
< 6 months	4.0	1.1	6.3	2.5	9.9	2.2	9.0	414,558
6-11 months	19.5	5.0	18.3	6.0	14.0	2.4	5.7	528,167
12-23 mo	38.4	11.2	36.6	16.6	21.0	5.2	3.6	956,300
24-35 mo	36.9	14.0	36.8	16.6	14.7	3.2	2.4	1,093,023
36-47 mo	33.2	9.2	35.9	18.5	12.8	3.3	2.6	1,138,109
48-59 mo	32.4	8.3	39.6	19.1	13.3	3.4	2.5	835,514
Mother's education								
None	35.1	11.7	36.6	17.9	16.9	4.2	3.9	2,917,020
Primary	27.3	6.4	28.9	12.0	11.9	2.4	3.4	1,302,308
Secondary+	18.9	4.1	20.1	8.5	11.2	2.3	3.0	659,446
Wealth index quintiles								
Poorest	35.7	14.3	34.7	18.2	22.2	6.3	5.1	901,937
Second	37.3	13.3	37.9	18.5	17.5	4.4	3.1	1,076,894
Middle	34.0	9.2	36.5	16.8	12.9	2.7	3.6	1,138,063
Fourth	27.0	5.7	29.4	12.6	11.0	1.9	2.9	1,069,554
Richest	18.1	3.4	20.8	8.2	10.2	2.3	3.4	779,224

*** SHHS indicator 6: *Underweight prevalence* [Proportion of children under age five who fall below minus 2 (moderate and severe) and below minus 3 (severe) standard deviations from median weight for age of the reference population]; MDG indicator 4**

**** SHHS indicator 7: *Stunting prevalence* [Proportion of children underage five who fall below minus 2 (moderate and severe) and below minus 3 (severe) standard deviations from median height for age of the reference population]**

***** SHHS indicator 8: *Wasting prevalence* [Proportion of children under age five who fall below minus 2 (moderate and severe) and below minus 3 (severe) standard deviations from median weight for height of the reference population]**

Boys and girls are equally likely to be undernourished. The age pattern shows that a higher percentage of children aged 12-23 months and older are undernourished, according to all three indices, in comparison to younger children (Figure NU.1a). For example, in Southern Sudan, 6 percent of children aged 0-6 months were severely stunted, and this increased to 22 percent in the 48-59 month age-group. This pattern is expected and is related to the age at which many children cease to be breastfed and are exposed to contamination in water, food, and the general environment.

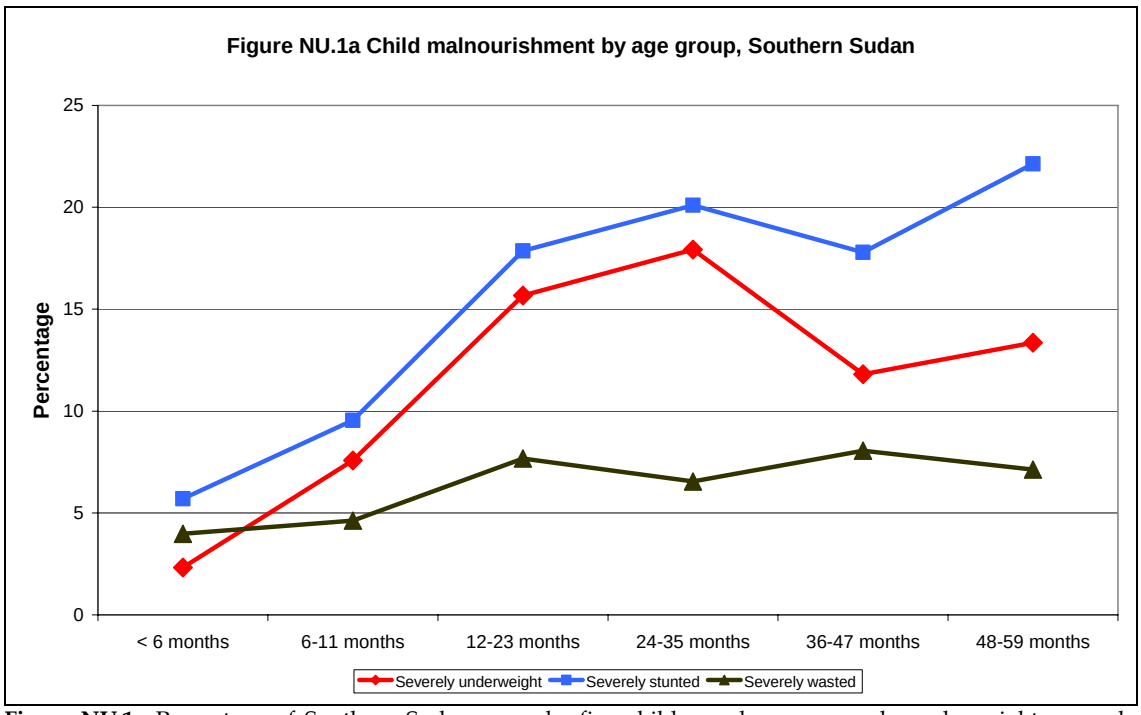

Figure NU.1a Percentage of Southern Sudanese under-five children who are severely underweight, severely stunted, and severely wasted

Both the wealth of the child's household and the educational background of the child's mother influence the likelihood that a child will be undernourished, with children from richer households less likely to be underweight, stunted or wasted than those from poorer families (Figure NU.1b). For example, in the Sudan as a whole 35 percent of children whose mothers had received no formal education were underweight for their age, while for those whose mothers had reached at least secondary school, the rate was 19 percent. It is somewhat surprising that these differentials are not more severe, and particularly that an appreciable number of children from the wealthiest households are nevertheless undernourished. Thus, for example, 21 percent of children from the top wealth quintile were found to be stunted.

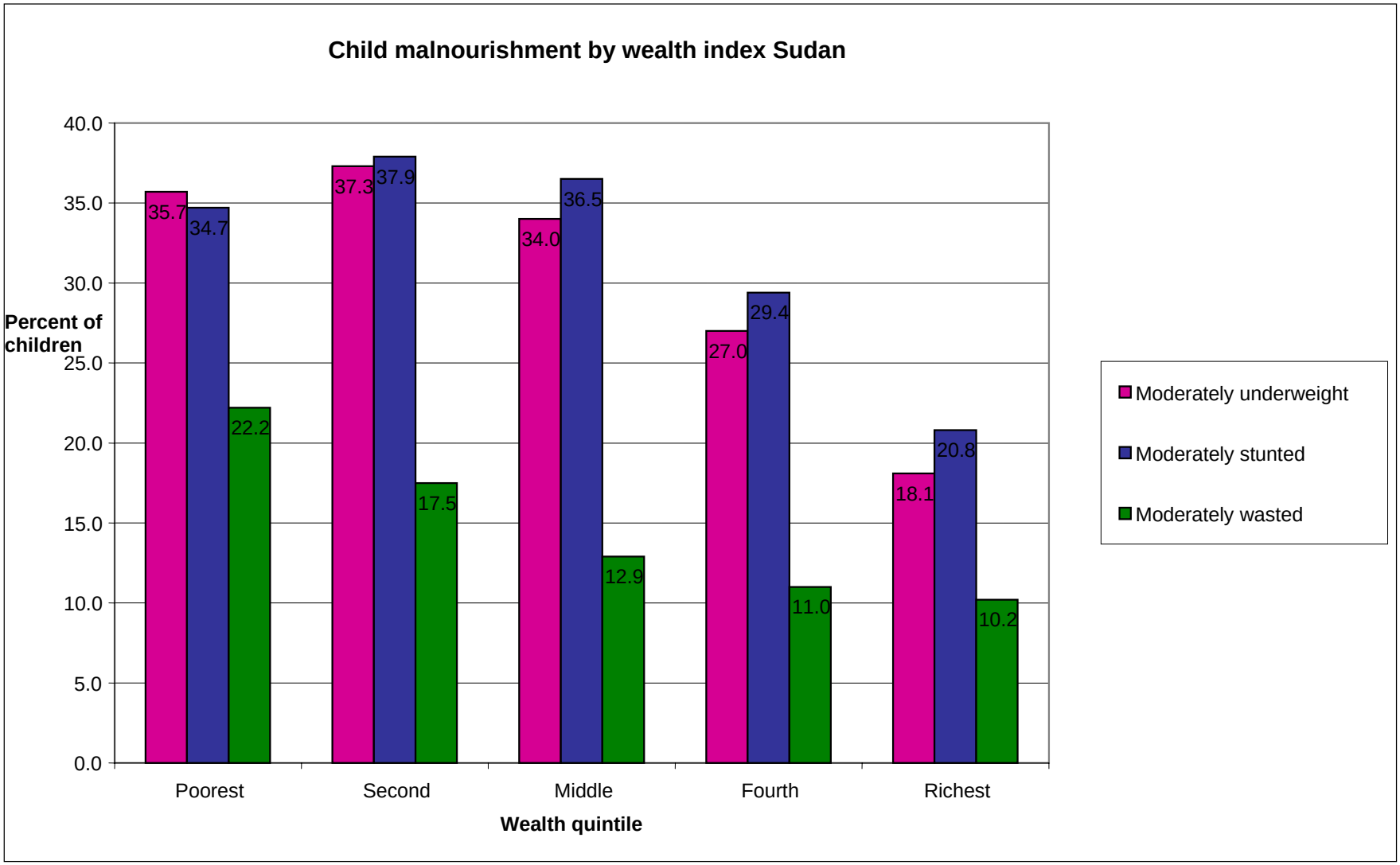

Figure NU.1b Proportions of Sudanese children from different wealth backgrounds who are moderately underweight, stunted, and waste

The findings indicate that children from the 10 States of Southern Sudan are more likely to be underweight, stunted and wasted (Table NU.1; Figures NU.1c – f). There are also considerable differences among the 10 States. Children in Unity State are most likely to be malnourished, while children living in Central Equatoria are least likely to be underweight, stunted or wasted.

Figures NU.1c – e) show each of the malnourishment categories in turn. On average, 14 percent of Southern children are severely underweight, against a national average of 11 percent (Figure NU.1c). Figures are worst in Unity State, where more than 1 in 5 children (22 percent) are severely underweight. Northern (19 percent) and Western Bahr El Ghazal (18 percent) also have a high prevalence of severely underweight children, as do Upper Nile and Jonglei (both 17 percent). Children are least likely to be underweight for their age in Central Equatoria (5 percent) and in Lakes (6 percent).

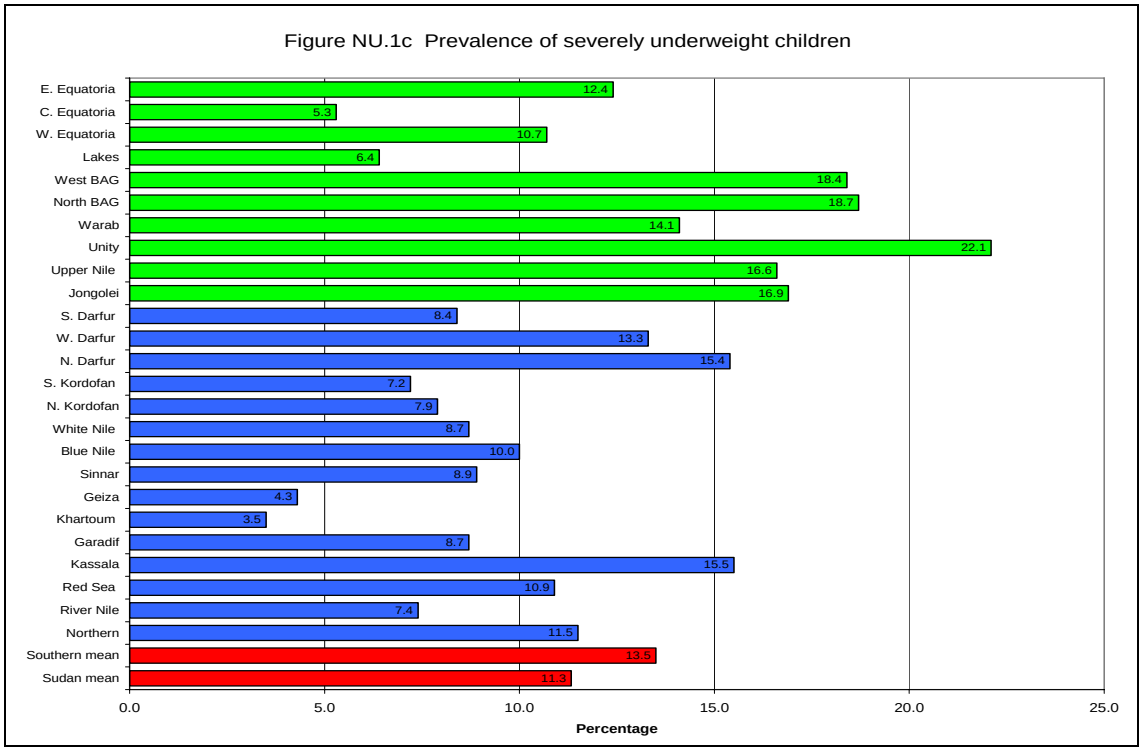

Figure NU.1c Proportion of children under age five who fall below minus 3 standard deviations from median weight for age of the reference population

The mean percentage of Southern Sudanese children who are severely stunted (18 percent) is slightly higher than the figure for the Sudan as a whole (17 percent; Figure NU.1d). Figures for severe stunting were worst in Unity, where more than 1 in 4 children (27 percent) are too short for their age, and were also high in Northern and Western Bahr El Ghazal (both 22 percent) and in Western Equatoria (20 percent). The States with the lowest prevalence of severely stunted children are Central Equatoria (13 percent) and Lakes (14 percent); but even here, more than 1 in 10 children show evidence of long-term severe malnourishment.

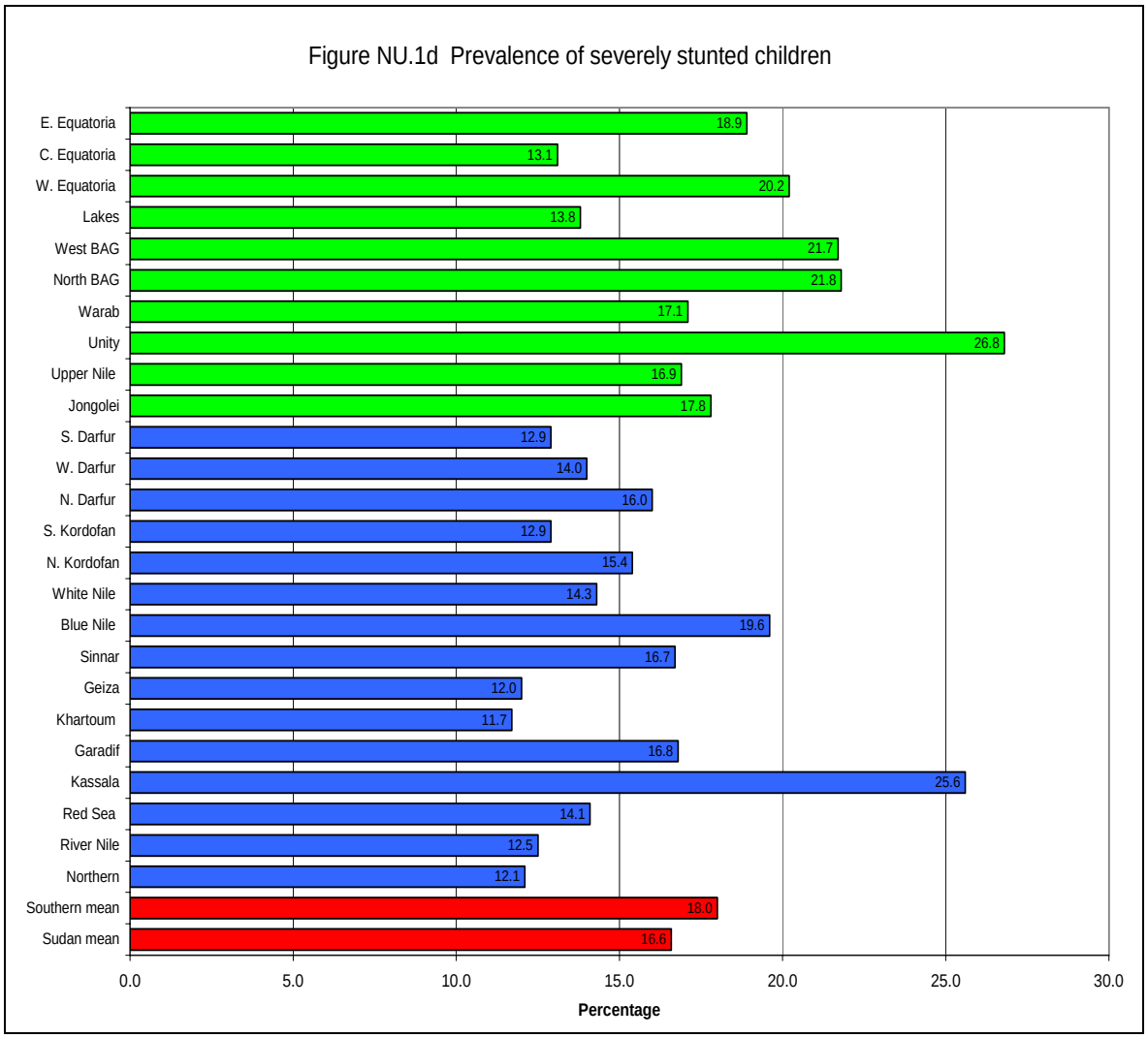

Figure NU.1d Proportion of children under age five who fall below minus 3 standard deviations from median height for age of the reference population

The prevalence of severely wasted children was again highest in Unity (12 percent), followed by Jonglei, Western Bahr El Ghazal, and Upper Nile (all roughly 9 percent; Figures NU.1e & f). In Central Equatoria, on the other hand, less than 2 percent of children were found to be wasted, while the figures in Western Equatoria and Lakes were intermediate (roughly 4 percent).

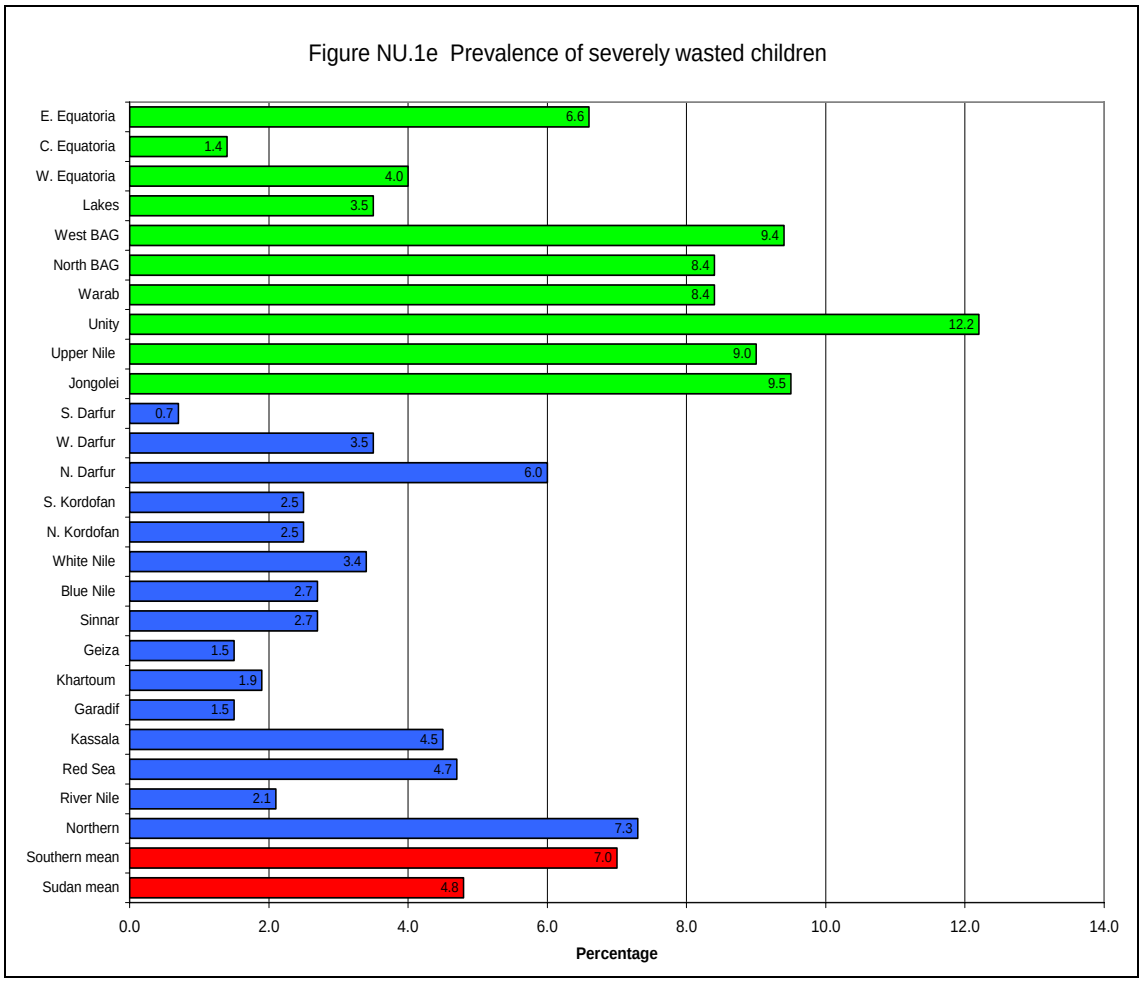

Figure NU.1e Proportion of children under age five who fall below minus 3 standard deviations from median weight for height of the reference population]

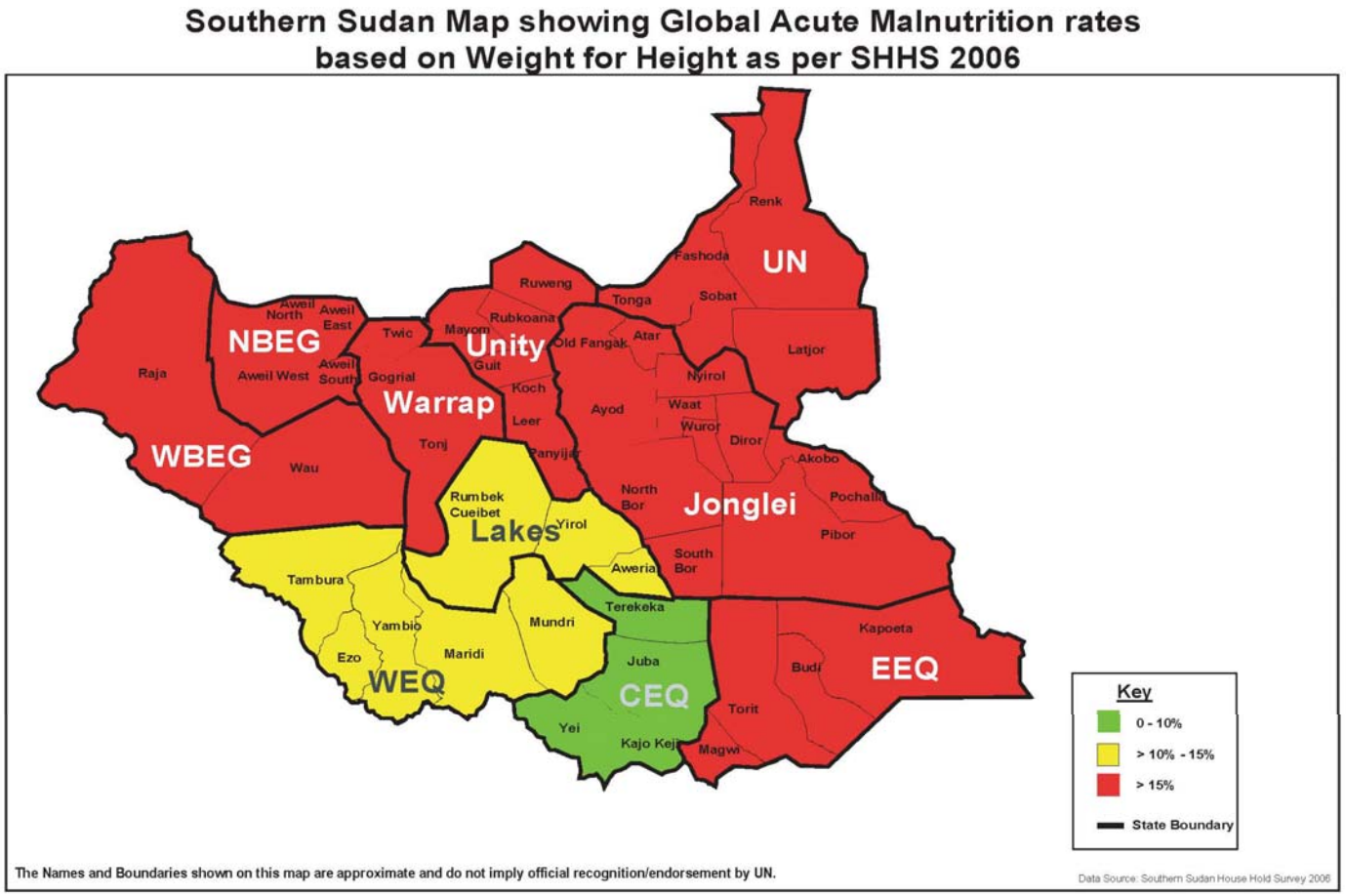

Figure NU.1f Map of Southern Sudan showing the percentage of under-five children who are severely wasted in each State. In States shaded green, fewer than 10 percent of under-five children are wasted, in those shaded yellow, the rate is 10-15 percent, and in those shaded red, over 15 percent of under-five children are too light for their height. Figure prepared by the Directorate of Nutrition, Ministry of Health, GOSS in collaboration with UNICEF.

4.2.1 Breastfeeding

Breastfeeding for the first few years of life protects children from infection, provides an ideal source of nutrients, and is economical and safe. However, many mothers stop breastfeeding too soon and there are often pressures to switch to infant formula, which can contribute to growth faltering and micronutrient malnutrition, and is unsafe if clean water is not readily available. The World Fit for Children goal States that children should be exclusively breastfed for 6 months and continue to be breastfed with safe, appropriate and adequate complementary feeding for up to 2 years of age and beyond.

WHO/UNICEF have the following feeding recommendations:

a. Exclusive breastfeeding for first six months
b. Continued breastfeeding for two years or more
c. Safe, appropriate and adequate complementary foods beginning at 6 months
d. Frequency of complementary feeding: 2 times per day for 6-8 month olds; 3 times per day for 9-11 month olds

It is also recommended that breastfeeding be initiated within one hour of birth.

The indicators recommended for child feeding practices are as follows:

a. Exclusive breastfeeding rate (< 6 months & < 4 months)
b. Timely complementary feeding rate (6-9 months)
c. Continued breastfeeding rate (12-15 & 20-23 months)
d. Timely initiation of breastfeeding (within 1 hour of birth)
e. Frequency of complementary feeding (6-11 months)
f. Adequately fed infants (0-11 months)

In Table NU.2, breastfeeding status is based on the reports of mothers/caretakers of children's consumption of food and fluids in the 24 hours prior to the interview. *Exclusively breastfed* refers to infants who received only breast milk (and vitamins, mineral supplements, or medicine). The table shows exclusive breastfeeding of infants during the first six months of life (separately for 0-3 months and 0-5 months), as well as complementary feeding of children 6-9 months and continued breastfeeding of children at 12-15 and 20-23 months of age.

In the Sudan as a whole, 42.5 percent of children aged 0-3 months were exclusively breastfed, while the figure for children aged 0-5 months was 33.7 percent (Table NU.2). By the age of 6-9 months, 56 percent of babies received a combination of breast milk and complementary food. The findings suggest that country-wide, 84 percent of children aged 12-15 months continue some degree of breastfeeding, but that by the age of 20-23 months this figure drops to 35 percent.

Table NU.2: Breastfeeding : Percentage of living children according to breastfeeding status at each age group, Sudan, 2006

		Age 0-3 months		Age 0-5 months		Age 6-9 months		Age 12-15 months		Age 20-23 months	
		% exclusively breastfed	Number of children	% exclusively breastfed*	Number of children	% receiving breastmilk and complementary food**	Number of children	% breastfed***	Number of children	% breastfed****	Number of children
Sex	Male	40.0	206,437	32.1	327,899	57.5	221,456	84.5	277,029	32.8	146,668
	Female	45.2	194,236	35.5	297,418	54.0	217,727	82.6	254,046	37.5	132,070
State	Northern	42.4	3,025	24.6	6,632	71.8	5,348	89.3	6,509	53.7	4,781
	River Nile	41.4	6,477	27.5	10,343	75.4	8,342	90.0	8,834	46.6	7,020
	Red Sea	37.5	5,901	25.4	10,842	70.6	8,184	88.2	8,701	39.7	3,633
	Kassala	52.8	15,911	43.9	23,762	50.0	22,373	84.1	22,302	60.7	9,380
	Gadarif	48.3	18,159	38.3	28,057	60.5	21,568	95.6	25,844	55.8	14,745
	Khartoum	56.1	54,296	39.6	89,379	82.1	70,549	88.6	46,703	54.4	38,426
	Gezira	48.2	24,490	37.8	42,773	64.2	24,151	90.7	47,939	34.3	18,374
	Sinnar	41.3	10,347	32.3	19,044	65.9	13,748	92.7	17,338	42.7	10,632
	Blue Nile	43.0	9,804	34.1	15,805	53.8	12,476	91.0	10,307	34.4	8,265
	White Nile	52.8	17,290	42.7	25,103	60.6	20,852	87.9	17,534	46.0	13,165
	N. Kordofan	47.2	30,520	34.7	45,342	72.2	23,574	92.5	34,872	25.7	16,984
	S. Kordofan	46.9	19,668	34.7	32,975	40.8	25,714	92.6	21,348	43.2	9,548
	N. Darfur	65.2	19,689	53.2	32,517	50.7	19,987	89.5	25,655	40.0	13,424
	W. Darfur	48.5	25,865	40.0	39,938	43.2	28,147	82.7	30,809	21.7	8,748
	S. Darfur	36.8	32,149	32.5	46,814	57.8	50,762	83.3	40,610	31.3	27,073
	Jonglei	24.4	25,048	19.4	34,682	13.2	12,203	57.0	25,369	9.4	10,276
	Upper Nile	17.1	9,982	18.5	15,401	11.8	9,697	73.8	18,539	20.7	8,271
	Unity	13.0	3,379	14.7	4,996	17.9	4,114	61.0	12,048	9.6	7,640
	Warrap	40.9	12,447	27.9	19,236	17.4	6,506	77.6	27,722	8.3	10,184
	NBG	12.9	12,222	22.2	14,193	22.7	8,674	76.0	19,713	11.1	10,645
	WBG	20.0	3,726	17.8	5,589	9.1	2,733	65.1	7,825	22.7	2,733
	Lakes	20.6	11,096	20.7	15,323	15.4	11,448	62.7	14,618	13.6	7,749
	W. Equatoria	16.7	6,866	11.1	11,586	50.0	5,149	84.6	9,298	33.3	3,433
	C. Equatoria	32.8	12,082	28.4	19,255	65.1	11,893	78.6	15,857	26.0	9,439
	E. Equatoria	31.5	10,233	20.5	15,728	44.8	10,991	84.6	14,781	22.7	4,169
SUDAN		**42.5**	**400,673**	**33.7**	**625,316**	**55.8**	**439,183**	**83.6**	**531,075**	**35.1**	**278,738**
Mother's education	None	36.0	248,029	29.4	383,339	44.4	241,207	80.6	339,334	31.0	165,787
	Primary	46.3	101,470	36.8	155,324	63.8	117,699	87.5	126,003	40.4	76,523
	Secondary +	69.4	46,322	49.0	77,332	78.2	72,050	91.0	57,635	41.6	32,910
Wealth index quintiles	Poorest	33.7	88,371	28.9	131,896	29.9	75,634	75.7	125,613	26.1	51,208
	Second	36.5	91,947	30.1	147,017	43.3	97,655	83.2	127,802	31.2	60,038
	Middle	42.8	92,609	35.3	140,134	60.3	101,166	85.4	118,269	33.6	62,112
	Fourth	43.7	70,708	31.3	110,552	70.1	97,121	89.4	92,336	40.0	62,872
	Richest	63.9	57,038	46.4	95,717	75.7	67,606	87.9	67,056	46.2	42,508

* SHHS indicator 9: Exclusive breastfeeding rate (infants aged 0-5 months)
** SHHS indicator 10: Timely complementary feeding rate (infants aged 6-8 months)
*** & **** SHHS indicator 11 & 12: Continued breastfeeding rate (children aged 12-15 months & 20-23 months)

Baby girls are somewhat more likely (45 percent) than baby boys (40 percent) to be exclusively breastfed before the age of 3 months, and some differential is maintained until they reach 6 months. On the other hand, the figures suggest baby boys aged 6-9 months are more likely (58 percent) to receive a suitable combination of breast milk and complementary food than baby girls (54 percent), while baby girls in the 20-23 months age group were again more likely to breastfeed than baby boys.

Background characteristics have a strong influence on the likelihood that a baby will be suitably breastfed, with more educated and wealthier women considerably more likely to exclusively breastfeed their baby than less educated and poorer women. For example, almost 2 out of 3 (64 percent) women from the top wealth quintile fed their under-3-month-old baby exclusively on breast milk, while the figure was only 1 in 3 (34 percent) for women from the bottom wealth quintile.

Figure NU. 2a-d shows the proportion of children aged 0-5 months from each of the 25 Sudanese States who were exclusively breastfed. The average figure for the 10 Southern States (20 percent) is considerably lower than the national mean. In Southern Sudan, children aged 0-3 months and 0-5 months were most likely to be exclusively breastfed in the States of Central Equatoria and Warrap. On the other hand, children aged 0-3 months and were least likely to have been exclusively breastfed in the States of Northern BEG (12.9 percent) and Unity (13 percent), and children aged 0-5 months were least likely to have been exclusively breastfed in the States of Western Equatoria (11 percent) and Unity (15 percent).

The proportion of children aged 6-9 months who received both breast milk and appropriate complementary food (27 percent) was less than half that for the Sudan as a whole (56 percent; Figure NU.2b). Within the South, there was stark differentiation between the States, with figures being much higher in Greater Equatoria (ranging from 45-65 percent and highest in Central Equatoria) than in the remaining 7 States (ranging from 9-23 percent). Western Bahr El Ghazal had the lowest figure.

Children from the 10 States of Southern Sudan (72 percent) were less likely than majority of children from the remaining States of Sudan (84 percent) to continue receiving some breast milk between the ages of 12-15 months (Figure NU.2c). However, in the South, figures did not vary widely between the different States, with Eastern and Central Equatoria reporting the highest figures (both 85 percent) and Jonglei reporting the lowest figure (57 percent). With regards to children aged 20-23 months in Southern Sudan (Figure NU.2d), there were appreciable differences in the figures for the different States. Toddlers were most likely to continue receiving some breast milk in Greater Equatoria, with 1 in 3 children in the age category 20-23 months receiving some breast milk in Western Equatoria. Figures were lowest in Warrap (8 percent), but were barely higher in Jonglei, Unity, and Northern Bahr El Ghazal.

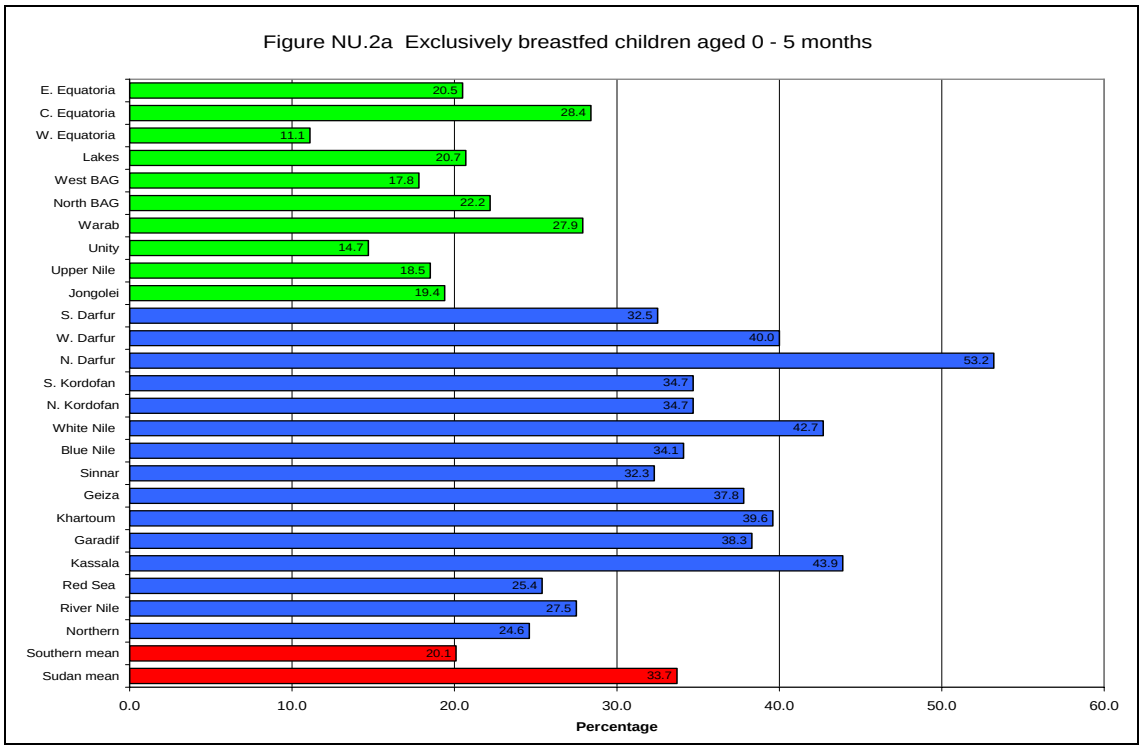

Figure NU.2a Percentage of children aged 0-5 months who feed exclusively on breast milk.

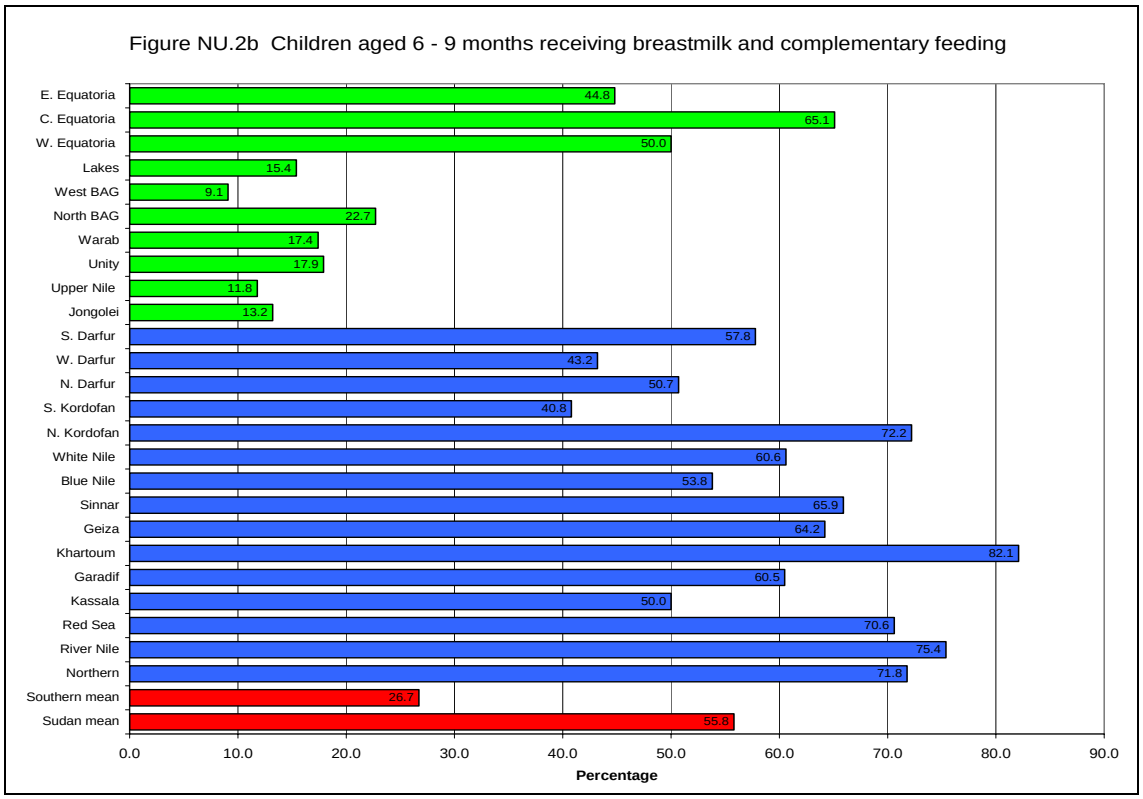

Figure NU.2b Percentage of children aged 6-9 months who receive breast milk as well as complementary food

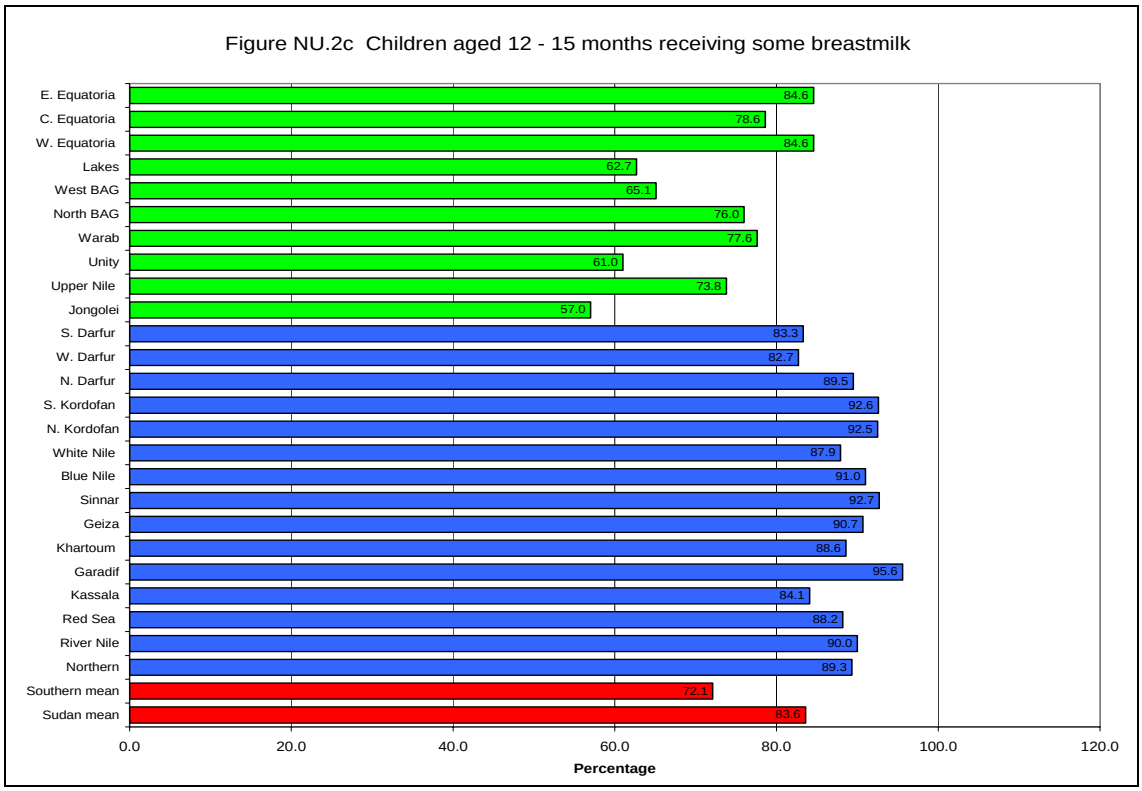

Figure NU.2c Percentage of children aged 12-15 months who continue receiving some breast milk

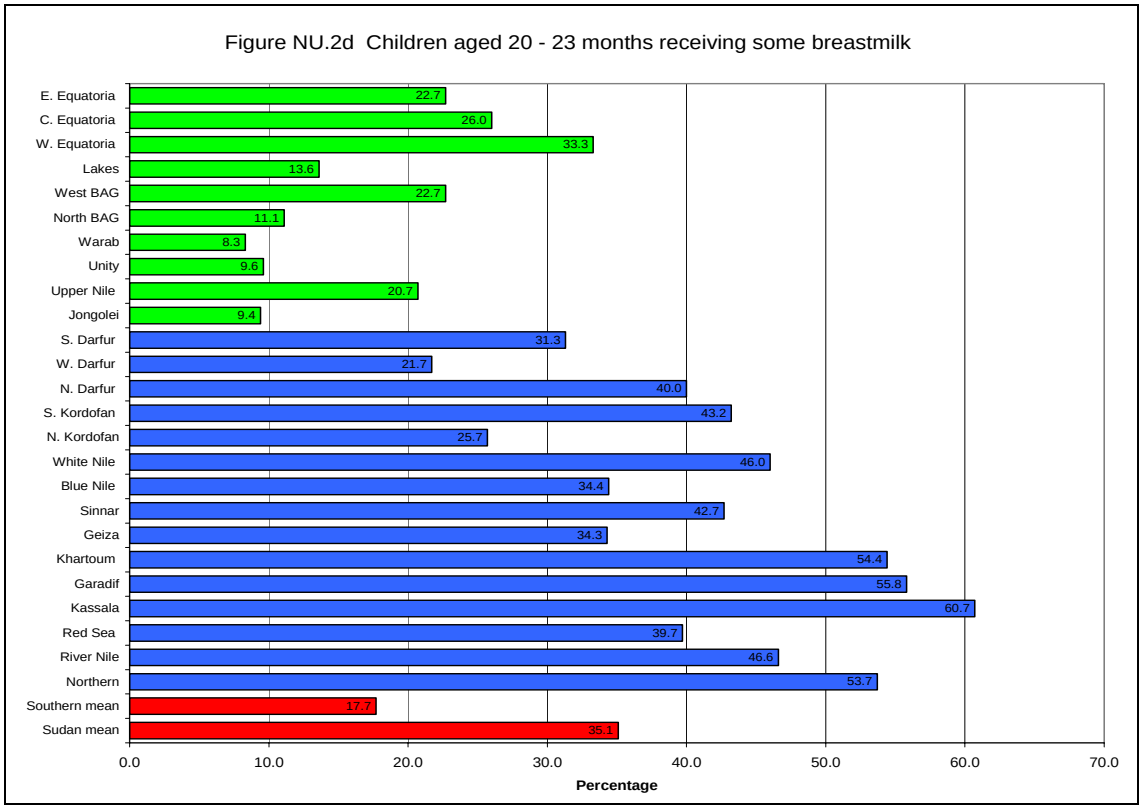

Figure NU.2d Percentage of children aged 20-23 months who continue receiving some breast milk

Table NU.3 shows infant feeding patterns of children aged 0-35 months in Southern Sudan. This includes children who are exclusively breastfed, given breast milk and plain water only, given breast milk and non-milk liquids, given breast milk and other milk or formula, given breast milk and complementary foods, and children who are weaned off breast milk completely.

Table NU.3 Infant feeding patterns by age, Southern Sudan, 2006

Age (months)	Infant feeding pattern						Total	Number of children
	Exclusively breastfed	Breastfed and plain water only	Breastfed and non-milk liquids	Breastfed and other milk/ formula	Breastfed and complementary foods	Weaned (not breastfed)		
0-1	28.4	3.0	6.9	25.4	8.3	28.1	100.0	46,329
2-3	21.6	5.6	6.4	30.0	8.4	27.9	100.0	60,752
4-5	13.7	6.6	5.7	25.7	16.4	31.9	100.0	48,909
6-7	10.6	3.5	6.2	26.6	27.4	25.8	100.0	41,529
8-9	9.6	4.6	5.2	30.4	29.8	20.4	100.0	41,878
10-11	15.9	1.5	5.4	16.5	37.8	22.8	100.0	48,495
12-13	8.2	2.1	4.3	21.6	36.2	27.5	100.0	112,936
14-15	8.4	0.7	3.8	19.2	38.3	29.5	100.0	52,834
16-17	2.0	0.7	4.8	16.5	35.0	41.0	100.0	44,665
18-19	4.0	1.2	1.0	5.9	32.3	55.6	100.0	30,332
20-21	2.2	0.4	0.0	3.1	13.3	80.9	100.0	32,564
22-23	2.8	0.8	0.4	3.4	5.5	87.0	100.0	41,975
24-25	0.4	0.0	0.3	1.8	1.5	96.1	100.0	157,244
26-27	0.5	0.0	0.5	1.2	2.3	95.5	100.0	61,487
28-29	0.0	0.0	0.6	1.4	1.4	96.7	100.0	52,641
30-31	0.0	0.0	1.3	1.0	1.6	96.1	100.0	29,206
32-33	0.0	0.0	0.0	1.2	0.5	98.3	100.0	32,331
34-35	0.0	0.0	0.0	0.0	1.1	98.9	100.0	40,692
Total	6.9	1.6	2.9	12.8	16.2	59.5	100.0	976,797

While during the first month of their lives 28 percent of babies were breastfed exclusively, the figures suggest a similar proportion of Southern babies were weaned off breast milk altogether. Roughly 1 in 4 babies of this age (25 percent) were fed on breast milk as well as milk or milk formula, and smaller proportions fed on breast milk as well as complementary foods (8 percent), non-milk liquids (7 percent) or plain water (3 percent).

At 12 months old, less than 1 in 10 babies (8 percent) were exclusively breastfed, while over 1 in 3 babies (36 percent) were fed complementary food in addition to breast milk. Somewhat counter-intuitively, the proportion of babies weaned off breast milk altogether remained the same (28 percent) as for 1-month-old babies, rather than increasing.

At 24 months all but a tiny minority (0.4 percent) of children had stopped feeding exclusively on breast milk. Indeed, the vast majority (96 percent) had been weaned off breast milk altogether.

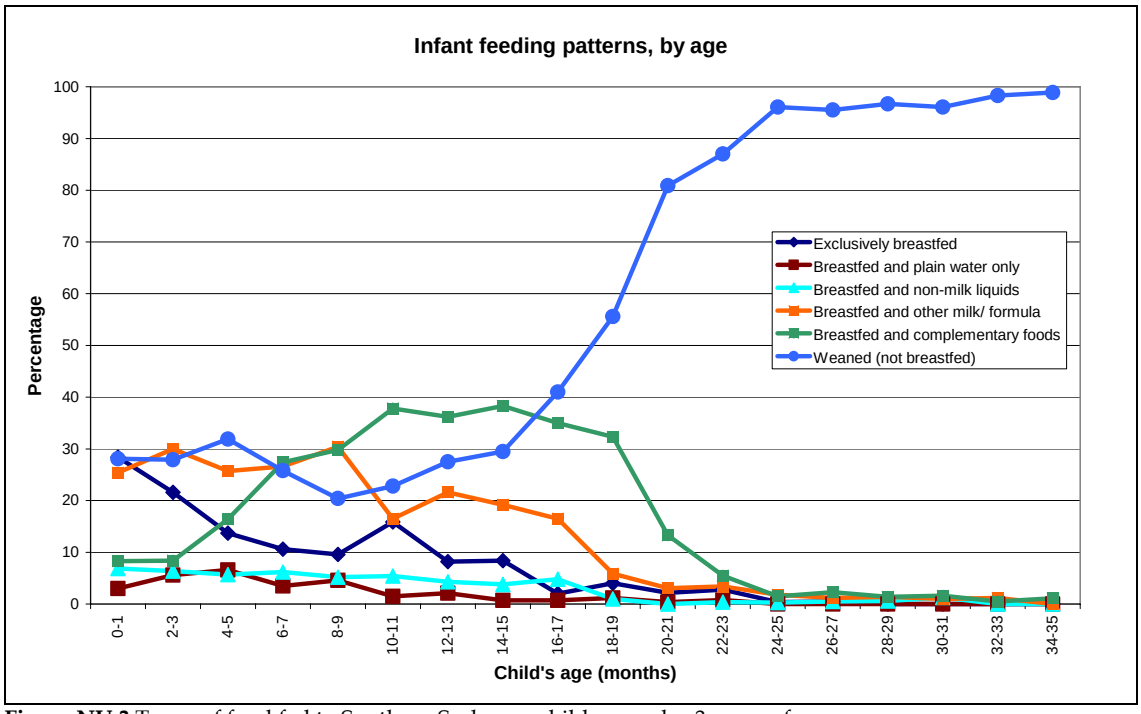

Figure NU.3 Types of food fed to Southern Sudanese children under-3 years of age

4.2.2 Frequency of complementary feeding

The adequacy of infant feeding in children under-12 months is provided in Table NU.4. Different criteria of adequate feeding are used depending on the age of the child. For infants aged 0-5 months, exclusive breastfeeding is considered as adequate feeding. Infants aged 6-8 months are considered to be adequately fed if they are receiving breast milk and complementary food at least two times per day, while infants aged 9-11 months are considered to be adequately fed if they are receiving breast milk and eating complementary food at least three times a day.

In the Sudan as a whole, only 36 percent of infants aged 6-11 months received breast milk and complementary food at least the recommended number of times per day. As a result of these feeding patterns, only 35 percent of children aged 6-11 months are being adequately fed.

A child's sex has little bearing on these figures, but his or her mother's education and the wealth quintile to which his or her family belong both correlate positively with the likelihood the child will be adequately fed. For example, infants whose mothers have no formal education are only half as likely (28 percent) as those whose mothers have at least secondary education (54 percent) to be adequately fed. Similarly, children from households in the bottom wealth quintile are less than half (23 percent) as likely as children from households in the top wealth quintile (52 percent) to be adequately fed.

Table NU.4: Adequately fed infants
Percentage of infants in various age categories who ate at least the minimum recommended number of times the day before the survey, and percentage of infants aged 0-11 months who are adequately fed, Sudan, 2006

		Percentage of infants aged:					Number of infants aged 0-11 months
		0-5 months exclusively breastfed	6-8 months who received breast milk and complementary food at least 2 times in prior 24 hours	9-11 months who received breast milk and complementary food at least 3 times in prior 24 hours	6-11 months who received breast milk and complementary food at least the minimum recommended number of times per day*	0-11 months who were adequately fed**	
Sex	Male	32.1	39.1	35.7	37.4	34.8	652,480
	Female	35.5	38.7	30.1	34.8	35.1	612,231
State	Northern	24.6	50.0	44.7	47.2	37.2	15,008
	River Nile	27.5	65.4	55.9	60.5	46.7	24,773
	Red Sea	25.4	52.6	37.1	45.5	35.8	22,422
	Kassala	43.9	43.7	39.3	42.1	42.9	51,833
	Gadarif	38.3	39.7	44.4	42.2	40.4	62,395
	Khartoum	39.6	64.1	54.9	59.7	49.9	184,075
	Gezira	37.8	40.3	34.7	37.3	37.6	87,835
	Sinnar	32.3	47.9	32.5	41.4	36.8	38,241
	Blue Nile	34.1	47.7	33.8	41.7	38.1	33,574
	White Nile	42.7	41.9	22.6	33.0	37.4	55,457
	N. Kordofan	34.7	46.2	51.0	48.8	41.1	82,882
	S. Kordofan	34.7	28.5	25.0	27.1	30.8	66,942
	N. Darfur	53.2	36.2	25.7	32.3	43.6	60,260
	W. Darfur	40.0	30.4	25.0	28.3	34.5	74,931
	S. Darfur	32.5	31.9	19.6	26.8	29.1	116,189
	Jonglei	19.4	3.6	16.7	10.9	16.3	55,234
	Upper Nile	18.5	16.7	11.5	14.0	16.3	29,662
	Unity	14.7	0.0	0.0	0.0	6.3	11,607
	Warrap	27.9	10.0	11.5	10.9	21.1	32,248
	NBG	22.2	12.5	0.0	5.3	13.5	29,175
	WBG	17.8	5.9	0.0	2.8	11.1	10,061
	Lakes	20.7	5.7	2.6	4.3	12.3	31,526
	W. Equatoria	11.1	25.9	40.0	33.3	20.3	19,740
	C. Equatoria	28.4	41.3	46.6	44.2	36.4	38,888
	E. Equatoria	20.5	39.5	22.6	32.4	26.1	29,751
SUDAN		**33.7**	**38.9**	**33.0**	**36.1**	**35.0**	**1,264,711**
Mother's education	None	29.4	28.9	25.0	27.1	28.3	739,771
	Primary	36.8	43.8	39.6	42.0	39.5	320,616
	Secondary+	49.0	67.2	49.6	58.2	54.3	183,393
Wealth index quintiles	Poorest	28.9	18.5	13.4	16.2	23.2	239,772
	Second	30.1	25.1	22.8	24.0	27.0	294,097
	Middle	35.3	42.7	36.3	39.7	37.6	288,530
	Fourth	31.3	51.1	37.9	45.3	39.1	248,161
	Richest	46.4	58.7	57.3	58.0	52.3	194,150

* SHHS indicator 13: Frequency of complementary feeding received by infants aged 6-11 months

** SHHS indicator 14: Adequately fed infants aged 0-11 months

Children aged 6-11 months from the 10 States of Southern Sudan were only half as likely to have received both breast milk and complementary food, at least the recommended number of times per day (Figure NU.4a). There were also huge differences for this indicator among the 10 Southern Sudanese States. For example, children from greater Equatoria, mainly Central (44.2 percent), Western (33.2 percent) and Eastern (32.4 percent) Equatoria were most likely to have received at least the recommended diet compared to other States that reported low figures below 15 percent, with the worst reporting States being Northern Bahr El Ghazel (5.3 percent), Lakes (4.3 percent) Western Bahr El Ghazel (2.8 percent), and the worst of all Unity State, which reported an insignificant percentage that was statistically reflected as zero.

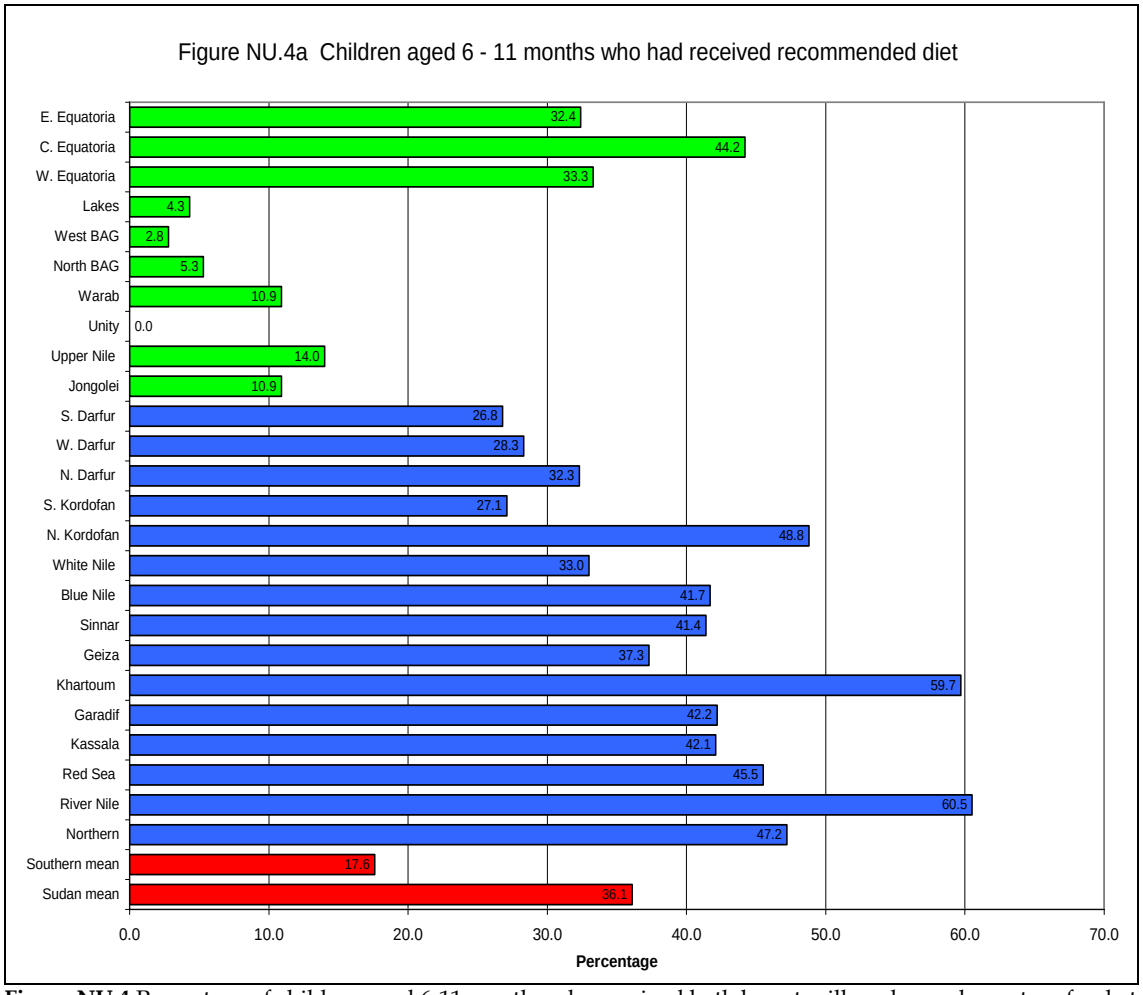

Figure NU.4 Percentage of children aged 6-11 months who received both breast milk and complementary food at least the minimum recommended number of times per day

Figure NU.4b shows the percentage of children aged 0-11 months who were found to be adequately fed. The figures for the country as a whole are low, with almost 2 out of 3 children being underfed, and are particularly poor for the Southern States, where less than 1 in 5 children are adequately fed, and where figures were below the national average in all States except Central Equatoria (36 percent).

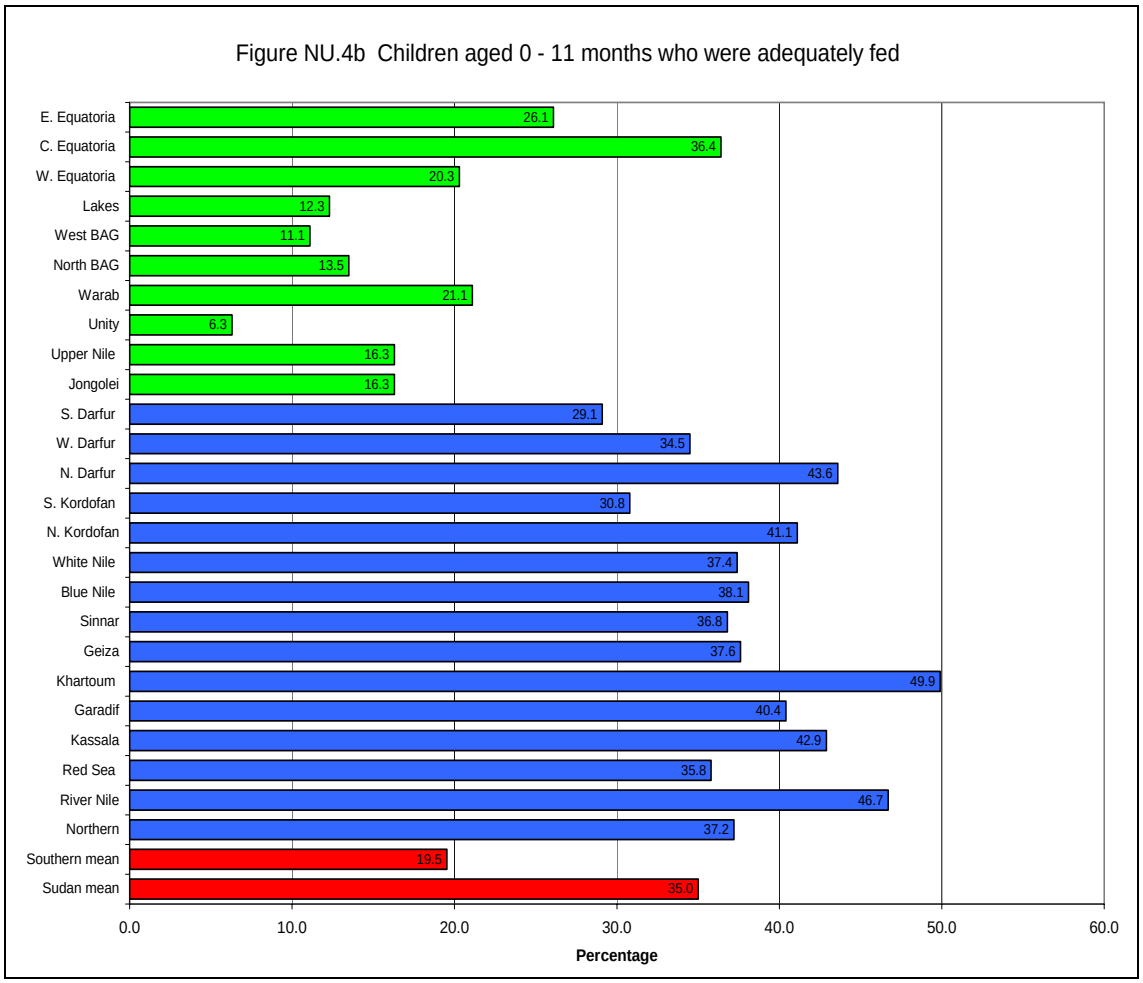

Figure NU.4b Percentage of infants aged 0-11 months who were adequately fed.

4.2.3 Salt Iodization

Iodine Deficiency Disorders (IDD) is the world's leading cause of preventable mental retardation and impaired psychomotor development in young children. In its most extreme form, iodine deficiency causes cretinism. It also increases the risks of stillbirth and miscarriage in pregnant women. Iodine deficiency is most commonly and visibly associated with goitre. IDD takes its greatest toll in impaired mental growth and development, contributing in turn to poor school performance, reduced intellectual ability, and impaired work performance. The international goal is to achieve sustainable elimination of iodine deficiency by 2005. The indicator is the percentage of households consuming adequately iodized salt ($\geq$15 parts per million).

In Southern Sudan, the Ministry of Health and the health partners are in the process of coming up with a plans and strategy in addressing the problem of salt iodization. The Ministry acknowledges the importance of ensuring that iodized salt are supplied in the market and all households have access to iodized salt and are using it. Ad hoc initiatives by humanitarian agencies during the period of civil war have shown great increase in use of iodized salt in Southern Sudan.

Table NU.5 shows the percentages of households in which salt was tested, and contained more than 15 parts per million (ppm) of iodine.

Table NU.5: Iodized salt consumption
Percentage of households consuming adequately iodized salt, Sudan State, 2006

		Percent of households in which salt was tested	Number of households interviewed	Percent of households with salt test result		Total	Number of households in which salt was tested or with no salt
				< 15 ppm	15+ ppm*		
State	Northern	97.1	112,522	99.8	0.2	100.0	112,522
	River Nile	99.7	168,535	99.5	0.5	100.0	168,535
	Red Sea	95.0	141,271	94.0	6.0	100.0	141,271
	Kassala	99.0	316,757	99.1	0.9	100.0	316,757
	Gadarif	96.7	270,533	99.4	0.6	100.0	270,533
	Khartoum	98.9	860,348	99.0	1.0	100.0	860,348
	Gezira	99.6	625,927	99.7	0.3	100.0	625,927
	Sinnar	93.3	222,509	99.2	0.8	100.0	222,509
	Blue Nile	95.0	112,245	99.7	0.3	100.0	112,245
	White Nile	99.4	259,638	99.2	0.8	100.0	259,638
	N. Kordofan	97.0	422,599	95.8	4.2	100.0	422,599
	S. Kordofan	93.8	287,880	95.1	4.9	100.0	287,880
	N. Darfur	95.4	284,110	64.2	35.8	100.0	284,110
	W. Darfur	97.5	367,028	61.0	39.0	100.0	367,028
	S. Darfur	97.7	547,828	84.2	15.8	100.0	547,828
	Jonglei	37.7	216,875	93.6	6.4	100.0	216,875
	Upper Nile	13.4	188,215	85.4	14.6	100.0	188,215
	Unity	38.7	89,366	89.2	10.8	100.0	89,366
	Warrap	27.6	241,439	88.3	11.7	100.0	241,439
	North BEG	34.9	211,241	78.8	21.2	100.0	211,241
	West BEG	54.0	64,565	68.6	31.4	100.0	64,565
	Lakes	48.4	131,682	40.7	59.3	100.0	131,682
	W. Equatoria	84.5	110,127	86.4	13.6	100.0	110,127
	C. Equatoria	97.1	161,701	21.1	78.9	100.0	161,701
	E. Equatoria	36.7	173,175	49.5	50.5	100.0	173,175
Wealth index quintiles	Poorest	62.0	1,380,473	74.4	25.6	100.0	1,380,473
	Second	77.8	1,396,037	82.0	18.0	100.0	1,396,037
	Middle	89.8	1,341,950	89.3	10.7	100.0	1,341,950
	Fourth	97.8	1,271,905	96.1	3.9	100.0	1,271,905
	Richest	98.5	1,197,748	96.5	3.5	100.0	1,197,748
Total		84.5	6,588,113	88.6	11.4	100.0	6,588,113

*MICS indicator 41; (SHHS indicator 15: Iodised salt consumption ; MDG indicator 12)

Salt used for cooking was tested for iodine content in an average of 84 percent of households within the 25 States of Sudan using salt test kits that test for the presence of potassium iodate. Findings indicated a country-wide average differences between the 10 Southern States and the remaining 15 States (Table NU.5). Households in the

10 Southern States were much more likely to use sufficiently iodized salt than those in the 15 States, with on average over 1 in 3 Southern households having salt meeting international standards (Figure NU.5).

Counter-intuitively, the results show a negative correlation between the wealth quintile to which a household belonged and the likelihood that this household had sufficiently iodized salt. Thus the poorest households were more than five times likely to use salt with more than 15 ppm of iodine than households in the wealthiest quintile. This may be because the poorer households were more likely to have been the recipients of humanitarian food aid, which often includes (sufficiently iodized) salt.

When referring specifically to Southern Sudan, findings indicate that the mean figures for consumption of adequately iodized salt are higher than the mean figure for the country as a whole (Figures NU.5). However, it is important to note that salt for cooking was tested in less than 50 percent of households in more than two thirds of the States. The findings should therefore be treated with circumspection. Nonetheless, there were stark variations in the figures for the different Southern States. More than 50 percent of households in Eastern and Central Equatoria and in Lakes used adequately iodized salt, but in the remaining States, the figure was less that 50 percent with Jonglei, Unity and Warrap States reporting the lowest figure of less than 12 percent.

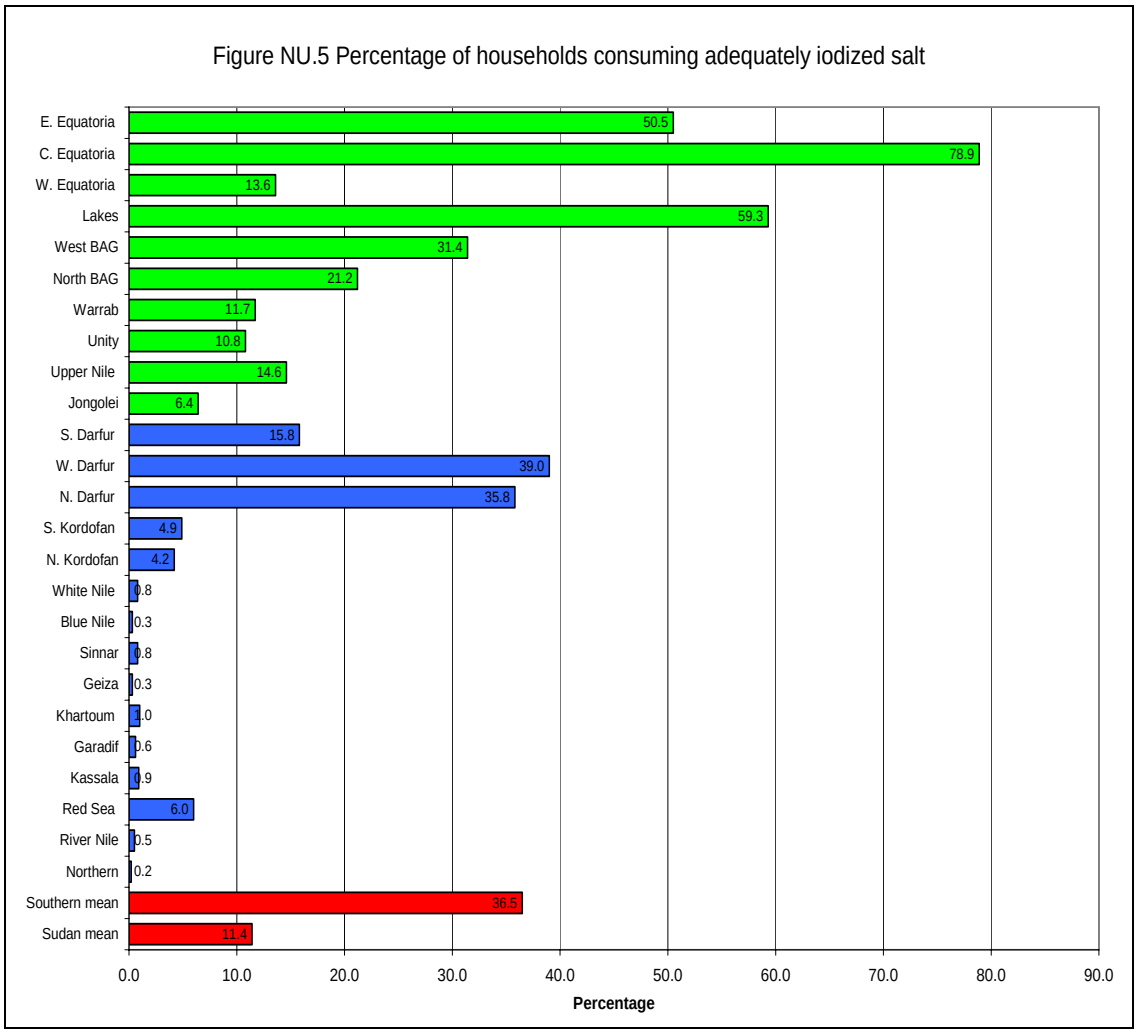

Figure NU.5 Percentage of households in which tested salt was found to have more than 15 ppm of iodine

4.2.4 Vitamin A Supplements

Vitamin A is essential for eye health and proper functioning of the immune system. It is found in foods such as milk, liver, eggs, red and orange fruits, red palm oil and green leafy vegetables, although the amount of vitamin A readily available to the body from these sources varies widely. In developing areas of the world, where vitamin A is largely consumed in the form of fruits and vegetables, daily per capita intake is often insufficient to meet dietary requirements. Inadequate intakes are further compromised by increased requirements for the vitamin as children grow or during periods of illness, as well as increased losses during common childhood infections. As a result, vitamin A deficiency is quite prevalent in the developing world and particularly in countries with the highest burden of under-five deaths.

The 1990 World Summit for Children set the goal of virtual elimination of vitamin A deficiency and its consequences, including blindness, by the year 2000. This goal was also endorsed at the Policy Conference on Ending Hidden Hunger in 1991, the 1992

International Conference on Nutrition, and the UN General Assembly's Special Session on Children in 2002. The critical role of vitamin A for child health and immune function also makes control of deficiency a primary component of child survival efforts, and therefore critical to the achievement of the fourth Millennium Development Goal: a two-thirds reduction in under-five mortality by the year 2015.

For countries with vitamin A deficiency problems, current international recommendations call for high-dose vitamin A supplementation every four to six months, targeted to all children between the ages of 6 to 59 months living in affected areas. Providing young children with two high-dose vitamin A capsules a year is a safe, cost-effective, efficient strategy for eliminating vitamin A deficiency and improving child survival. Giving vitamin A to new mothers who are breastfeeding helps protect their children during the first months of life and helps to replenish the mother's stores of vitamin A, which are depleted during pregnancy and lactation. For countries with vitamin A supplementation programmes, the definition of the indicator is the percent of children 6-59 months of age receiving at least one high dose vitamin A supplement in the last six months.

Based on UNICEF/WHO guidelines, the Ministry of Health, Government of Southern Sudan recommend that children aged 6-11 months be given a 100,000 IU vitamin A capsule and children aged 12-59 months given a 200,000 IU vitamin A capsule once every 6 months. In some parts of the country, vitamin A capsules are linked to immunisation services and are given when the child has contact with these services after six months of age. It is also recommended that mothers take a vitamin A supplement within eight weeks of giving birth due to increased vitamin A requirements during pregnancy and lactation.

Table NU.6 shows the percentage of children, in the age-group 6-59 months, by who received a high-dose vitamin A supplement in the 6 months prior to the survey.

Table NU.6: Children's vitamin A supplementation
Percent distribution of children aged 6-59 months by whether they received a high dose Vitamin A supplement in the last 6 months, Sudan,2006

		Percent of children who received Vitamin A:				Total	
		Within last 6 months**	Prior to last 6 months	Not sure if received	Never received Vitamin A	Total (%)	Number of children aged 6-59 months
Sex	Male	75.8	1.5	1.2	21.5	100.0	2,732,088
	Female	77.1	1.5	1.2	20.2	100.0	2,597,463
State	Northern	93.5	0.2	1.1	5.2	100.0	64,649
	River Nile	87.3	0.6	0.3	11.8	100.0	97,735
	Red Sea	90.4	0.5	0.5	8.5	100.0	81,798
	Kassala	86.6	2.1	0.8	10.4	100.0	204,819
	Gadarif	95.6	0.8	0.0	3.6	100.0	249,652
	Khartoum	92.5	2.5	0.5	4.5	100.0	638,683
	Gezira	93.4	0.6	0.2	5.8	100.0	455,486
	Sinnar	96.9	0.3	0.1	2.6	100.0	165,331
	Blue Nile	95.1	0.5	0.1	4.3	100.0	119,910
	White Nile	89.6	0.6	0.6	9.2	100.0	218,343
	N. Kordofan	93.9	0.5	0.5	5.1	100.0	335,313
	S. Kordofan	82.9	1.3	0.7	15.2	100.0	244,103
	N. Darfur	90.3	1.1	1.6	7.0	100.0	235,672
	W. Darfur	89.1	0.9	0.3	9.8	100.0	260,929
	S. Darfur	85.9	0.4	0.2	13.5	100.0	455,730
	Jonglei	19.2	3.1	5.4	72.3	100.0	208,735
	Upper Nile	34.1	3.3	3.1	59.5	100.0	155,726
	Unity	40.3	2.7	2.8	54.3	100.0	115,338
	Warrap	43.6	1.5	1.9	53.0	100.0	219,515
	North BEG	20.2	1.6	5.9	72.4	100.0	201,069
	West BEG	45.1	1.1	4.3	49.6	100.0	69,432
	Lakes	36.1	0.5	1.1	62.3	100.0	140,546
	W. Equatoria	47.1	3.7	1.8	47.5	100.0	73,523
	C. Equatoria	65.6	1.9	1.5	30.9	100.0	170,653
	E. Equatoria	63.1	7.2	1.4	28.3	100.0	146,861
Age	< 6 months	60.5	2.3	0.2	37.0	100.0	53,699
	6-11 months	75.4	1.0	0.7	22.9	100.0	609,749
	12-23 months	77.8	1.2	1.0	20.0	100.0	1,141,026
	24-35 months	78.0	1.4	1.3	19.3	100.0	1,262,671
	36-47 months	76.8	1.6	1.4	20.3	100.0	1,291,161
	48-59 months	73.8	2.2	1.4	22.6	100.0	971,246
Mother's education	None	67.6	1.7	1.5	29.2	100.0	3,325,793
	Primary	89.7	1.5	0.6	8.3	100.0	1,274,736
	Secondary	93.5	0.9	0.7	4.9	100.0	645,022
	Non-standard curriculum	94.1	0.4	0.0	5.5	100.0	73,362
	Missing/DK	93.1	0.0	0.0	6.9	100.0	10,639
Wealth index quintiles	Poorest	52.3	2.2	2.5	43.0	100.0	1,132,637
	Second	68.6	1.6	1.3	28.5	100.0	1,219,414
	Middle	82.7	1.0	0.9	15.4	100.0	1,179,270
	Fourth	92.8	1.1	0.3	5.8	100.0	1,050,762
	Richest	92.9	1.5	0.8	4.8	100.0	747,469
Total		76.4	1.5	1.2	20.9	100.0	5,329,552

** **SHHS indicator 16:** *Vitamin A supplementation (under-fives)*: Proportion of children 6-59 months of age who have received at least one high-dose vitamin A supplement in the 6 months prior to the survey

Within six months prior to the survey, a country-wide average of 76 percent of children aged 6-59 months received a high dose vitamin A supplement (Table NU.6). Less than two percent had received such a supplement more than six months before the survey.

The mother's level of education and the family's wealth index were closely linked to the likelihood of their child receiving vitamin A supplementation. Thus 68 percent of mothers with no formal education, and only 52 percent of mothers from the bottom wealth quintile, received high-dose vitamin A supplementation for their children. For the richest and best-educated women, this figure was well over 90 percent.

In Southern Sudan, coverage of vitamin A supplementation is low (Figure NU.6). Only two States of Central and Eastern Equatoria reported coverage of above 60 percent. Even in these two States, coverage is still well below the national average (76.4 percent). The remaining eight States reported low coverage of less than 50 percent. This is especially poor in Jonglei and Northern Bahr El Ghazal.

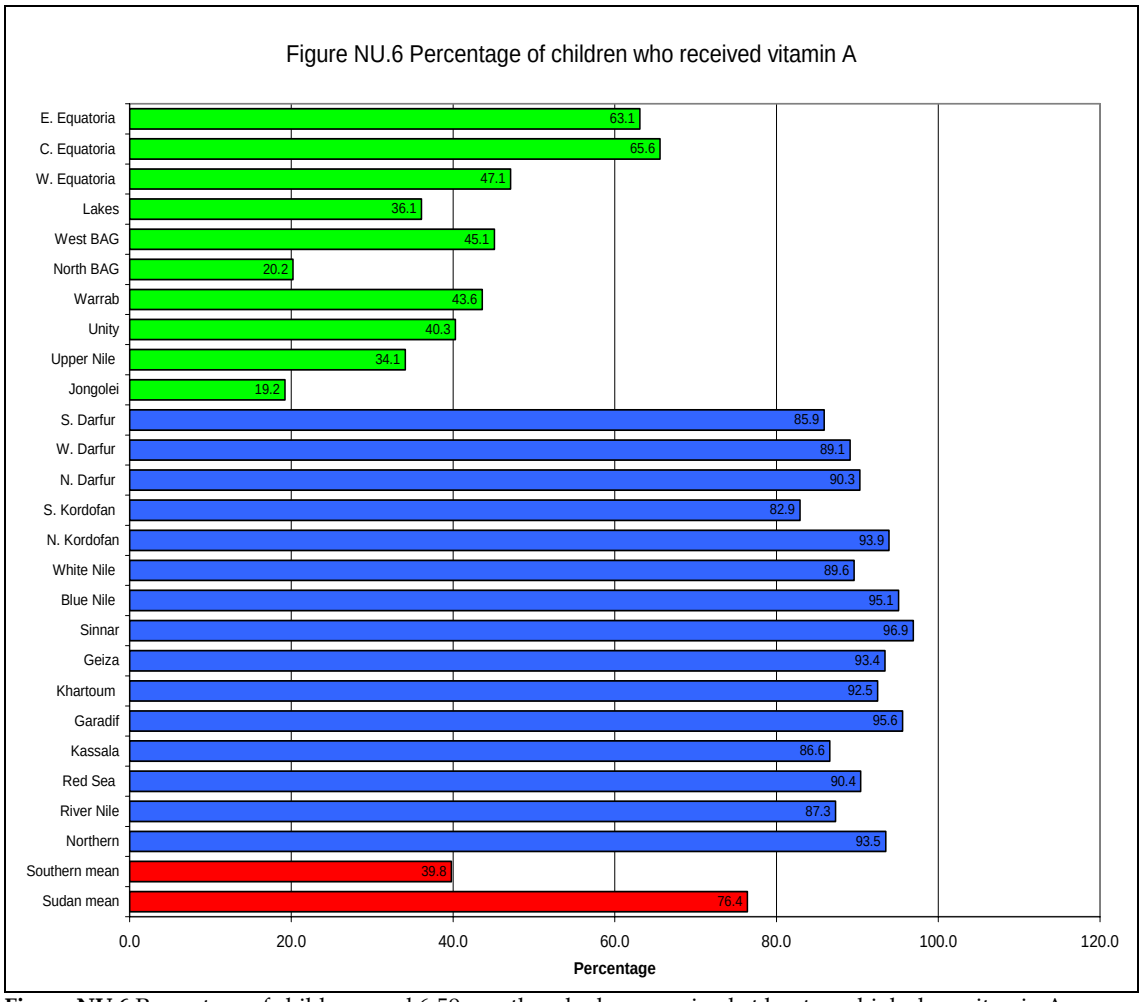

Figure NU.6 Percentage of children aged 6-59 months who have received at least one high-dose vitamin A supplement in the 6 months prior to the survey.

Table NU.7 shows the percentage of women aged 15-49 years who had a live birth in the two years preceding the survey and who received a high dose of vitamin A supplement before the infant was eight weeks old.

Table NU.7: Post-partum mothers' vitamin A supplementation
Percentage of women aged 15-49 years with a live birth in the 2 years preceding the survey by whether they received a high dose vitamin A supplement before the infant was 8 weeks old, Sudan, 2006

		Received vitamin A supplement* (%)	Not sure if received vitamin A (%)	Number of women aged 15-49 years (%)
State	Northern	11.2	8.6	36,320
	River Nile	24.9	5.1	52,123
	Red Sea	19.2	5.0	42,590
	Kassala	14.6	4.0	105,562
	Gadarif	16.1	3.8	130,314
	Khartoum	35.3	7.3	364,733
	Gezira	15.4	6.0	212,346
	Sinnar	10.9	10.5	93,892
	Blue Nile	11.0	5.7	68,166
	White Nile	18.4	5.7	110,693
	N. Kordofan	19.5	5.5	181,311
	S. Kordofan	11.2	3.5	128,748
	N. Darfur	12.2	8.2	131,960
	W. Darfur	14.6	3.7	153,542
	S. Darfur	15.8	6.0	244,234
	Jonglei	11.1	15.0	113,949
	Upper Nile	14.2	9.0	101,984
	Unity	31.6	6.3	65,656
	Warrap	11.0	23.6	83,379
	NBG	12.0	5.6	120,235
	WBG	14.3	6.6	47,933
	Lakes	25.8	3.4	103,432
	W. Equatoria	20.3	1.8	48,139
	C. Equatoria	22.7	1.3	97,937
	E. Equatoria	17.4	5.6	59,640
SUDAN		**18.5**	**6.6**	**2,898,818**
Education	None	15.6	6.4	1,731,869
	Primary	21.9	6.7	1,021,800
	Secondary +	28.9	7.9	141,452
Wealth Index quintiles	Poorest	13.6	7.8	603,866
	Second	15.8	5.8	670,156
	Middle	18.5	5.0	651,924
	Fourth	20.2	6.8	551,156
	Richest	27.3	8.3	421,717

***SHHS indicator 17:** *Vitamin A supplementation (post-partum mothers):* Proportion of women aged 15-49 years with a live birth in the 2 years preceding the survey who have received a high dose vitamin A supplement within eight weeks after birth

In the country as a whole, only about 19 percent of mothers with a birth in the previous two years before the survey received a vitamin A supplement within eight weeks of the birth (Table NU.7). Considering background characteristics, vitamin A coverage increases with the education of the mother but it is still only about 29 percent among women with secondary or higher education. Similarly, women in the wealthiest quintile of households were twice as likely (27 percent) to have received a supplement as those in the poorest quintile (14 percent).

Post-partum mothers in Southern Sudan were roughly equally likely to have received a vitamin A supplement as those in the remaining 15 States (Figure NU.7). The coverage across the 10 Southern States is below 35 percent with the highest coverage being Unity, where still only 32 percent of mothers received the supplement. Lakes State, as well as Central and Western Equatoria, also fared relatively well compared to Unity, but in Jonglei, Warrap and Northern Bahr El Ghazal, barely 1 in 10 post-partum mothers received the vitamin A supplement.

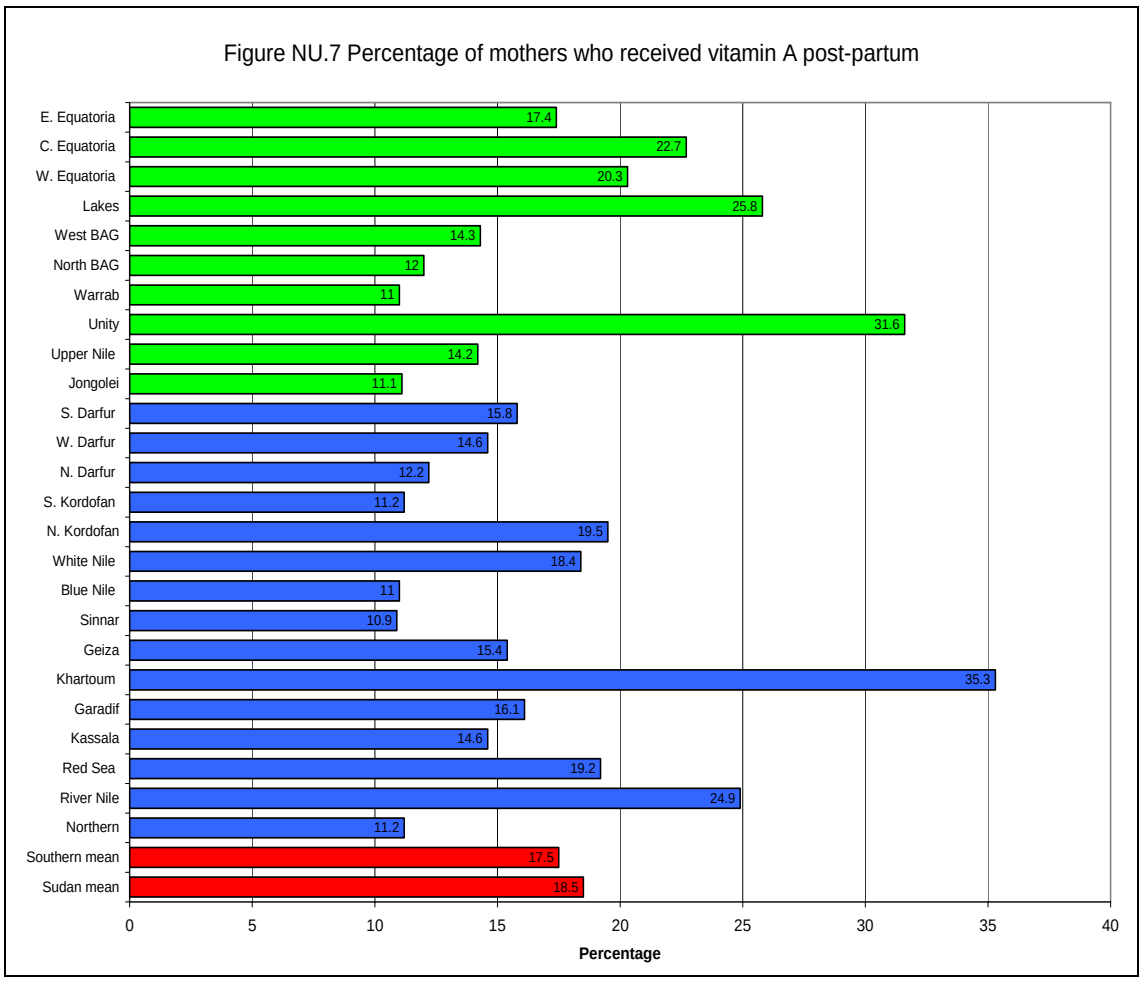

Figure NU.7 Proportion of women aged 15-49 years with a live birth in the 2 years preceding the survey who received a high dose vitamin A supplement within eight weeks after giving birth

4.3 Child Health

4.3.1 Immunisation

Millennium Development Goal 4 is to reduce child mortality by two thirds between 1990 and 2015. Immunisation plays a key part in this goal. Immunisations have saved the lives of millions of children in the three decades since the launch of the Expanded Programme on Immunisation (EPI) in 1974. Worldwide there are still 27 million children overlooked by routine immunisation and as a result, vaccine-preventable diseases cause more than 2 million deaths every year.

A World Fit for Children goal is to ensure full immunisation of children under one year of age at 90 percent nationally, with at least 80 percent coverage in every district or equivalent administrative unit.

According to UNICEF and WHO guidelines, a child should receive a Bacillis Calmette-Guérin (BCG) vaccination to protect against tuberculosis, three doses of DPT to protect against diphtheria, pertussis, and tetanus, three doses of polio vaccine, and a measles vaccination by the age of 12 months. Mothers were asked to provide vaccination cards for children under the age of five. Interviewers copied vaccination information from the cards onto the MICS questionnaire.

Table CH.1 shows the percentage of Southern Sudanese children aged 12-23 months immunised against childhood diseases.

Table CH.1: Vaccinations in first year of life
Percentage of children aged 12-23 months immunised against childhood diseases at any time before the survey and before the first birthday, Southern Sudan, 2006

	Percentage of children who received:											Number of children aged 12-23 months
	BCG*	DPT1	DPT2	DPT3**	Polio0	Polio1	Polio2	Polio3***	Measles****	All*****	None	
Vaccinated at any time before the survey according to vaccination card	11.3	11.2	10.5	10.3	9.5	11.0	10.1	9.3	11.9	9.4	0.1	315,305
Vaccinated at any time before the survey according to Mother's report	38.8	32.3	23.2	13.8	12.1	43.2	35.4	20.5	31.4	7.8	42.2	315,305
Vaccinated at any time before the survey (Total)	50.2	43.6	33.8	24.0	21.6	54.1	45.6	29.8	43.3	17.3	42.2	315,305
Vaccinated by 12 months of age	42.9	36.9	26.1	20.2	18.1	45.8	37.6	25.4	27.7	2.7	42.5	315,305

***SHHS indicator 18:** *Tuberculosis immunisation coverage* (Proportion of children 12-23 months of age who were vaccinated against Tuberculosis by 12 months of age, i.e. percentage of children aged 12-23 months who received BCG vaccination before their first birthday)

****SHHS indicator 19:** *DPT3 immunisation coverage* (Proportion of children 12-23 months of age who were vaccinated against diphtheria, pertussis and tetanus by 12 months of age, i.e. percentage of children aged 12-23 months who received DPT3 vaccination before their first birthday)

*****SHHS indicator 20:** *Polio immunisation coverage* (Proportion of children 12-23 months of age who were vaccinated against polio by 12 months of age, i.e. percentage of children aged 12-23 months who received OPV3 before their first birthday)

******SHHS indicator 21:** *Measles immunisation coverage* (Proportion of children 12-23 months of age who were vaccinated against measles by 12 months of age, i.e. percentage of children aged 12-23 months who received measles vaccination before their first birthday)

*******SHHS indicator 22:** *Fully immunised children* (Proportion of children 12-23 months of age who were vaccinated against childhood diseases by 12 months of age, i.e. percentage of children aged 12-23 months who received BCG, DPT1-3, OPV-1-3, and measles vaccinations before their first birth day)

The denominator for the table is comprised of children aged 12-23 months so that only children who are old enough to be fully vaccinated are counted. In the top panel, the numerator includes all children who were vaccinated at any time before the survey, according to the vaccination card or the mother's recollection. In the bottom panel, only those who were vaccinated before their first birthday, as recommended, are included (see also Figure CH.1). For children without vaccination cards, the proportion of vaccinations given before the first birthday is assumed to be the same as for children with vaccination cards.

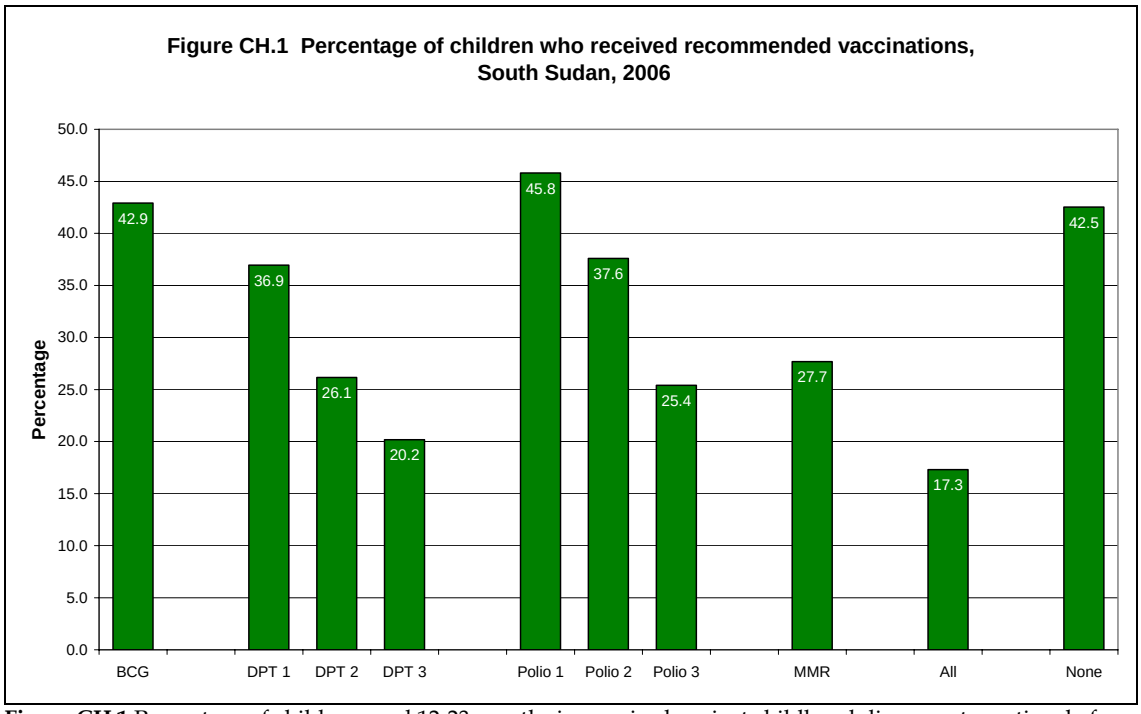

Figure CH.1 Percentage of children aged 12-23 months immunised against childhood diseases at any time before the survey and before their first birthday, Southern Sudan, 2006

In Southern Sudan, approximately 43 percent of children aged 12-23 months received a BCG vaccination by the age of 12 months, and the first dose of DPT was given to 37 percent of the target group (Figure CH.1). The percentage declines for subsequent doses of DPT to 26 percent for the second dose and to only 20 percent for the third dose. Similarly, 46 percent of children received Polio 1 by age 12 months but this figure declines to 24 percent for the third dose. The coverage for the MMR vaccine by 12 months is 28 percent. The percentage of children who had all the recommended vaccinations by their first birthday is exceedingly low, at only 32 percent. 43 percent of children aged 12-23 months had not received any of the recommended vaccinations whatsoever.

Table CH.2 show vaccination rates in Sudan among children aged 12-23 months by State and by background characteristics. The figures indicate children receiving the vaccinations at any time up to the date of the survey, and are based on information from both the vaccination cards and mothers'/caretakers' responses. Country-wide, only 35 percent of Sudanese children had health cards (Table CH.2). If the child did not have a card, the mother was asked to recall whether or not the child had received each of the vaccinations and, for DPT and Polio, how many times.

Table CH.2: Vaccinations by background characteristics
Percentage of children aged 12-23 months currently vaccinated against childhood diseases, Sudan, 2006

		BCG	DPT1	DPT2	DPT3	Polio 0	Polio 1	Polio 2	Polio 3	MMR	All	None	Percent with health card	Number of children aged 12-23 months
Sex	Male	74.7	73.7	65.4	53.7	32.0	82.2	76.4	61.5	64.9	40.3	15.1	33.7	602,547
	Female	75.0	74.4	66.5	55.9	33.5	83.3	77.3	62.3	68.0	42.5	14.2	35.6	563,074
State	Northern	85.2	88.7	85.8	85.1	27.6	97.9	95.1	89.5	79.3	72.5	2.1	43.0	16,507
	River Nile	87.6	87.4	85.9	74.6	40.5	94.8	91.7	73.3	82.8	57.0	3.0	32.1	23,671
	Red Sea	74.9	72.9	67.0	58.1	38.8	85.2	77.7	62.2	60.2	41.2	9.6	34.1	20,061
	Kassala	89.6	91.0	87.1	72.1	27.1	96.5	94.2	78.3	81.6	56.5	2.1	31.3	49,327
	Gadarif	87.0	86.5	78.3	67.7	41.8	87.0	84.2	68.3	78.4	50.8	5.8	44.2	59,070
	Khartoum	94.6	97.6	95.9	89.4	61.8	98.4	95.4	80.4	84.2	66.8	1.6	72.2	122,408
	Gezira	95.1	95.3	88.9	81.2	43.6	95.8	92.9	82.8	89.5	68.8	2.9	43.0	107,251
	Sinnar	92.4	94.9	89.6	80.3	37.2	96.1	93.6	81.0	81.8	61.1	0.9	55.1	45,211
	Blue Nile	87.1	86.5	83.1	77.2	35.9	95.6	91.9	77.2	70.4	58.8	2.8	68.1	29,711
	White Nile	81.5	85.1	81.3	76.5	23.0	88.9	86.8	80.9	72.8	60.7	8.5	46.2	49,973
	North Kordofan	76.5	81.1	73.1	54.9	37.1	97.1	91.3	69.2	71.1	39.4	1.1	40.6	76,286
	South Kordofan	73.1	74.5	67.1	56.9	24.0	85.2	79.5	57.3	67.2	37.3	11.6	32.4	47,167
	North Darfur	87.7	88.5	75.1	55.8	42.9	94.4	81.4	67.0	82.6	39.9	3.9	29.1	53,399
	West Darfur	69.1	77.0	63.0	32.6	16.4	93.6	85.7	63.6	61.2	23.9	5.6	15.4	54,392
	South Darfur	66.3	62.4	44.1	32.4	21.2	87.1	78.1	67.5	50.3	23.7	8.9	28.2	95,884
	Jonglei	25.0	19.8	17.6	16.0	17.2	30.2	26.4	17.6	19.7	11.8	65.4	10.9	41,426
	Upper Nile	65.1	60.8	48.8	36.6	29.1	68.3	60.2	40.7	54.6	28.5	29.1	17.3	36,222
	Unity	62.7	61.5	45.5	35.9	23.0	66.1	55.5	36.6	58.1	23.5	30.3	12.6	25,712
	Warrap	42.2	36.6	30.1	16.3	21.2	44.2	35.1	19.5	39.7	12.2	53.2	8.9	44,412
	North BEG	30.2	26.2	21.6	12.7	18.7	41.5	35.0	24.3	24.0	5.9	56.5	3.7	42,579
	West BEG	41.9	36.4	29.1	16.4	17.1	52.3	44.0	19.3	32.4	5.5	43.2	2.7	13,911
	Lakes	55.0	41.7	22.0	11.9	17.1	55.9	38.8	21.2	47.6	7.1	37.3	10.0	29,941
	West Equatoria	67.3	43.5	27.8	15.7	10.8	71.2	67.0	41.3	59.4	8.2	20.7	21.6	15,877
	C. Equatoria	79.2	74.5	63.6	54.5	29.9	80.1	72.5	55.5	67.5	43.6	16.6	25.9	40,020
	East Equatoria	43.1	36.2	26.2	14.6	23.3	45.9	34.6	22.6	41.4	13.8	51.9	15.0	25,203

Table CH.2 (cont.): Vaccinations by background characteristics
Percentage of children aged 12-23 months currently vaccinated against childhood diseases, Sudan, 2006

		BCG	DPT1	DPT2	DPT3	Polio 0	Polio 1	Polio 2	Polio 3	MMR	All	None	Percent with health card	Number of children aged 12-23 months
Mother's education	None	65.1	62.7	53.2	41.7	26.7	74.8	67.0	51.6	56.0	30.6	22.2	26.5	699,836
	Primary	87.8	88.6	82.4	71.2	39.0	93.3	89.9	75.6	79.4	54.8	4.3	47.7	307,712
	Secondary	93.4	96.2	90.2	80.5	47.9	97.3	94.8	80.1	89.0	63.0	1.4	45.0	140,546
	Non-standard curriculum	86.2	89.9	85.0	76.6	41.3	94.3	90.4	81.9	69.3	57.0	4.0	51.0	16,330
	Missing/DK	76.8	100.0	76.8	46.3	24.4	100.0	100.0	62.1	61.0	46.3	0.0	9.7	1,198
Wealth index quintiles	Poorest	51.9	48.8	39.6	25.9	20.3	62.4	52.0	33.7	46.6	16.5	34.2	12.7	234,861
	Second	63.0	60.7	50.4	37.8	24.8	75.4	67.5	51.1	54.4	28.0	21.3	24.1	257,390
	Middle	78.9	78.3	69.4	59.7	30.9	87.0	81.9	69.7	69.6	44.9	10.2	39.4	262,092
	Fourth	91.0	91.3	84.3	73.8	40.8	94.9	91.4	78.1	80.0	59.7	3.1	49.1	247,520
	Richest	94.7	97.8	93.6	85.0	53.6	98.0	96.3	81.3	87.2	64.1	0.9	53.1	163,758
Total		74.9	74.1	65.9	54.8	32.7	82.7	76.8	61.9	66.4	41.4	14.7	34.6	1,165,621

SHHS indicator 23 : *Tuberculosis immunisation coverage* (Proportion of children 12-23 months of age who received BCG vaccination at any time up to the date of the survey)

SHHS indicator 24: *DPT3 immunisation coverage* (Proportion of children 12-23 months of age received DPT3 vaccination at any time up to the date of the survey)

SHHS indicator 25: *Polio immunisation coverage* ((Proportion of children 12-23 months of age who received OPV3 vaccination at any time up to the date of the survey)

SHHS indicator 26: *Measles immunisation coverage* (Proportion of children 12-23 months of age who received measles vaccination at any time up to the date of the survey)

SHHS indicator 27: *Fully immunised children* ((Proportion of children 12-23 months of age who received BCG, DPT1-3, OPV1-3, and measles vaccinations at any time up to the date of the survey)

In the Sudan as a whole, there is a strong positive correlation between the likelihood that a child is vaccinated and both the mother's education and the family's wealth index. For example, while 34 percent of children born into the poorest wealth quintile had received no vaccinations whatsoever, only 1 percent of the children from the richest quintile had not received any vaccinations. Boys and girls were equally likely to have been vaccinated.

There is a big difference between the 10 Southern States compared to the majority of the remaining 15 States with regards to immunisation coverage, with only about half of the children in Southern Sudan as likely to have been vaccinated (Figures CH.2a - f). Considering overall immunisation coverage within Southern Sudan, Central Equatoria, and to a lesser extent Western Equatoria, fare well compared to other Southern States. Particularly, poorly immunised are the children of Northern and Western Bahr El Ghazal, Lakes, and Eastern Equatoria. Coverage by each vaccination type is discussed in more detail below.

Immunisation of children aged 12-23 months with the BCG vaccine in Southern Sudan had a mean coverage of 50 percent, a figure considerably lower than the national mean figure (Figure CH.2a). BCG coverage varied considerably among the Southern States. Five States mainly Eastern Equatoria (43.1 percent), Warrap (42.2 percent), Western Bahr El Ghazel (41.9 percent), Northern Bahr El Ghazel (30.2 percent) and Jonglei (25 percent) reported BCG coverage of less than 50%. Central Equatoria (79.2 percent), and to a lesser extent Western Equatoria (67.3 percent), Unity (62.7 percent), Upper Nile (65.1) and lakes (55 percent) received relatively good coverage compared to the other five Southern States. The worst coverage is reported in Jonglei and Northern Bahr El Ghazal, where less than 1 in 3 infants are vaccinated with BCG.

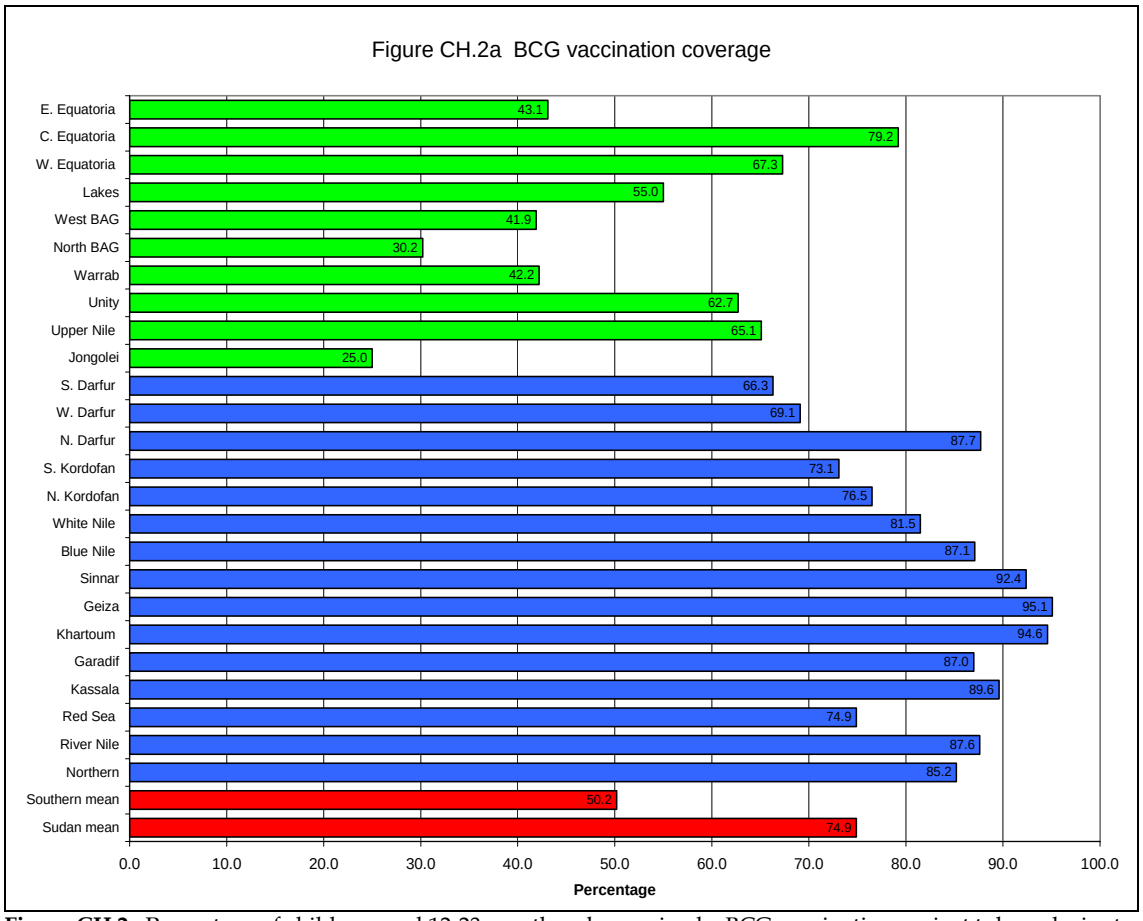

Figure CH.2a Percentage of children aged 12-23 months who received a BCG vaccination against tuberculosis at any time up to the date of the survey

The SHHS finding indicates very low coverage of DPT 3 vaccine in the ten Southern States, with the mean average reported at only 24 percent, a figure less than half that of the national (Sudan) mean coverage (Figure CH.2b). Central Equatoria is the only State that reported the highest coverage of DPT3 vaccination (55 percent) in Southern Sudan. This is followed by Upper Nile and Unity that have reported coverage of roughly 36 percent, a figure at least twice as high as all the remaining Southern States that have reported a low coverage of less than 20 percent. Lakes reported the lowest coverage of about 12 percent.

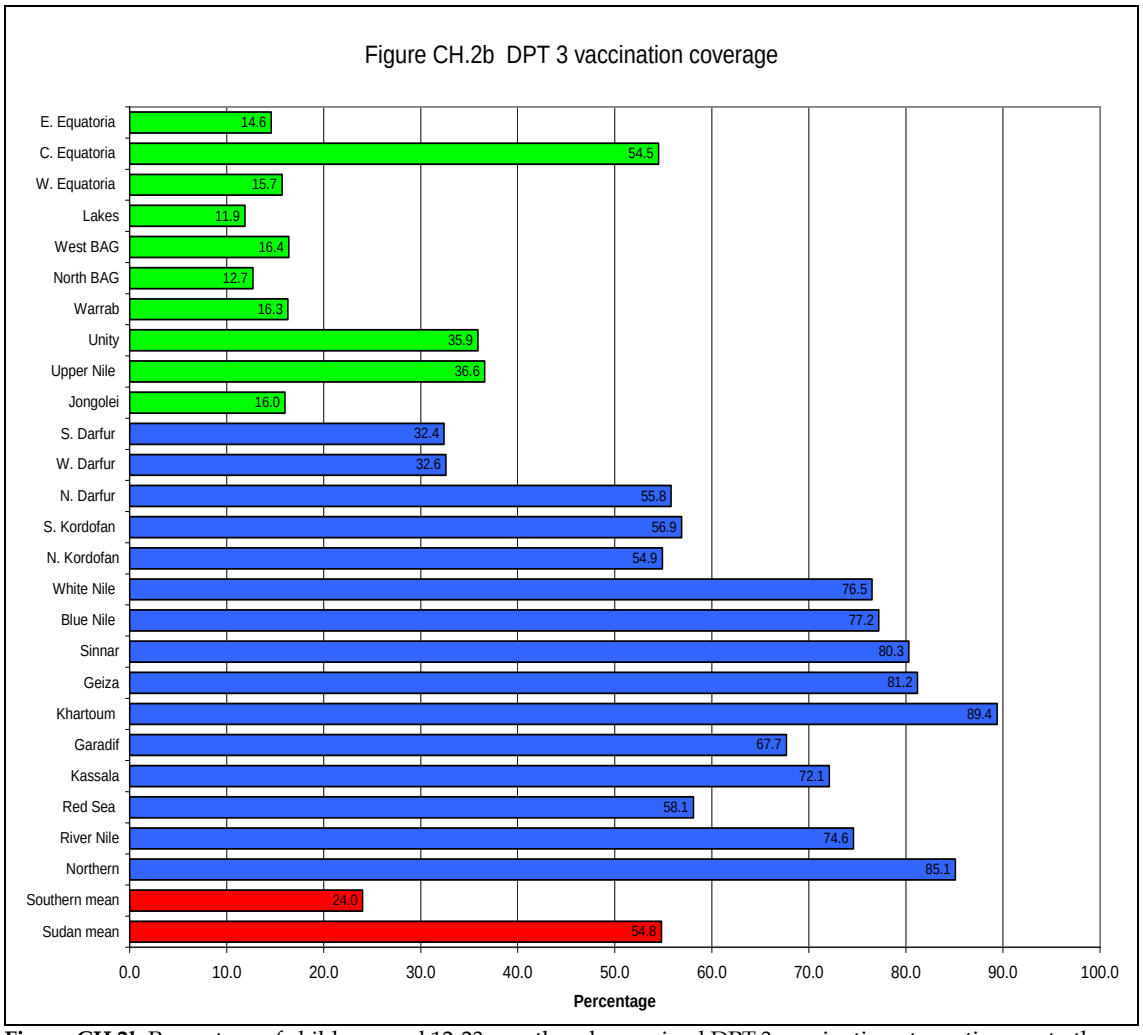

Figure CH.2b Percentage of children aged 12-23 months who received DPT 3 vaccination at any time up to the date of the survey

The SHHS findings indicate low coverage for the polio 3 vaccine in Southern Sudan, that closely resembles that for DPT 3 coverage, with the mean figure for Southern Sudan (30 percent) being less than half that for the country as a whole (62 percent; Figure CH.2c). Central Equatoria (56 percent) again stands out as the only Southern State with a relatively acceptable coverage of above 50 percent. The remaining 9 States reported a low coverage of less than 50 percent. Western Equatoria, Unity and Upper Nile States had coverage ranging between 35 and 42 percent, relatively better when compared to the remaining Southern States, all with a coverage of less than 25 percent, and Jonglei (19 percent) again having the lowest coverage of all.

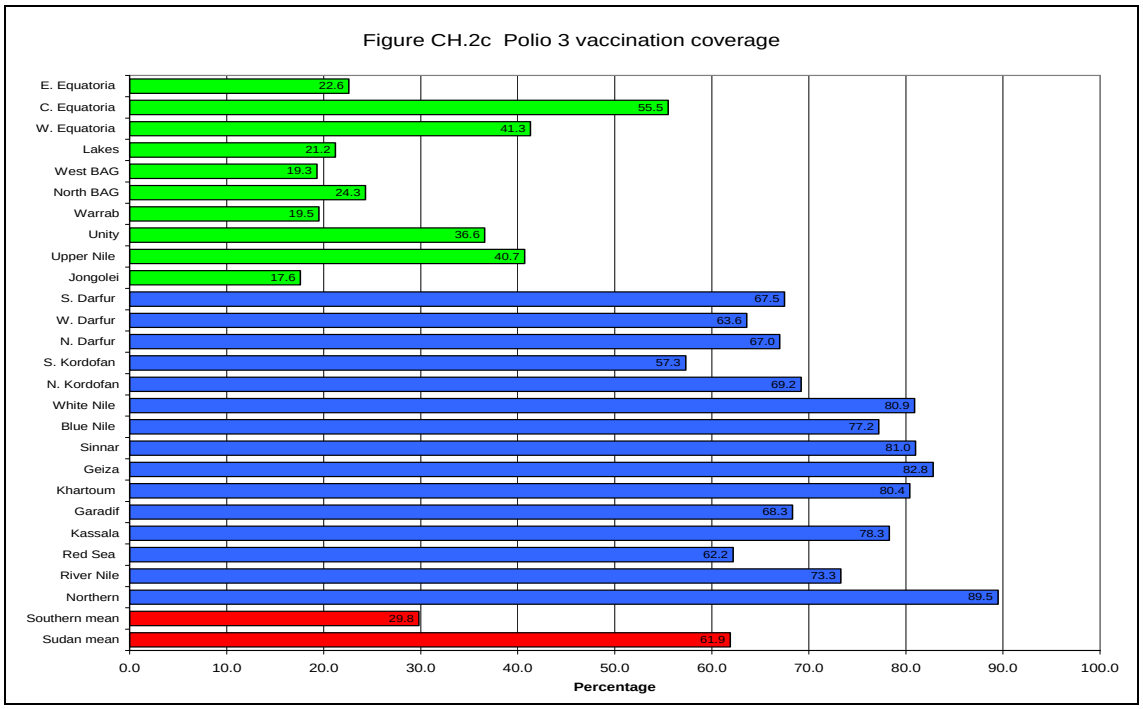

Figure CH.2c Percentage of children aged 12-23 months who received OPV 3 vaccination at any time up to the date of the survey

Coverage with the MMR vaccine in Southern Sudan is somewhat better than for either DPT3 or polio 3, with on average 43 percent of children aged 12-23 months being immunised (Figure CH.2d). The figures vary greatly among the ten Southern Sudanese States. Central and Western Equatoria have the best coverage, with respectively 67 percent and 59 percent of children immunised against MMR. Northern Bahr El Ghazal (24 percent), and especially Jonglei (20 percent), again has the lowest vaccination coverage of all.

Considering the percentage of children aged 12-23 months who received all the recommended vaccines, the figure for Southern Sudan (17 percent) is again less than half the country-wide average (41 percent; Figure CH.2e & CH.2h). Central Equatoria (44 percent) is the only Southern State where more than 30 percent of children received all the recommended vaccines. Coverage was lowest in Western Equatoria, Lakes, Northern Bahr El Ghazal, and Western Bahr El Ghazal, where well below 10 percent of children were covered with all the recommended vaccines.

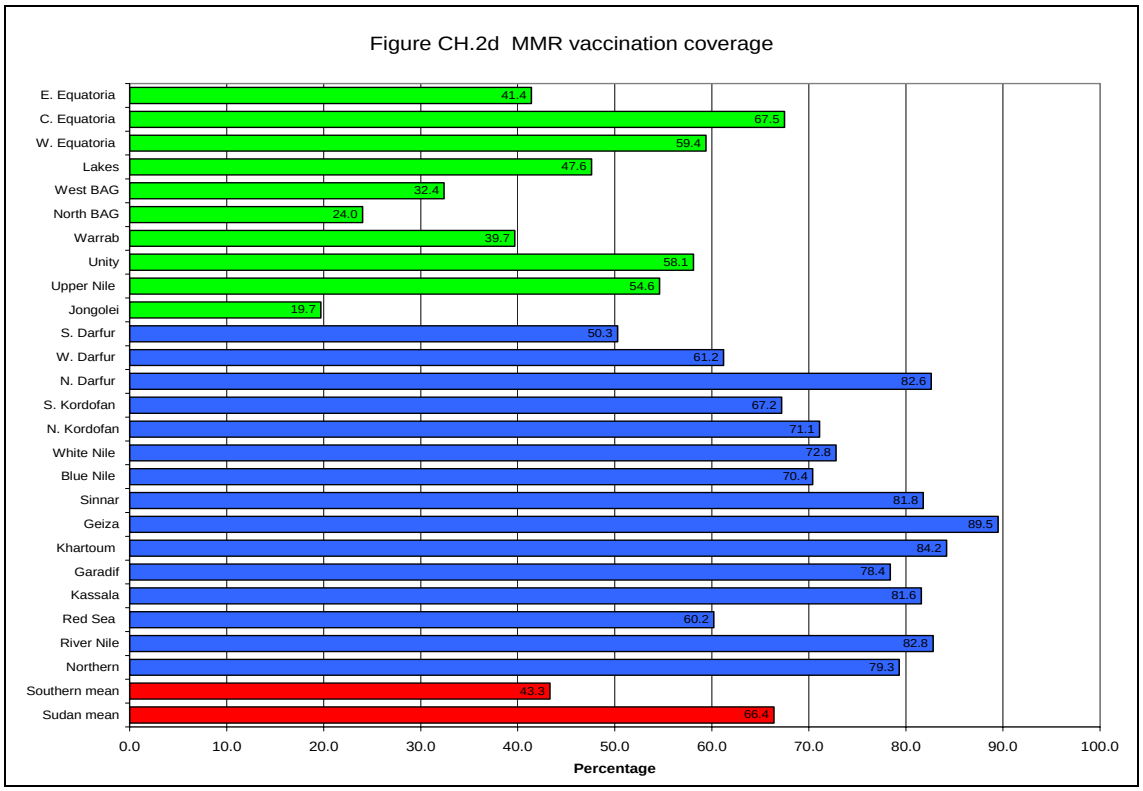

Figure CH.2d Percentage of children aged 12-23 months who received MMR vaccination at any time up to the date of the survey

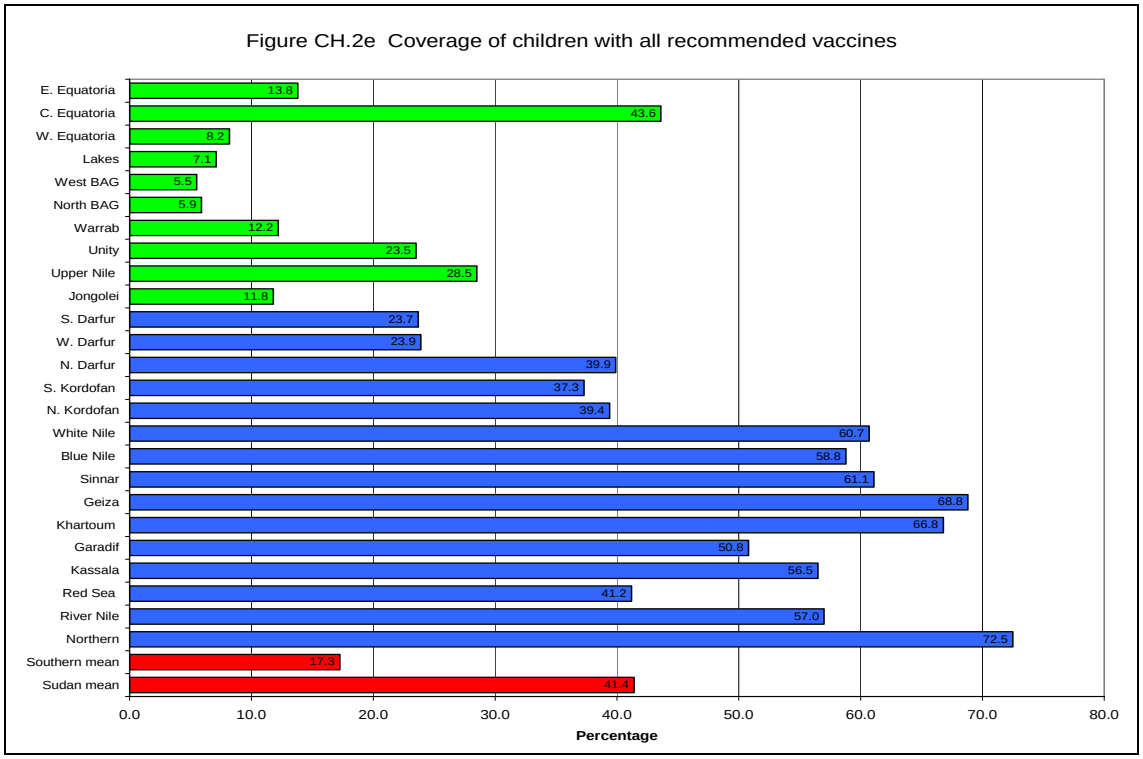

Figure CH.2e Percentage of children aged 12-23 months who received BCG, DPT 1-3, OPV 1-3, and MMR vaccinations at any time up to the date of the survey

The percentage of children who were not vaccinated with any of the recommended vaccines is roughly three times as high in Southern Sudan (43 percent) as in the country as a whole (Figure CH.2f & CH.2i). Central (19 percent), and Eastern Equatoria (21 percent) fare best, but even in these States, coverage is worse than the national average. The highest percentages of children aged 12-23 months who had received none of the recommended vaccines was in Jonglei (65 percent), followed by Northern Bahr El Ghazal (57 percent) and Eastern Equatoria (52 percent).

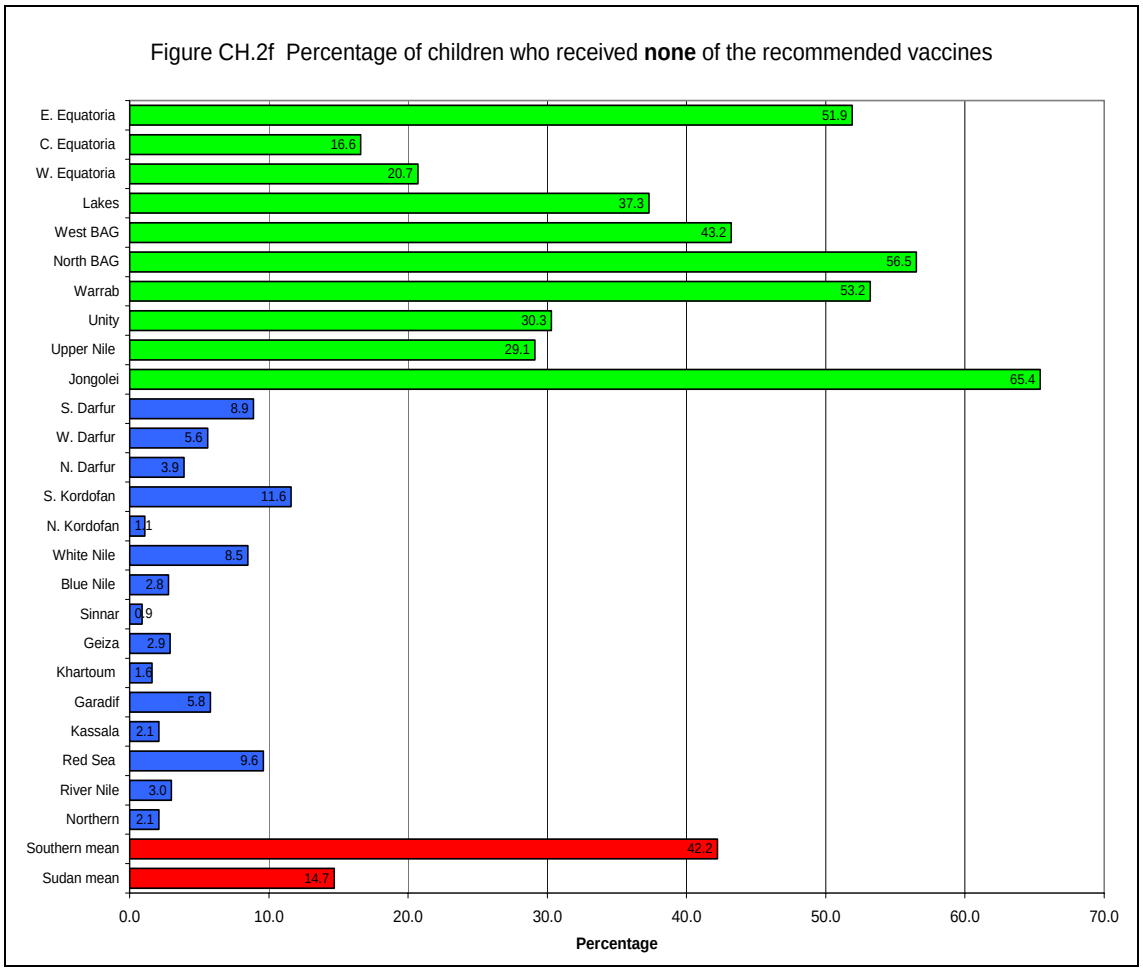

Figure CH.2f Percentage of children aged 12-23 months who had received **none** of the recommended vaccinations at any time up to the date of the survey (In other words, not vaccinated).

The average percentage of Southern Sudanese children in possession of a health card (13 percent) is roughly one third that of the country-wide average (35 percent: Figure CH.2g). All the 10 Southern States reported a figure less than 26 percent. Generally, children in Central Equatoria (25.9 percent), Western Equatoria (22 percent) and Upper Nile (17 percent) were relatively most likely to have a health card compared to children in the remaining Southern States. Children were least likely to have a health card in Western Bahr El Ghazal (2.7 percent) Northern Bahr El Ghazal (3.7 percent).

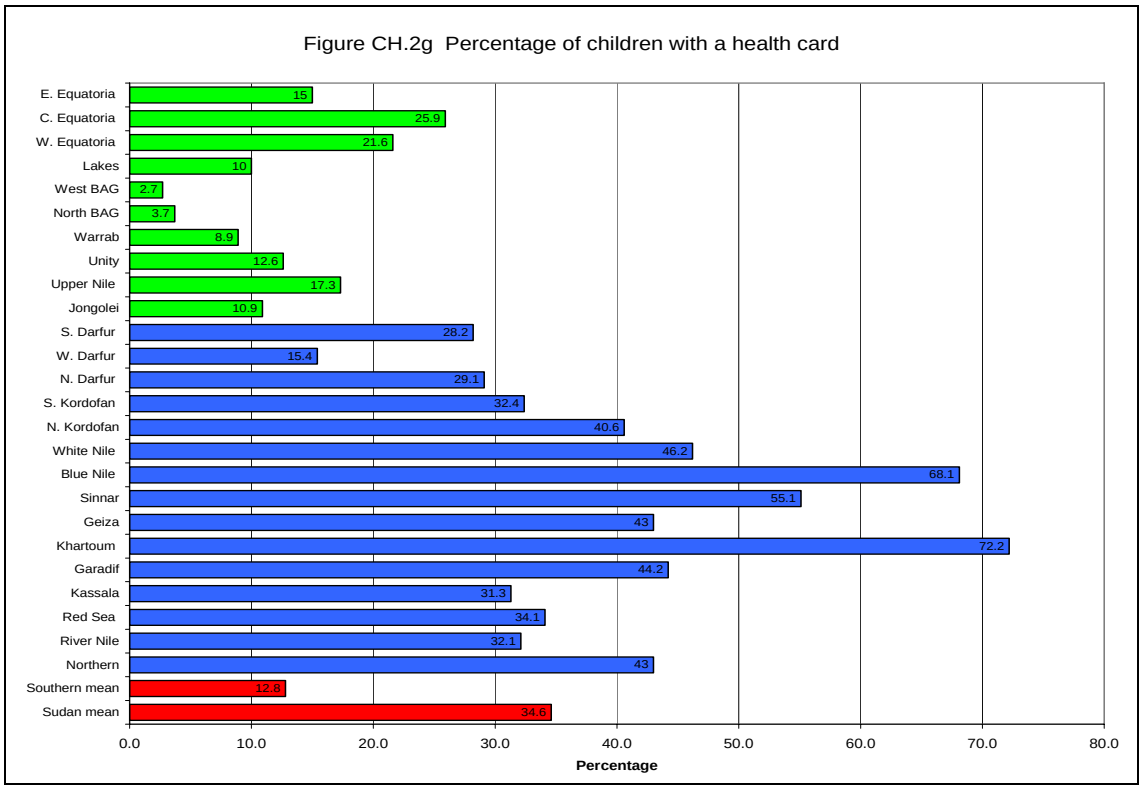

Figure CH.2g Percentage of children aged 12-23 months in possession of a health card

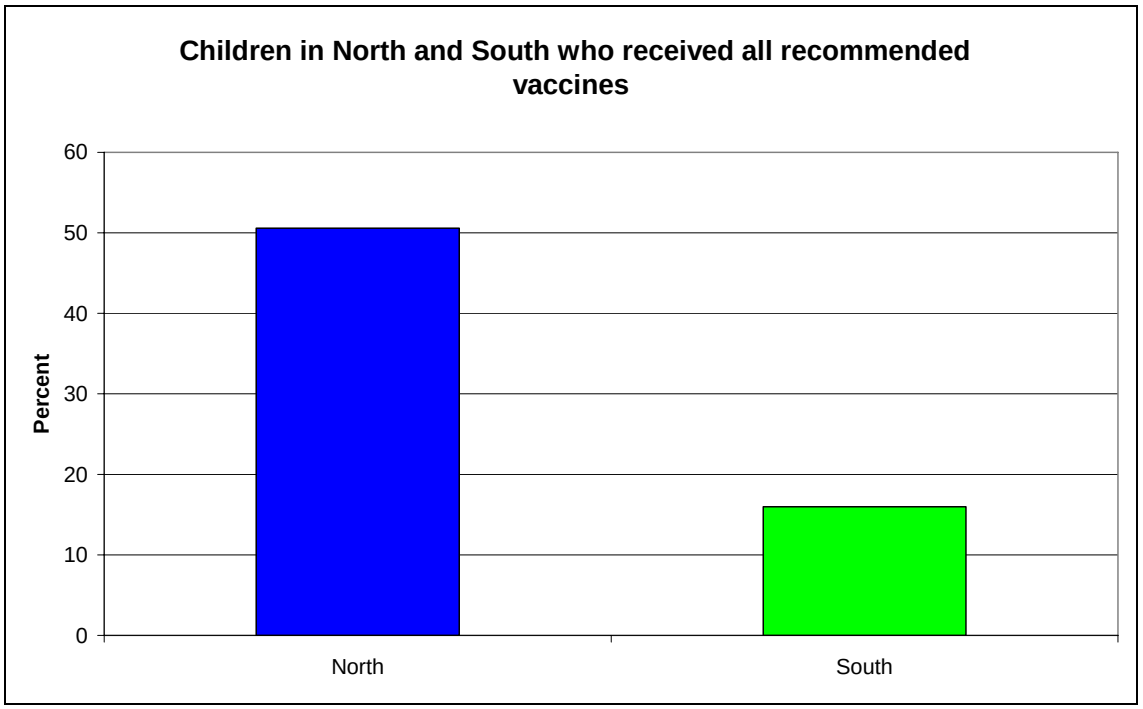

Figure CH.2h The percentage of children who received all necessary vaccines against childhood diseases, i.e. BCG, DPT, polio, and MMR.

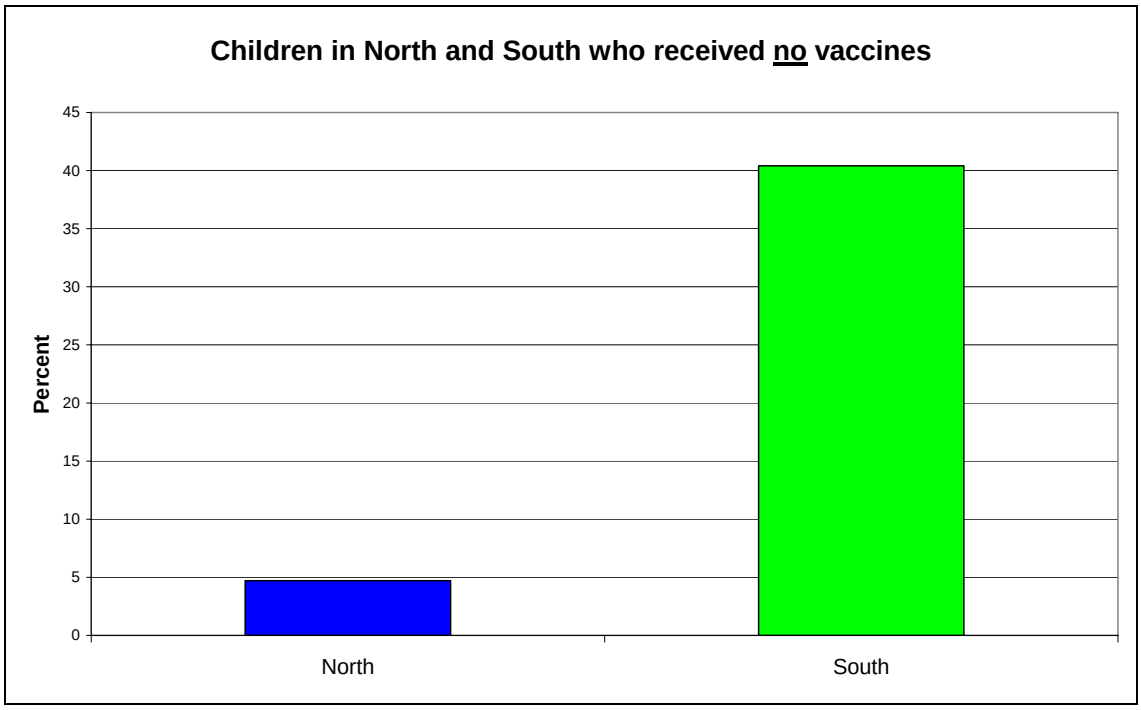

Figure CH.2i The percentage of children who received none of the recommended vaccines against childhood diseases

4.3.2 Neonatal tetanus protection

Prevention of maternal and neonatal tetanus is achieved if all pregnant women receive at least two doses of tetanus toxoid vaccine. However, if women do not receive two doses of the vaccine during pregnancy, they (and their newborn) are also considered to be protected if the following conditions are met:

- Receive at least two doses of tetanus toxoid vaccine, the last within the prior 3 years;
- Receive at least 3 doses, the last within the prior 5 years;
- Receive at least 4 doses, the last within 10 years;
- Receive at least 5 doses during lifetime.

Table CH.3 shows the protection status from tetanus of women who have had a live birth within the last 12 months, by major background characteristics.

Table CH.3: Neonatal tetanus protection
Percentage of mothers with a birth in the last 12 months protected against neonatal tetanus, Sudan , 2006

		Received at least 2 doses during last pregnancy	Received at least 3 doses	Received at least 4 doses	Received at least 5 doses during lifetime	Received at least 2 doses during last pregnancy and protected against tetanus *	Number of mothers
State	Northern	54.4	27.9	13.2	6.6	54.4	36,320
	River Nile	73.0	38.3	17.7	9.2	73.0	52,123
	Red Sea	50.1	26.5	14.8	7.7	50.1	42,590
	Kassala	56.3	31.0	13.8	7.9	56.3	105,562
	Gadarif	46.6	30.2	12.1	7.2	46.6	130,314
	Khartoum	74.0	42.9	22.8	13.4	74.0	364,733
	Gezira	68.8	44.6	24.0	12.2	68.8	212,346
	Sinnar	59.3	34.8	13.9	8.2	59.3	93,892
	Blue Nile	45.3	30.8	12.2	6.0	45.3	68,166
	White Nile	64.8	42.6	20.0	12.0	64.8	110,693
	N. Kordofan	49.9	29.2	11.2	6.0	49.9	181,311
	S. Kordofan	47.1	22.0	7.3	3.5	47.1	128,748
	N. Darfur	46.0	27.1	10.7	7.2	46.0	131,960
	W. Darfur	41.6	22.5	7.0	2.8	41.6	153,542
	S. Darfur	45.8	27.0	13.6	7.9	45.8	244,234
	Jonglei	10.1	6.5	2.0	0.3	10.1	113,949
	Upper Nile	36.2	24.3	9.0	3.0	36.2	101,984
	Unity	27.4	16.5	8.9	5.3	27.4	65,656
	Warrap	22.8	13.7	3.4	1.9	22.8	83,379
	North BEG	17.6	9.9	3.2	1.8	17.6	120,235
	West BEG	26.0	12.8	3.6	2.1	26.0	47,933
	Lakes	32.4	17.0	5.8	2.1	32.4	103,432
	W. Equatoria	62.4	46.1	29.2	18.8	62.4	48,139
	C. Equatoria	55.3	41.1	22.7	13.6	55.3	97,937
	E. Equatoria	27.1	13.5	3.8	1.4	27.1	59,640
Age	15-19	43.2	18.5	4.4	1.5	43.2	194,533
	20-24	46.9	24.3	9.0	3.8	46.9	607,280
	25-29	47.6	27.7	12.0	6.2	47.6	822,578
	30-34	52.2	33.9	17.0	9.8	52.2	586,520
	35-39	51.9	34.2	18.8	11.1	51.9	465,622
	40-44	52.4	36.4	17.7	12.3	52.4	163,715
	45-49	35.3	24.0	13.2	12.0	35.3	58,569
Wealth index quintiles	Poorest	26.4	13.9	5.4	2.9	26.4	603,866
	Second	36.1	21.2	8.9	5.1	36.1	670,156
	Middle	48.7	29.4	12.3	6.5	48.7	651,924
	Fourth	65.4	40.8	19.5	10.6	65.4	551,156
	Richest	79.5	47.5	25.1	14.4	79.5	421,717
Education	None	35.7	20.7	8.5	4.8	35.7	1,731,869
	Primary	67.6	41.8	20.2	11.1	67.6	1,021,800
	Secondary +	74.1	40.4	22.7	10.9	74.1	141,452
	Missing/DK	35.8	28.2	24.3	13.1	35.8	3,696
Total		48.8	29.1	13.3	7.4	48.8	2,898,818

*SHHS indicator 28: *Neonatal tetanus protection* (Proportion of mothers with live births in the previous year who were given at least two doses of tetanus toxoid (TT) vaccine within the appropriate interval prior to giving birth)

Less than half (49 %) of Sudanese mothers who gave birth in the 12 months prior to the survey were vaccinated against tetanus (Table CH.3). There were no clear patterns between a mother's age and the likelihood of her being protected against tetanus. Perhaps as expected, there was a strong correlation between a mother's wealth and her education level and the likelihood that she had received tetanus immunisation. For example, mothers with secondary education (74 percent) were more than twice as likely as those without any formal education (35 percent) to have been immunised.

The mean figure for Southern States (30 percent) is appreciably lower than that for the Sudan as a whole (49 percent), and there is also noticeable variation between the Southern States (Figure CH.3). Few mothers had been protected against neonatal tetanus in Jonglei (10 percent) and Northern Bahr El Ghazal (18 percent), while mothers in Western Equatoria (62 percent) and Central Equatoria (55 percent) were most likely to have been immunised.

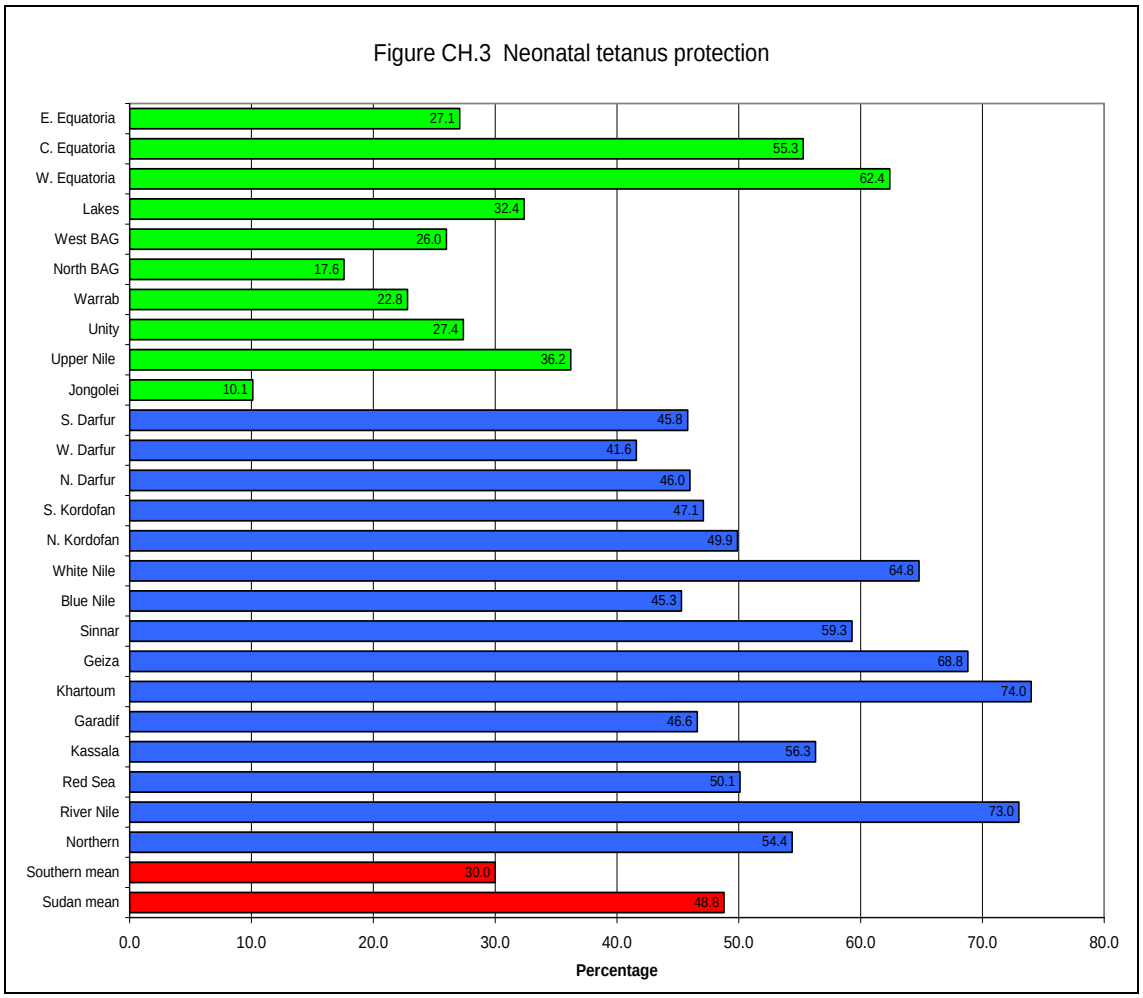

Figure CH.3 Percentage of mothers with a birth in the 12 months prior to the survey who had received protection against neonatal tetanus

4.3.3 Oral Re-hydration Treatment

Diarrhoea is the second leading cause of death among children under five worldwide. Most diarrhoea-related deaths in children are due to dehydration from loss of large quantities of water and electrolytes from the body in liquid stools. Management of diarrhoea – either through oral re-hydration salts (ORS) or a recommended home fluid (RHF) - can prevent many of these deaths. Preventing dehydration and malnutrition by increasing fluid intake and continuing to feed the child are also important strategies for managing diarrhoea.

In the questionnaire, mothers (or caretakers) were asked to report whether their children had had diarrhoea in the two weeks prior to the survey. If so, the mother was asked a series of questions about what the children had for a drink and food during the episode and whether this was more or less than the child usually ate and drank.

Table CH.4 shows the percentage of children under age 5 who had suffered from diarrhoea in the two weeks prior to the survey, and who had taken an oral rehydration solution or an alternative oral rehydration treatment.

Table CH.4: Oral rehydration treatment
Percentage of children aged 0-59 months with diarrhoea in the last 2 weeks and treatment with oral rehydration solution (ORS) or other oral rehydration treatment (ORT), Sudan, 2006

		Had diarrhoea in last 2 weeks (%)	Number of children aged 0-59 months	Children with diarrhoea who received (%):			ORT use rate (%)*	Number of children aged 0-59 months with diarrhoea
				Fluid from ORS packet	Recommended homemade fluid	No treatment		
Sex	Male	28.9	3,060,302	32.4	41.4	40.6	59.4	883,899
	Female	27.4	2,895,494	30.0	40.7	42.9	57.1	794,116
State	Northern	18.6	71,281	18.5	55.2	38.6	61.4	13,242
	River Nile	17.7	108,078	19.4	57.7	34.9	65.1	19,143
	Red Sea	15.2	92,640	26.9	55.5	36.8	63.2	14,036
	Kassala	16.3	228,581	39.7	38.2	40.4	59.6	37,311
	Gadarif	28.4	277,710	17.2	29.5	58.4	41.6	78,948
	Khartoum	20.0	728,062	20.7	67.3	27.0	73.0	145,891
	Gezira	17.4	498,259	15.5	54.1	39.2	60.8	86,497
	Sinnar	21.8	184,375	18.6	57.7	35.2	64.8	40,176
	Blue Nile	33.4	135,715	16.9	26.3	64.6	35.4	45,354
	White Nile	21.1	243,446	14.1	40.7	52.7	47.3	51,383
	N. Kordofan	24.8	380,655	14.8	37.9	55.1	44.9	94,371
	S. Kordofan	17.8	277,708	14.8	35.4	54.3	45.7	49,515
	N. Darfur	24.0	268,487	28.2	37.0	44.4	55.6	64,437
	W. Darfur	26.8	300,867	39.2	24.5	48.6	51.4	80,637
	S. Darfur	29.2	502,544	20.4	39.2	51.2	48.8	146,646
	Jonglei	43.0	243,417	34.0	29.8	49.7	50.3	104,689
	Upper Nile	39.8	171,127	43.9	16.3	49.8	50.2	68,166
	Unity	50.5	120,333	56.0	38.4	28.7	71.3	60,828
	Warrap	43.5	238,751	43.9	39.0	37.9	62.1	103,817
	NBG	43.6	215,262	41.2	39.5	37.4	62.6	93,832
	WBG	51.8	75,022	46.3	52.1	21.1	78.9	38,877
	Lakes	42.4	155,869	44.3	26.9	44.0	56.0	66,046
	W. Equatoria	53.3	85,109	36.6	50.5	27.4	72.6	45,344
	C. Equatoria	29.9	189,908	60.1	46.2	28.9	71.1	56,821
	E. Equatoria	44.3	162,590	52.6	55.3	16.8	83.2	72,009
SUDAN		**28.2**	**5,955,796**	**31.3**	**41.1**	**41.7**	**58.3**	**1,678,015**
Age	< 6 months	23.4	670,822	23.9	27.4	59.2	40.8	157,251
	6-11 months	36.9	617,803	30.3	41.5	43.4	56.6	227,956
	12-23 months	36.2	1,142,094	32.5	42.1	39.9	60.1	413,640
	24-35 months	29.9	1,262,671	31.4	45.6	36.9	63.1	377,019
	36-47 months	22.4	1,291,161	32.3	43.9	39.2	60.8	289,313
	48-59 months	21.9	971,246	33.7	36.9	42.4	57.6	212,838
Mother's education	None	32.3	3,709,763	35.0	37.0	43.1	56.9	1,197,348
	Primary	23.5	1,430,060	23.0	49.4	39.1	60.9	335,520
	Secondary+	16.4	722,652	18.2	60.1	33.3	66.7	118,390
Wealth index quintiles	Poorest	37.8	1,264,533	37.2	35.0	43.2	56.8	478,206
	Second	33.7	1,367,061	33.4	36.9	43.1	56.9	461,302
	Middle	26.7	1,319,404	29.5	39.2	45.0	55.0	351,946
	Fourth	21.2	1,161,613	23.5	53.5	36.1	63.9	246,502
	Richest	16.6	843,186	22.3	58.6	33.3	66.7	140,060

* SHHS indicator 24: Oral rehydration therapy (ORT) use rate (Proportion of children aged 0-59 months with diarrhoea in the previous 2 weeks who received oral rehydration salts and/or an appropriate household solution)

For the Sudan as a whole, 28 percent of under-five children had diarrhoea in the two weeks preceding the survey (Table CH.4). The peak of diarrhoea prevalence occurs in the weaning period, among children age 6-23 months.

The children of less educated and less wealthy mothers (35 percent) were roughly twice as likely to have suffered from diarrhoea in the two weeks prior to the survey as children from better-educated and wealthier households (16 percent).

Table CH.4 also shows the percentage of children receiving various types of recommended liquids during the episode of diarrhoea. Since mothers were able to name more than one type of liquid, the percentages do not necessarily add to 100. In the Sudan as a whole about 31 percent received fluids from ORS packets, and 41 percent of children received recommended homemade fluids.

The children of less educated mothers were more likely to have used fluid from an ORS packet than the children of better educated mothers, but the latter were more likely to give their children alternative recommended fluid-replacement treatment. In general, the ORT use rate was some ten percentage points higher for the best educated mothers than for the least educated mothers. Wealth had a similar impact on the use of recommended homemade fluid and on ORT use rate as level of education.

Diarrhoea prevalence varied considerably between States (Figure CH.4a). The mean value for the Southern States (where 43 percent of mothers said their under-fives had suffered from diarrhoea in the past 2 weeks) was appreciably greater than that for the Sudan as a whole, where the figure was 28 per cent. Diarrhoea prevalence in the Southern States was uniformly high across all the 10 States with the exception of Central Equatoria, which had a somewhat lower prevalence of 30 percent.

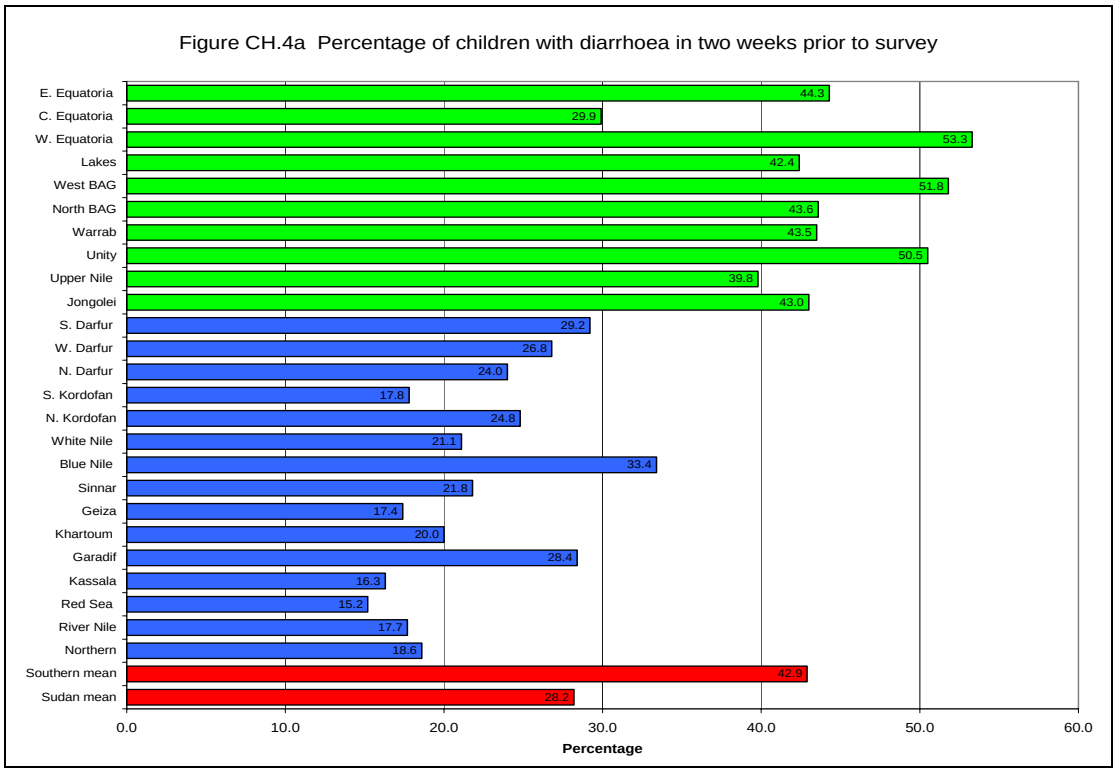

Figure CH.4a Percentage of children who suffered from diarrhoea in the two weeks prior to the survey

The findings indicate that children in Southern Sudan are more likely (45 percent, on average) to have received fluid from ORS packets than children in most of the remaining States in Sudan, with their usage greatest in Central Equatoria, Unity, and Eastern Equatoria, and lowest in Jonglei (34 percent; Figure CH.4b).

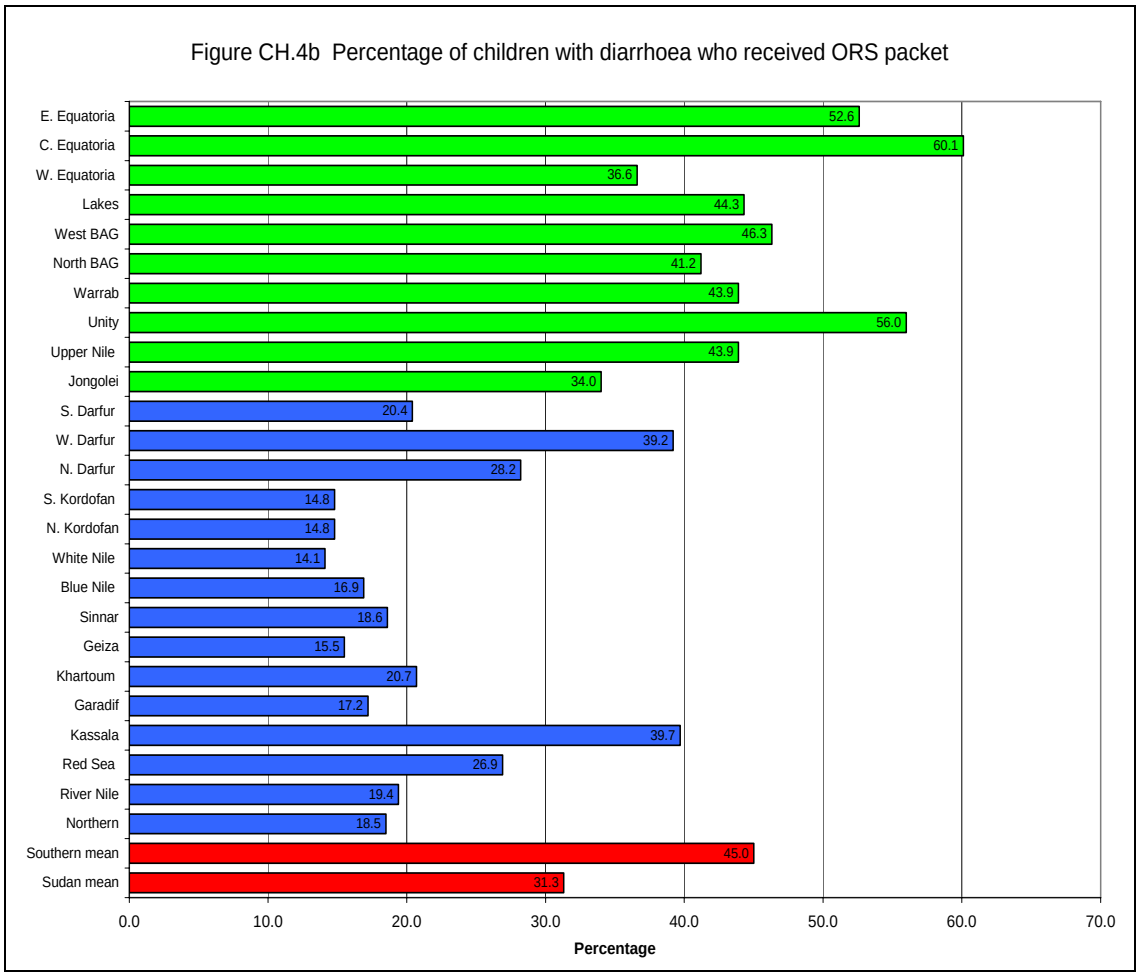

Figure CH.4b Percentage of children with diarrhoea who received fluid from an oral rehydration solution packet

Figures for the use rate of other recommended (homemade) treatments suggest there has been similar take-up in the Southern States (38 percent) as in the country as a whole (41 percent; Figure 4c). Within the 10 Southern States, recommended homemade fluid was most likely to have been administered in the three Equatorial States (46-55 percent), while children in Upper Nile State (16.3) were least likely to have received such treatment.

Across the country as a whole some 42 percent of children received no treatment for diarrhoea, whereby children in most Southern States were slightly more likely to receive treatment than those in the North (Table CH.4).

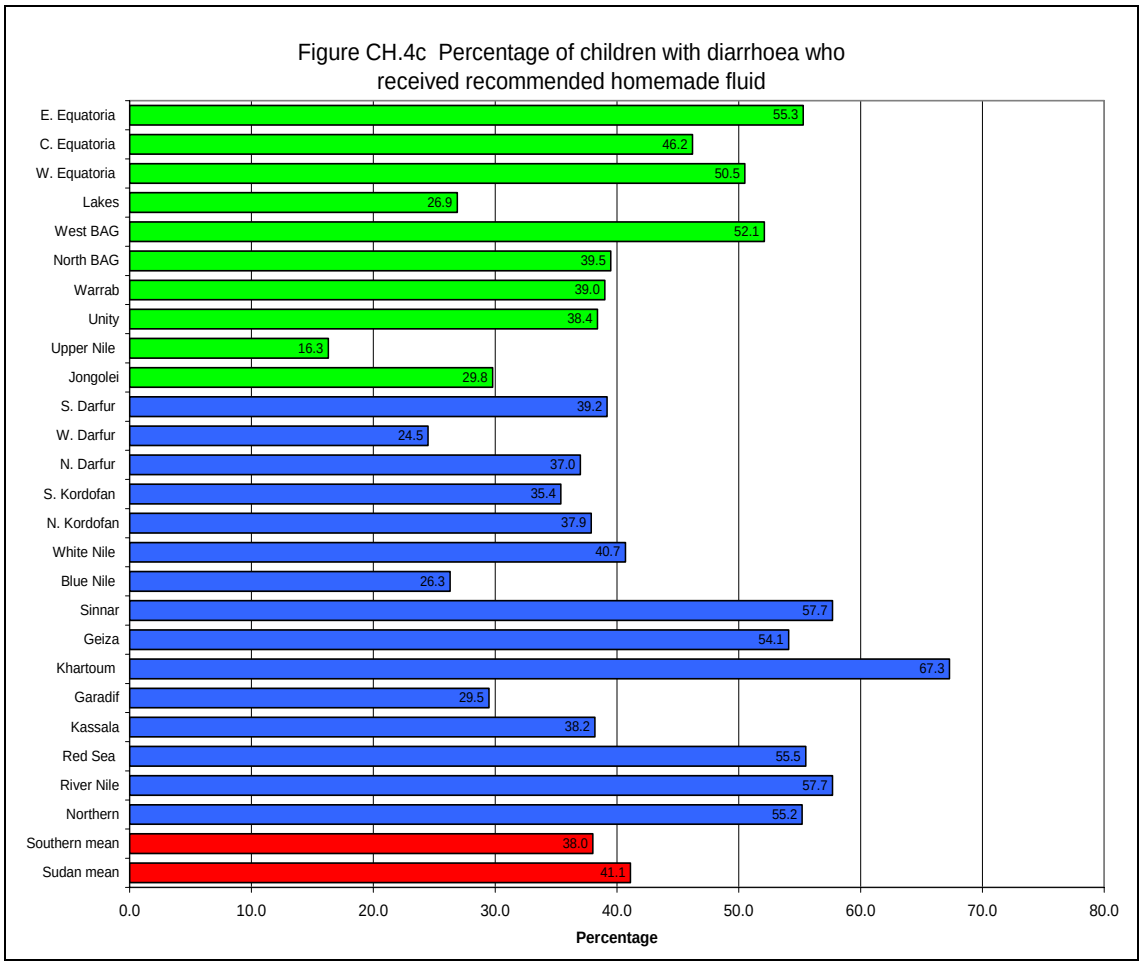

Figure CH.4c Percentage of children with diarrhoea who were treated with the recommended homemade fluid

In general, oral rehydration treatment of children suffering from diarrhoea was slightly higher in the Southern States (64 percent) than in the 15 States (59 percent; Figure CH.4d). Within the South, ORT use rate was highest in Eastern Equatoria and lowest in Upper Nile and Jonglei.

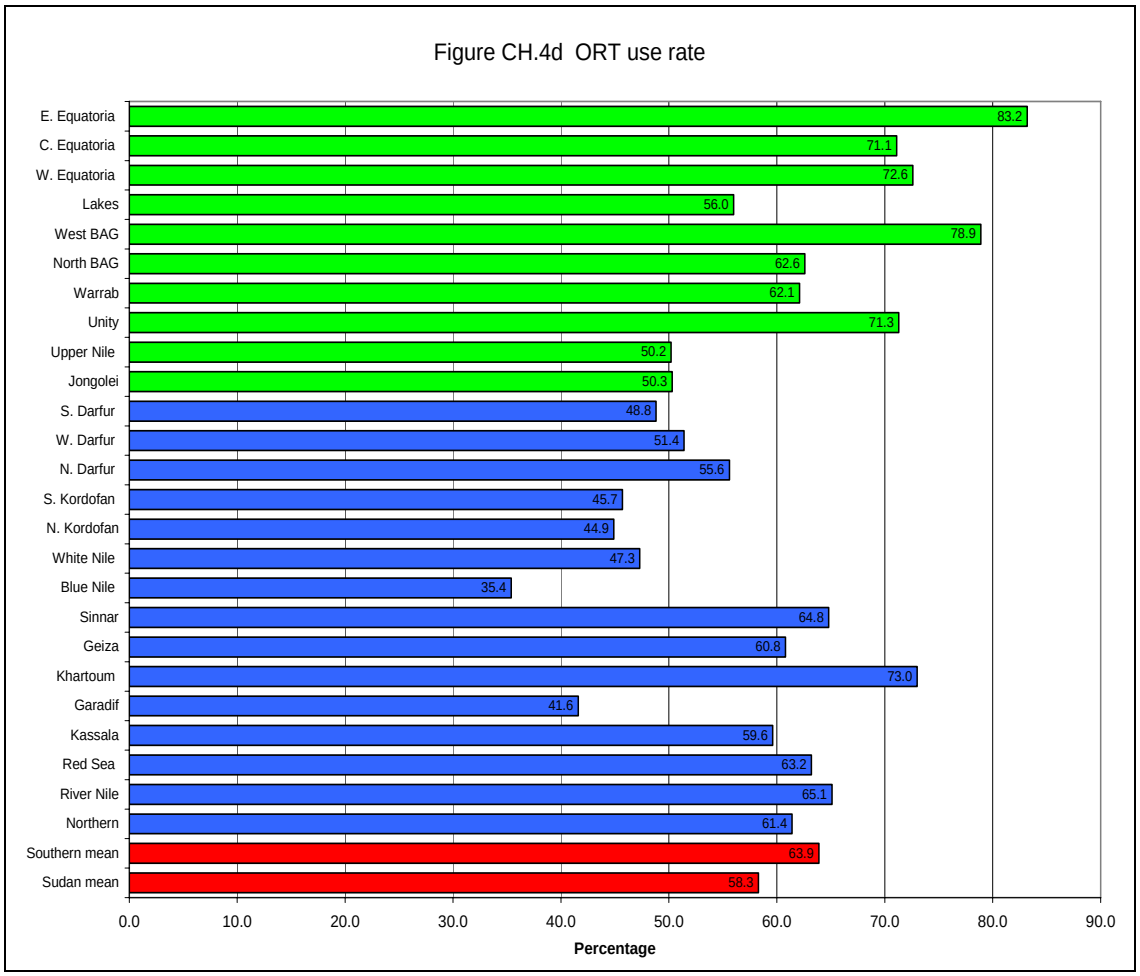

Figure CH.4d Percentage of children aged 0-59 months with diarrhoea in the previous two weeks who received oral rehydration salts and/or an appropriate household solution

Table CH.5 gives an overview of how children's eating and drinking behaviour was influenced by an episode of diarrhoea.

Table CH.5: Home management of diarrhea
Percentage of children aged 0-59 months with diarrhoea in the last 2 weeks who took increased fluids and continued to feed during the episode, Sudan, 2006

Background characteristics	Had diarrhoea in last 2 weeks (%)	Number of children aged 0-59 months	Children with diarrhoea who (%): Drank more	Drank the same or less	Ate somewhat less, same or more	Ate much less or none	Home management of diarrhoea* (%)	Received ORT or increased fluids AND continued feeding** (%)	Number of children aged 0-59 months with diarrhoea
Sex									
Male	28.9	3,060,302	25.7	63.8	79.0	78.4	21.5	56.1	883,899
Female	27.4	2,895,494	27.1	62.2	78.9	78.9	22.7	55.7	794,116
State									
Northern	18.6	71,281	17.6	71.9	77.1	78.2	15.8	55.2	13,242
River Nile	17.7	108,078	11.2	80.3	83.4	72.6	9.3	62.4	19,143
Red Sea	15.2	92,640	10.3	80.3	90.6	81.2	10.3	65.5	14,036
Kassala	16.3	228,581	10.6	75.6	78.6	80.6	8.2	52.0	37,311
Gadarif	28.4	277,710	25.5	69.8	83.5	65.8	19.8	45.3	78,948
Khartoum	20.0	728,062	19.1	71.6	80.5	77.8	15.9	64.1	145,891
Gezira	17.4	498,259	24.8	65.2	78.1	80.5	19.6	54.4	86,497
Sinnar	21.8	184,375	17.9	75.1	81.2	75.9	14.6	60.8	40,176
Blue Nile	33.4	135,715	29.1	64.3	79.2	71.2	24.9	44.6	45,354
White Nile	21.1	243,446	40.6	54.2	79.9	79.6	34.4	60.1	51,383
N. Kordofan	24.8	380,655	40.3	55.5	80.1	85.2	33.3	53.7	94,371
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N. Darfur	24.0	268,487	35.6	50.5	73.1	85.6	29.2	57.9	64,437
W. Darfur	26.8	300,867	6.1	85.8	81.6	77.4	6.1	46.7	80,637
S. Darfur	29.2	502,544	29.6	61.2	78.5	75.0	26.5	52.7	146,646
Jonglei	43.0	243,417	24.5	61.0	73.3	89.3	16.6	40.2	104,689
Upper Nile	39.8	171,127	33.9	51.9	74.1	74.5	27.2	54.8	68,166
Unity	50.5	120,333	27.8	60.4	83.3	71.3	22.9	65.5	60,828
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C. Equatoria	29.9	189,908	30.6	65.8	84.1	71.4	26.6	64.5	56,821
E. Equatoria	44.3	162,590	23.7	72.1	86.3	74.5	22.4	76.8	72,009
SUDAN	**28.2**	**5,955,796**	**26.4**	**63.0**	**78.9**	**78.6**	**22.1**	**55.9**	**1,678,015**
Age									
0-11 months	29.9	1,288,626	21.1	63.4	59.5	82.0	13.8	39.0	385,206
12-23 months	36.2	1,142,094	27.9	63.2	81.9	79.2	23.0	58.8	413,640
24-35 months	29.9	1,262,671	28.3	61.8	85.5	75.5	25.7	63.3	377,019
36-47 months	22.4	1,291,161	26.9	64.2	87.1	77.3	24.5	61.6	289,313
48-59 months	21.9	971,246	28.6	62.7	85.8	78.6	25.6	60.4	212,838
Mother's education									
None	32.3	3,709,763	26.1	62.7	79.1	78.7	22.0	54.9	1,197,348
Primary	23.5	1,430,060	27.4	63.8	78.7	78.5	22.5	58.7	335,520
Secondary +	16.4	722,652	28.9	62.2	77.6	78.7	24.3	60.4	118,390
Wealth index quintile									
Poorest	37.8	1,264,533	26.5	59.7	77.7	80.5	22.4	53.2	478,206
Second	33.7	1,367,061	25.7	63.4	77.6	80.8	20.5	53.5	461,302
Middle	26.7	1,319,404	29.0	62.2	80.0	76.5	24.4	56.5	351,946
Fourth	21.2	1,161,613	23.8	68.9	83.0	73.5	20.9	63.2	246,502
Richest	16.6	843,186	26.2	64.6	77.8	79.3	22.2	58.9	140,060

* SHHS indicator 25: *Home management of diarrhoea* (Proportion of children aged 0-59 months with diarrhoea in the previous 2 weeks who received more fluids AND continued eating somewhat less, the same or more food)

** SHHS indicator 26: *Received ORT or increased fluids and continued feeding* (Proportion of children aged 0-59 months who had diarrhoea in the last 2 weeks and received ORT(oral rehydration salts or an appropriate household solution) or received more fluids AND continued eating somewhat less, the same or more food during the episode)

Considering the country as a whole, only a quarter (26 percent) of under-five children increased their intake of fluids during an episode of diarrhoea, with the remainder drinking the same or less. Those under 1 year old were least likely to drink more. The level of the mother's education and the wealth quintile to which the child's household belonged did not influence a child's propensity to increase fluid intake while suffering from diarrhoea. *The results regarding whether a child continued eating roughly the same amount of food during a bout of diarrhoea, or whether s/he ate much less or none do not appear reasonable, and are therefore not described.*

It appears that in the Sudan as a whole, only 22 percent of children with diarrhoea had their infection managed competently at home, i.e. had received more fluids AND continued eating somewhat less, the same, or more food (Table CH.5). The youngest age group (0-11 months) were least likely to have received competent home management of this illness. The effectiveness of the home management of diarrhoea did not appear to be linked to either the mother's education or the wealth index quintile to which the household belonged.

There are no overriding differences in the home management of diarrhoea between the 10 Southern States compared to the remaining 15 States of the country, with the mean figures for the Sudan as a whole (22 percent), and for the South (23 percent) almost identical (Figure CH.5a). There is considerable variation between the different Southern States. Home management of diarrhoea was most effective in Western Equatoria and Lakes, and least well developed in Warrap and Jonglei.

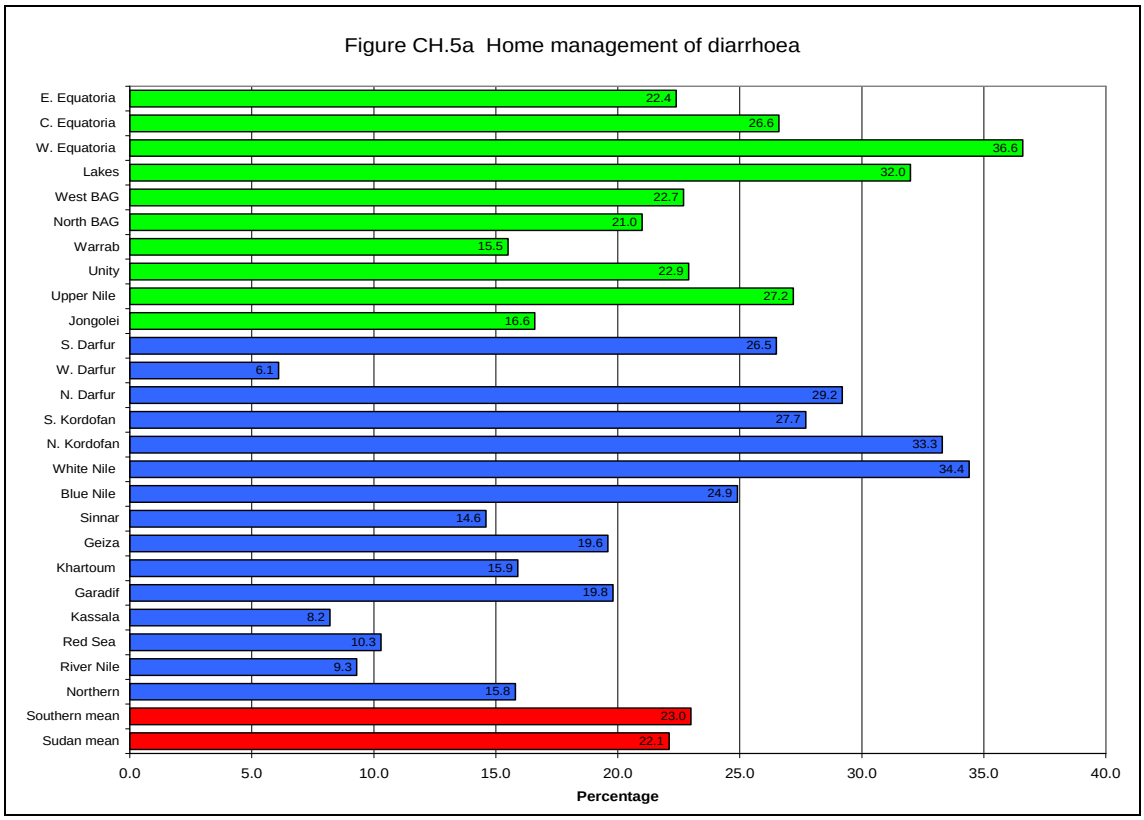

Figure CH.5a Percentage of children aged 0-59 months with diarrhoea in the previous two weeks who received more fluids AND continued eating somewhat less, the same, or more food

There were also virtually no differences between the Southern States compared to the remaining 15 States of the country with regard to the percentage of children who received ORT or increased fluid intake while at the same time continuing to feed (Figure CH.5b). The mean for the whole of the South was 58 percent, and the values for individual Southern States varied from 77 percent in Eastern Equatoria to 40 percent in Jonglei.

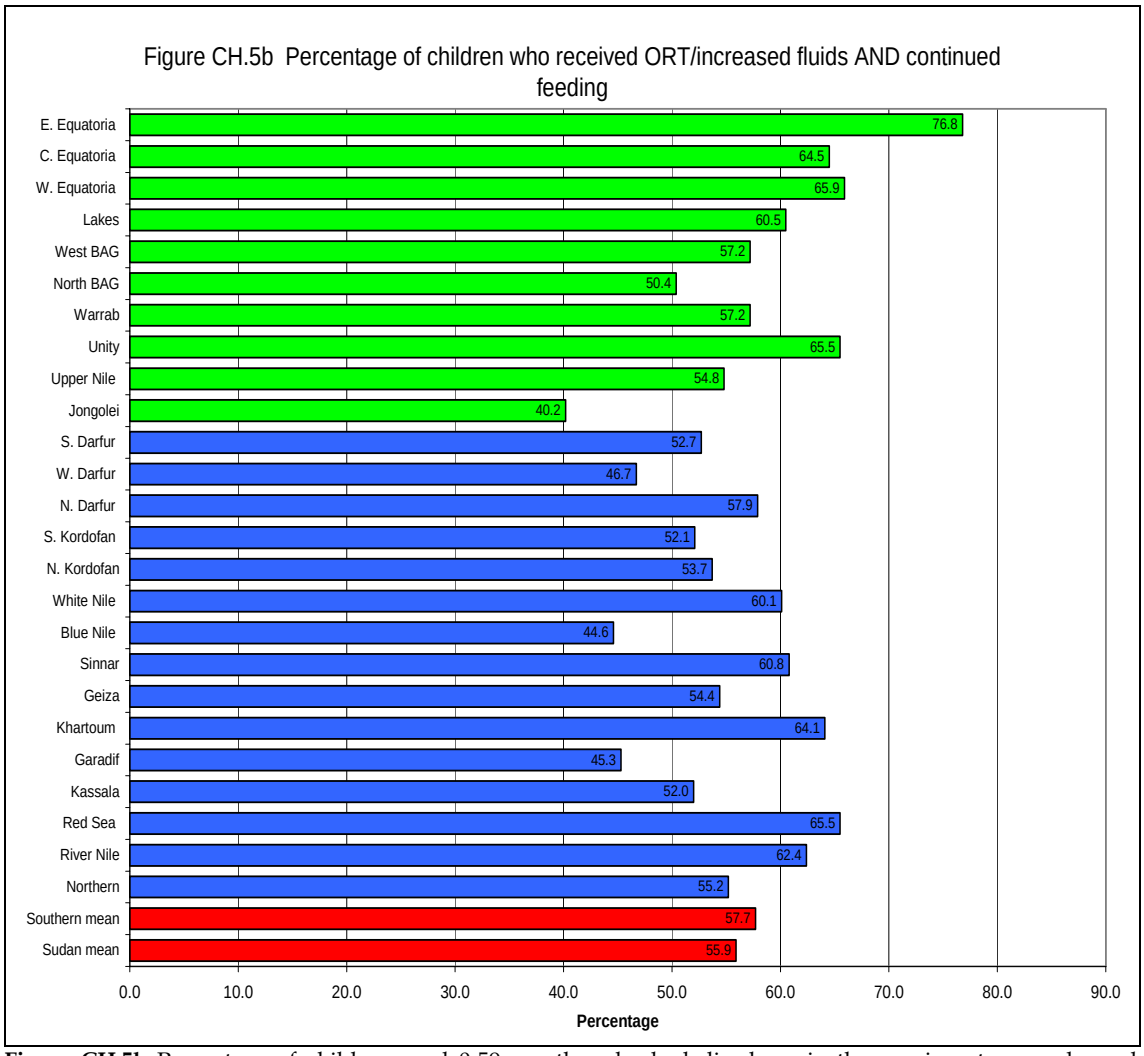

Figure CH.5b Percentage of children aged 0-59 months who had diarrhoea in the previous two weeks and received ORT (oral rehydration salts or an appropriate household solution) or received more fluids AND continued eating somewhat less, the same or more food during the episode

4.3.4 Care Seeking and Antibiotic Treatment of Pneumonia

Pneumonia is the leading cause of death in children and the use of antibiotics in under-fives with suspected pneumonia is a key intervention. A World Fit for Children goal is to reduce, by one-third, the deaths due to acute respiratory infections.

Children with suspected pneumonia are those who had an illness with a cough accompanied by rapid or difficult breathing and whose symptoms were NOT due to a problem in the chest and a blocked nose. The indicators are:

- Prevalence of suspected pneumonia
- Care seeking for suspected pneumonia
- Antibiotic treatment for suspected pneumonia
- Knowledge of the danger signs of pneumonia

Table CH.6 presents the prevalence of suspected pneumonia and, if care was sought outside the home, the type of health institution which provided this care.

Table CH.6: Care seeking for suspected pneumonia
Percentage of children aged 0-59 months in the last 2 weeks taken to a health provider, Sudan, 2006

		Had acute respiratory infection	Number of children aged 0-59 months	Govt. hospital	Govt. health centre	Govt. health post	Village health worker	Mobile/outreach clinic	Other public	Private hospital clinic	Private physician	Pharmacy	Mobile clinic	Other private medical	Religious healer	Magician healer	Relative or friend	Traditional practitioner	Other	Any appropriate provider *	Number of children aged 0-59 months with suspected pneumonia
Sex	Male	12.9	3,060,302	28.9	24.6	7.6	16.5	3.9	3.0	4.1	5.4	4.9	1.9	2.2	0.8	2.3	3.6	4.0	2.1	90.1	393,422
	Female	11.1	2,895,494	25.4	27.3	7.6	17.1	5.1	2.6	4.9	3.8	5.7	1.8	1.6	0.8	1.9	3.1	3.9	1.8	90.2	322,196
State	Northern	10.6	71,281	42.9	32.4	13.9	4.6	3.1	3.1	4.6	1.5	3.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	98.5	7,559
	River Nile	8.2	108,078	35.2	44.8	0.0	3.8	0.0	0.0	0.0	9.8	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.7	8,851
	Red Sea	6.3	92,640	32.2	27.3	4.3	4.3	2.2	2.7	5.5	11.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	7.7	89.6	5,875
	Kassala	7.8	228,581	24.6	51.6	2.0	0.0	0.0	2.0	0.0	8.2	0.0	0.0	3.9	0.0	0.0	2.0	7.4	0.0	92.2	17,786
	Gadarif	8.9	277,710	45.9	18.3	16.2	8.1	0.0	1.2	0.0	10.4	2.3	0.0	0.0	2.3	1.2	0.0	1.1	0.0	97.7	24,667
	Khartoum	12.8	728,062	29.2	40.4	6.1	4.4	0.0	4.2	1.8	13.8	0.0	0.0	0.0	0.7	0.0	2.9	0.0	2.1	96.1	93,266
	Gezira	10.3	498,259	30.9	40.6	8.3	7.3	2.5	2.7	0.0	7.6	0.0	0.0	0.0	1.2	0.0	4.1	0.0	0.0	97.5	51,542
	Sinnar	12.6	184,375	40.2	34.7	4.5	9.1	1.8	0.0	0.0	8.5	2.1	0.0	0.0	0.0	0.0	0.9	0.9	0.9	95.2	23,188
	Blue Nile	11.7	135,715	34.2	19.3	8.0	12.4	1.5	7.3	1.5	3.0	4.4	0.0	4.5	0.0	0.0	2.9	3.8	3.0	88.8	15,873
	White Nile	8.1	243,446	34.3	30.9	11.8	11.0	1.4	0.0	1.2	2.7	1.4	1.2	1.4	0.0	0.0	4.1	0.0	1.4	94.5	19,634
	N. Kordofan	11.9	380,655	31.7	21.1	3.9	23.2	1.9	1.0	3.8	1.9	3.8	1.0	1.0	0.0	0.0	3.8	3.8	2.9	89.5	45,376
	S. Kordofan	7.7	277,708	27.0	31.3	11.8	5.9	0.0	1.5	3.0	1.5	9.1	1.5	1.5	0.0	0.0	1.5	4.5	1.5	83.5	21,360
	N. Darfur	11.2	268,487	35.6	28.7	0.0	19.8	4.0	2.0	0.0	2.0	2.0	3.0	3.0	0.0	0.0	2.0	3.0	1.0	93.1	30,130
	W. Darfur	11.3	300,867	15.7	15.7	18.0	12.4	15.7	6.7	7.9	1.1	3.4	2.2	1.1	0.0	0.0	0.0	3.4	0.0	94.4	33,852
	S. Darfur	21.1	502,544	22.9	15.4	9.6	16.0	3.2	0.0	3.2	3.7	12.2	3.2	4.3	0.5	0.0	3.7	3.2	2.7	79.8	106,036
	Jonglei	5.8	243,417	20.5	13.6	2.3	20.5	4.5	2.3	6.8	0.0	0.0	4.5	9.1	0.0	13.6	2.3	9.1	15.9	75.0	14,130
	Upper Nile	12.5	171,127	30.7	13.3	6.7	26.7	8.0	10.7	4.0	2.7	12.0	5.3	2.7	1.3	1.3	2.7	1.3	0.0	90.7	21,391
	Unity	22.5	120,333	12.0	48.4	4.3	38.6	4.9	2.2	8.7	0.5	2.2	2.2	2.2	2.7	18.5	1.1	15.2	0.0	95.1	27,035
	Warrap	12.8	238,751	6.5	9.3	5.6	25.9	34.3	0.9	14.8	0.0	5.6	0.9	0.9	0.9	5.6	18.5	14.8	0.0	85.2	30,551
	North BEG	10.3	215,262	23.2	14.3	7.1	39.3	5.4	7.1	19.6	1.8	5.4	5.4	3.6	5.4	7.1	1.8	16.1	1.8	83.9	22,078
	West BEG	12.4	75,022	50.7	21.3	6.7	12.0	1.3	0.0	4.0	0.0	4.0	0.0	0.0	0.0	1.3	0.0	1.3	0.0	90.7	9,316
	Lakes	7.1	155,869	42.9	9.5	4.8	15.9	3.2	3.2	15.9	0.0	15.9	1.6	0.0	1.6	1.6	1.6	0.0	3.2	84.1	11,096
	W. Equatoria	18.8	85,109	45.5	21.4	3.6	24.1	0.9	2.7	2.7	0.9	6.2	0.0	1.8	0.9	0.0	0.9	7.1	0.9	92.9	16,021
	C. Equatoria	16.0	189,908	17.4	25.5	18.0	14.9	3.7	2.5	8.1	1.9	14.9	1.2	1.9	1.9	0.0	5.6	3.1	5.0	82.6	30,393
	E. Equatoria	17.6	162,590	15.9	8.6	1.3	60.9	4.6	8.6	8.6	0.0	9.9	8.6	4.0	0.0	14.6	6.0	7.3	4.0	97.4	28,614

Table CH.6: Care seeking for suspected pneumonia
Percentage of children aged 0-59 months in the last 2 weeks taken to a health provider, Sudan, 2006

		Had acute respiratory infection	Number of children aged 0-59 months	Govt. hospital	Govt. health centre	Govt. health post	Village health worker	Mobile/outreach clinic	Other public	Private hospital clinic	Private physician	Pharmacy	Mobile clinic	Other private medical	Religious healer	Magician healer	Relative or friend	Traditional practitioner	Other	Any appropriate provider *	Number of children aged 0-59 months with suspected pneumonia
Age	0-11 months	12.3	1,288,626	31.8	21.4	10.0	14.7	3.4	3.4	5.2	6.2	4.2	1.0	1.2	1.2	0.9	2.7	3.7	0.4	92.7	158,809
	12-23 months	12.8	1,142,094	27.5	27.5	9.6	12.8	4.5	3.4	4.0	3.9	4.7	2.5	2.8	0.9	1.7	2.8	2.6	2.8	91.4	145,953
	24-35 months	13.7	1,262,671	23.5	32.3	6.8	18.2	4.4	2.0	3.3	3.8	5.2	2.7	1.4	0.4	2.3	2.3	4.0	2.2	90.1	173,340
	36-47 months	11.1	1,291,161	28.7	25.1	4.7	16.4	4.4	2.3	4.8	6.0	5.3	0.7	1.1	0.5	2.9	6.3	4.7	2.7	87.0	143,719
	48-59 months	9.7	971,246	24.5	19.6	6.5	24.6	6.1	3.2	5.4	2.9	8.1	2.1	4.0	1.3	3.3	2.9	5.5	1.5	88.6	93,798
Mother's education	None	11.6	3,709,763	24.8	22.6	7.8	22.0	6.4	2.9	6.1	2.0	5.9	2.2	2.1	1.1	3.4	4.0	5.4	1.7	88.9	428,604
	Primary	13.8	1,430,060	27.8	29.9	8.2	11.5	1.8	2.5	2.5	5.9	4.4	1.8	1.9	0.6	0.3	3.1	2.5	2.6	91.0	197,460
	Secondary	10.8	722,652	39.7	30.7	5.3	3.9	0.9	2.9	0.6	16.7	4.6	0.0	0.4	0.0	0.2	1.3	0.7	0.6	94.6	78,061
	Non-standard curriculum	12.0	81,410	22.6	50.3	4.2	1.2	0.0	4.2	0.0	2.9	0.0	0.0	4.4	0.0	0.0	0.0	0.0	10.1	89.9	9,764
	Missing/DK	14.5	11,911	57.1	0.0	25.3	17.6	0.0	0.0	0.0	0.0	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	1,730
Wealth index quintiles	Poorest	11.0	1,264,533	21.1	19.6	7.6	27.6	9.0	2.8	6.7	1.1	6.1	3.2	2.5	1.0	4.8	5.7	5.8	1.9	89.5	138,649
	Second	12.1	1,367,061	23.4	19.2	7.1	23.9	6.3	3.4	6.0	2.1	5.1	2.5	2.9	0.6	3.0	4.3	7.3	1.4	86.7	166,096
	Middle	14.1	1,319,404	28.2	27.5	8.6	15.0	3.9	2.8	3.9	2.8	6.4	1.8	1.8	1.3	1.7	2.1	3.4	3.1	89.5	186,134
	Fourth	11.7	1,161,613	36.1	28.9	8.4	8.7	0.8	2.4	2.3	7.6	5.5	0.4	1.0	0.7	0.2	3.6	0.8	0.5	92.7	136,364
	Richest	10.5	843,186	29.0	39.4	5.3	2.8	0.6	2.5	2.3	14.2	1.9	0.7	0.9	0.0	0.0	0.2	1.1	2.7	95.0	88,375
	Total	12.0	5,955,796	27.3	25.8	7.6	16.8	4.4	2.8	4.4	4.7	5.3	1.8	1.9	0.8	2.1	3.4	4.0	1.9	90.1	715,618

*SHHS indicator 27: *Care seeking for suspected pneumonia* (Proportion of children aged 0-59 months who had suspected pneumonia in the last 2 weeks and were taken to an appropriate health provider)

In the Sudan as a whole, 12 percent of children aged 0-59 months were reported to have had symptoms of pneumonia during the two weeks preceding the survey. Differences due to background characteristics are slight, but it appears children in the age group 24-35 months are most likely to suffer from acute respiratory infections.

There are significant differences between the 10 Southern States and the majority of the remaining 15 States, whereby children in Southern Sudan were more likely to have symptoms of pneumonia than those in most of the remaining States (Figure CH.6a). Within the South, the prevalence of suspected pneumonia is highest in Unity (23 percent) and the three Equatorial States (16-19 percent) and lowest in Jonglei (6 percent) and Lakes (7 percent).

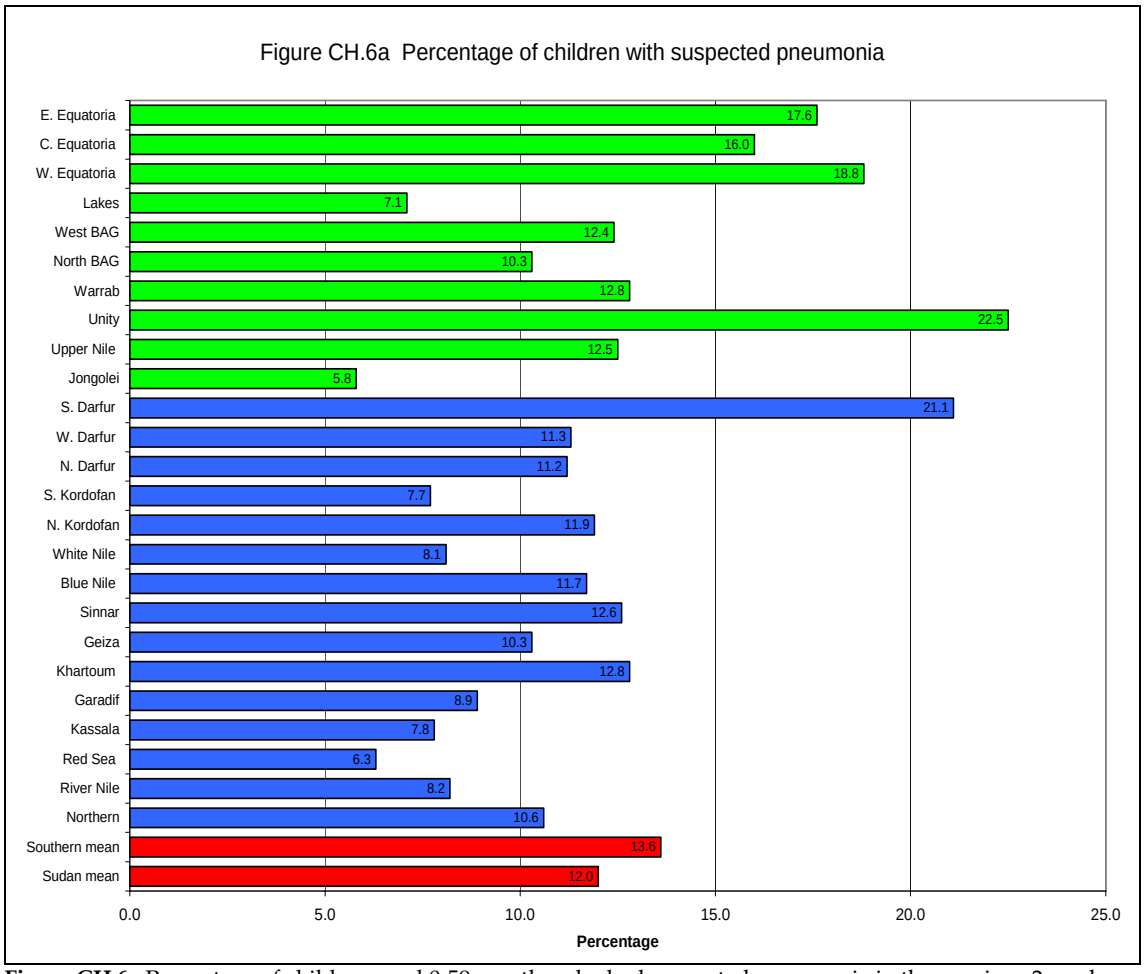

Figure CH.6a Percentage of children aged 0-59 months who had suspected pneumonia in the previous 2 weeks

4.3.5 Care seeking for suspected pneumonia

A national average of 90 percent of children with suspected pneumonia was taken to an appropriate health provider. Differences by background characteristics, by child's age, between the 10 States verses remaining 15 States, and between States are all very slight (Table CH.6; Figure CH.6b). However, it is important to note that specifically in the South, most of the health facilities (i.e. the PHCCs, the PHCUs) are managed by NGOs, rather than by government. Government hospitals were the most popular source of care in most States, closely followed by Government health care centres. However, the latter were less often sought out by Southern mothers whose children had suspected pneumonia, who instead were more likely to visit a village health worker. The remainder sought care at either private health clinics, or with alternative/traditional types of health carers.

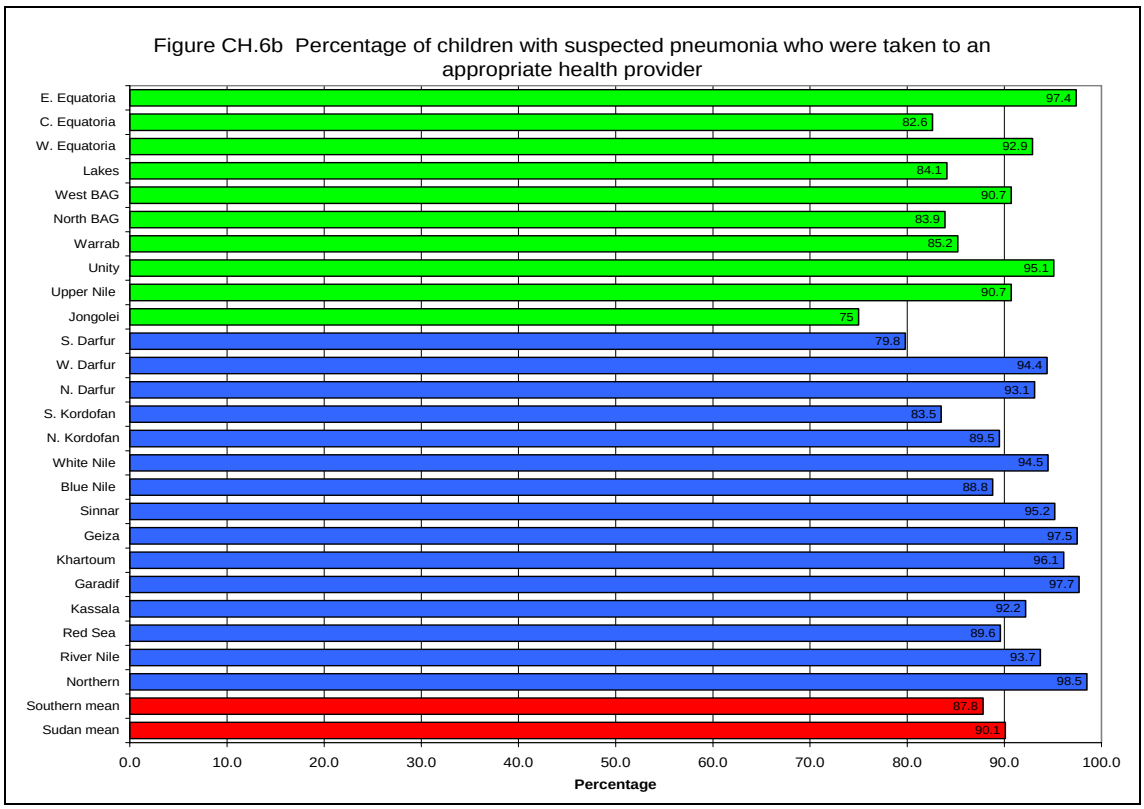

Figure CH.6b Percentage of children aged 0-59 months who were suspected to have pneumonia in the previous two weeks and who were taken to an appropriate health provider

Government hospitals were the most popular source of care in most States, closely followed by health care centres. However, the latter were less often sought out by mothers in Southern Sudan whose children had suspected pneumonia, who instead were more likely to visit a village health worker than most mothers from the remaining 15 States (Table CH.6).

4.3.6 Knowledge of the danger signs of pneumonia

Issues related to knowledge of danger signs of pneumonia are presented in Table CH.7.

Table CH.7: Knowledge of the two danger signs of pneumonia

Percentage of mothers/caretakers of children aged 0-59 months by knowledge of types of symptoms for taking a child immediately to a health facility, and percentage of mothers/caretakers who recognize fast and difficult breathing as signs for seeking care immediately, Sudan, 2006

		Percentage of mothers/caretakers of children aged 0-59 months who think that a child should be taken immediately to a health facility if the child shows sign s of pneumonia								Mothers/ caretakers who recognize the two danger signs of pneumonia*(%)	Number of mothers or caretakers of children aged 0-59 months
		Is not able to drink or breastfeed	Becomes sicker	Develops a fever	Has fast breathing	Has difficult breathing	Has blood in stool	Is drinking poorly	Has other symptoms		
State	Northern	4.6	50.6	69.5	16.8	25.1	3.8	4.6	27.1	3.3	71,281
	River Nile	9.8	60.0	49.9	10.2	10.0	2.6	2.2	26.8	2.7	108,078
	Red Sea	16.4	51.5	46.7	19.2	22.5	11.7	8.7	24.2	12.0	92,640
	Kassala	24.7	58.1	79.3	27.2	32.1	25.3	12.9	14.7	19.0	228,581
	Gadarif	5.2	43.6	63.7	5.4	7.1	6.4	2.9	40.3	1.1	277,710
	Khartoum	22.4	52.3	61.3	37.8	36.0	24.3	16.5	16.0	29.3	728,062
	Gezira	9.6	30.7	63.6	18.6	23.1	12.6	3.6	31.5	7.8	498,259
	Sinnar	3.3	45.0	64.8	13.9	17.0	3.6	2.2	18.9	6.3	184,375
	Blue Nile	4.2	38.6	60.8	10.1	8.9	2.6	1.4	31.7	3.6	135,715
	White Nile	23.5	59.5	59.3	32.3	34.6	22.2	10.5	12.9	24.5	243,446
	N. Kordofan	9.7	34.1	60.5	16.7	21.0	6.8	1.3	26.1	3.4	380,655
	S. Kordofan	12.3	35.8	56.5	14.6	17.2	7.6	5.1	24.6	9.1	277,708
	N. Darfur	6.1	60.8	31.1	5.2	6.2	4.2	2.9	23.3	2.8	268,487
	W. Darfur	17.7	50.8	46.8	11.1	18.1	16.9	5.1	26.8	4.7	300,867
	S. Darfur	9.5	60.8	49.3	12.0	12.2	9.2	5.8	16.9	6.5	502,544
	Jonglei	27.3	40.9	45.9	20.3	22.6	22.2	19.5	17.3	8.8	243,417
	Upper Nile	67.0	74.3	71.8	59.3	61.7	50.2	47.0	7.8	50.0	171,127
	Unity	40.8	68.1	55.9	36.0	38.1	46.4	33.9	5.3	27.0	120,333
	Warrap	27.5	36.8	64.7	15.4	21.8	18.1	15.2	6.8	2.6	238,751
	NBG	53.8	51.6	59.7	40.3	43.6	42.9	28.0	16.1	28.4	215,262
	WBG	25.3	34.4	42.7	20.5	17.5	25.3	10.8	10.1	7.3	75,022
	Lakes	35.3	57.1	81.9	43.1	46.1	43.8	23.5	4.5	24.0	155,869
	W. Equatoria	41.0	66.7	71.8	35.6	39.5	32.8	17.6	9.1	19.3	85,109
	C. Equatoria	43.7	60.0	82.8	61.2	59.6	45.3	29.3	3.7	47.8	189,908
	E. Equatoria	50.3	53.4	68.2	45.6	52.0	48.0	26.3	27.0	30.2	162,590

SUDAN		**21.1**	**49.5**	**59.6**	**24.1**	**26.5**	**19.5**	**12.0**	**19.8**	**14.9**	**5,955,796**
Mother's education	None	23.5	51.2	58.4	23.8	26.1	20.9	13.6	17.4	14.4	3,709,763
	Primary	16.1	46.6	60.4	23.0	25.0	16.7	8.0	24.4	13.7	1,430,060
	Secondary +	19.4	46.9	64.0	28.5	32.3	19.0	12.5	22.5	20.4	722,652
Wealth index quintiles	Poorest	29.4	51.8	56.3	25.0	29.4	26.3	17.4	14.7	15.2	1,264,533
	Second	24.0	50.7	57.2	24.1	25.6	20.5	13.0	16.8	14.7	1,367,061
	Middle	17.8	49.4	59.6	20.6	22.5	16.4	9.5	22.3	12.8	1,319,404
	Fourth	12.3	47.5	60.0	22.2	23.8	13.6	7.3	24.9	12.9	1,161,613
	Richest	21.0	47.2	67.5	31.0	33.4	20.7	12.8	21.6	21.1	843,186

****SHHS indicator 28: *Knowledge of the two danger signs of pneumonia* (Proportion of mothers/caretakers of children aged 0-59 months by knowledge of types of symptoms for taking a child immediately to a health facility, and percentage of mothers/caretakers who recognize fast and difficult breathing as signs for seeking care immediately)

Mothers' knowledge of the danger signs is clearly an important determinant of care-seeking behaviour. On average in the Sudan, only 15 percent of women/carers know of the two danger signs of pneumonia – namely fast and difficult breathing. Richer and more educated carers are more aware of these symptoms than poorer and less educated carers.

Across the country as a whole, developing a fever is the most commonly identified symptom for taking a child to a health facility; 60 percent of mothers/carers believe a febrile child should be taken to a health specialist (Table CH.7). 24 percent of mothers identified fast breathing and 27 percent of mothers identified difficult breathing as symptoms for taking children immediately to a health care provider. In general, these figures are not greatly affected by the mother/carer's education or by their wealth index.

In Southern Sudan, mothers in Upper Nile (50 percent) and Central Equatoria (48 percent) are best able to recognise these symptoms, while mothers in Warrap (3 percent) and Western Bahr El Ghazal (7 percent) score worst.

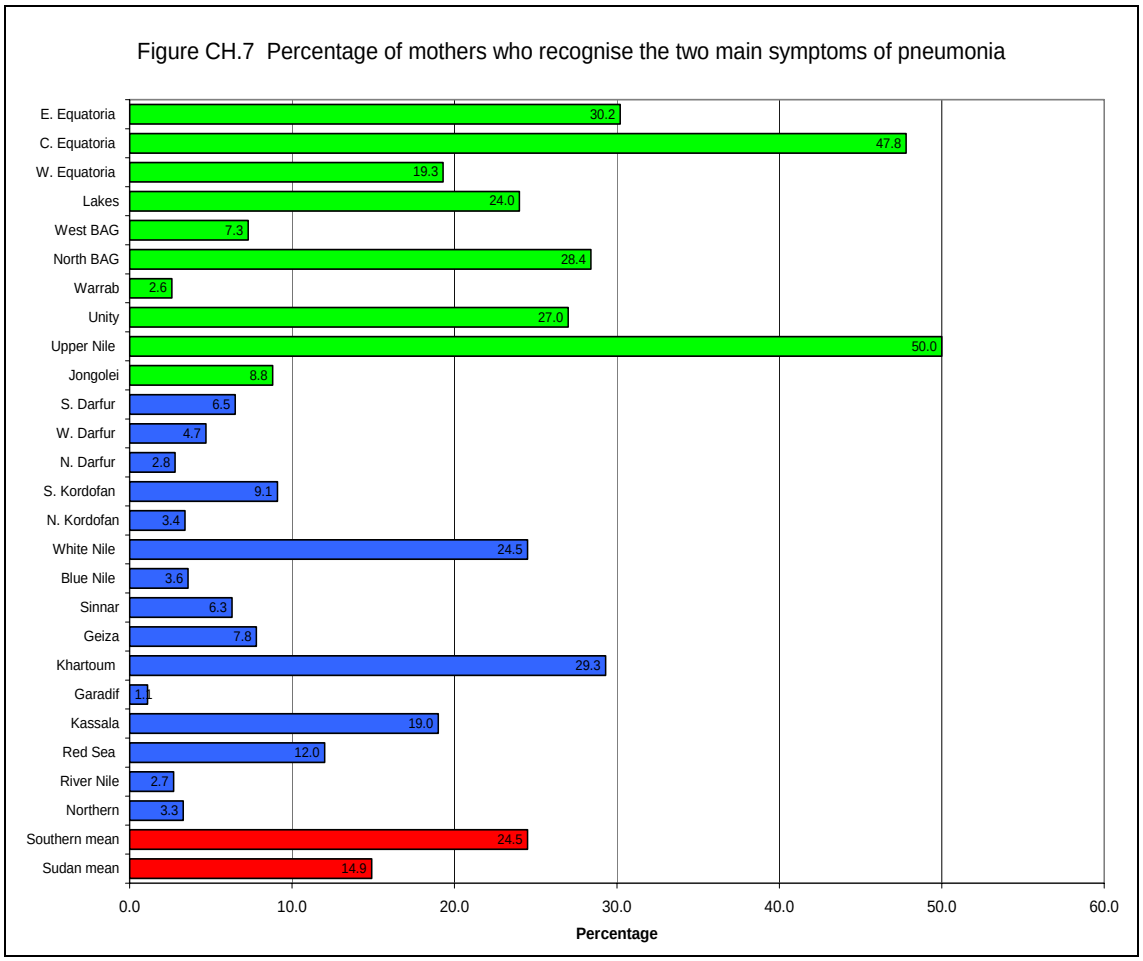

Figure CH.7 Percentage of mothers who recognize fast and difficult breathing as signs for seeking care for their 0-59 month-old children immediately

4.3.7 Solid fuel use

More than 3 billion people around the world rely on solid fuels (biomass and coal) for their basic energy needs, including cooking and heating. Cooking and heating with solid fuels leads to high levels of indoor smoke, a complex mix of health-damaging pollutants. The main problem with the use of solid fuels is products of incomplete combustion, including CO, polyaromatic hydrocarbons, SO_2, and other toxic elements. Use of solid fuels increases the risks of acute respiratory illness, pneumonia, chronic obstructive lung disease, cancer, and possibly tuberculosis, low birth weight, cataracts, and asthma. The primary indicator is the proportion of the population using solid fuels as the primary source of domestic energy for cooking.

Table CH.8 shows the types of fuel used for cooking in Sudanese households.

Table CH.8: Solid fuel use

Percent distribution of households according to type of cooking fuel, and percentage of households using solid fuels for cooking, Sudan, 2006

		Percentage of households using:														
		Electricity	Liquid propane gas (LPG)	Natural gas	Biogas	Kerosene	Coal/ Lignite	Charcoal	Wood	Straw/ shrubs / grass	Animal dung	Agricultural crop residue	Other	Missing	Total	Solid fuels for cooking*	Number of households
State	Northern	0.0	3.2	0.0	0.0	0.1	6.4	0.0	44.7	2.1	0.0	0.0	43.1	0.3	100	53.2	112,522
	River Nile	0.1	11.7	0.0	0.0	0.7	3.0	0.0	17.6	0.5	0.1	0.0	66.1	0.2	100	21.1	168,535
	Red Sea	0.0	12.9	0.6	0.4	0.1	33.0	0.0	27.0	5.5	0.1	0.0	19.3	1.0	100	65.6	141,271
	Kassala	0.0	0.0	2.6	0.0	0.1	19.5	0.0	57.5	1.6	0.3	0.0	17.9	0.5	100	78.9	316,757
	Gadarif	0.0	0.3	0.3	0.0	0.0	37.2	0.0	45.1	2.4	0.2	0.8	13.2	0.4	100	85.8	270,533
	Khartoum	0.0	26.2	0.2	0.0	1.9	17.5	0.2	3.5	0.6	0.0	0.0	49.0	0.8	100	21.8	860,348
	Gezira	0.1	0.1	0.0	0.0	0.0	18.4	0.0	8.1	1.1	1.8	0.0	70.1	0.3	100	29.4	625,927
	Sinnar	0.2	0.2	15.7	0.0	0.2	37.5	0.0	27.9	3.8	2.1	0.0	12.1	0.3	100	71.3	222,509
	Blue Nile	0.0	0.0	0.0	0.0	0.0	29.9	0.0	66.9	0.3	0.0	0.0	2.8	0.2	100	97.0	112,245
	White Nile	0.1	0.1	8.4	0.0	0.6	22.2	0.0	29.8	2.6	5.3	0.0	30.5	0.5	100	59.9	259,638
	N. Kordofan	0.0	0.0	3.7	0.0	0.1	21.4	0.0	66.7	0.6	0.0	0.0	7.4	0.2	100	88.7	422,599
	S. Kordofan	0.0	0.0	0.1	0.1	0.1	19.5	0.0	78.3	0.3	0.0	0.0	0.8	0.7	100	98.1	287,880
	North Darfur	0.0	0.1	0.8	0.0	0.0	11.6	0.0	85.4	0.8	0.2	0.0	0.6	0.4	100	98.1	284,110
	West Darfur	0.4	0.0	0.0	0.0	0.1	5.6	0.0	85.9	5.4	0.0	0.0	1.7	0.8	100	97.0	367,028
	South Darfur	0.0	0.4	0.1	0.0	0.0	13.9	0.1	84.5	0.2	0.0	0.0	0.7	0.1	100	98.7	547,828
	Jonglei	0.5	0.0	0.7	0.1	0.0	0.9	3.7	68.4	19.0	0.4	4.1	0.7	1.4	100	96.5	216,875
	Upper Nile	0.0	0.1	1.2	1.7	2.1	0.5	13.0	73.2	0.5	0.4	0.6	0.0	6.7	100	88.2	188,215
	Unity	0.0	0.0	0.9	1.7	0.1	0.1	4.6	80.9	1.7	1.0	5.6	0.2	3.3	100	93.8	89,366
	Warrap	0.0	0.0	9.1	7.6	0.1	0.0	1.1	77.2	0.5	0.0	1.6	0.3	2.4	100	80.5	241,439
	NBG	0.0	0.1	3.6	0.3	0.0	0.9	6.7	75.9	3.6	0.7	4.5	0.1	3.6	100	92.3	211,241
	WBG	0.0	0.2	0.5	0.0	0.2	0.1	6.1	89.0	0.5	0.1	0.1	0.0	3.1	100	96.0	64,565
	Lakes	0.0	0.1	2.7	0.1	0.1	0.2	1.6	91.7	1.0	0.1	0.1	0.1	2.1	100	94.8	131,682
	W. Equatoria	0.0	0.0	0.0	0.0	0.0	0.0	0.8	98.6	0.1	0.0	0.0	0.0	0.6	100	99.4	110,127
	C. Equatoria	0.3	0.0	0.2	0.0	0.1	0.1	8.2	88.9	0.0	0.0	0.3	0.3	1.5	100	97.6	161,701
	E. Equatoria	0.0	0.0	0.0	0.0	0.5	0.3	5.2	91.6	0.1	0.0	0.0	0.0	2.3	100	97.2	173,175
SUDAN		**0.1**	**4.1**	**1.9**	**0.4**	**0.4**	**14.3**	**1.3**	**53.7**	**2.0**	**0.5**	**0.5**	**19.7**	**1.0**	**100**	72.4	**6,588,113**
Education of household head	None	0.0	1.5	1.6	0.7	0.2	10.3	1.8	69.9	2.9	0.7	0.8	8.2	1.4	100	86.4	3,532,734
	Primary	0.1	4.4	1.4	0.1	0.5	19.2	0.7	41.2	1.1	0.5	0.1	30.3	0.4	100	62.8	1,266,563
	Secondary +	0.2	11.3	3.6	0.0	0.7	16.9	0.8	22.9	0.4	0.1	0.1	42.3	0.8	100	41.2	1,267,122
Wealth index quintiles	Poorest	0.0	0.0	0.5	0.8	0.0	0.4	1.2	90.9	3.5	0.1	1.2	0.1	1.2	100	97.3	1,380,473
	Second	0.0	0.0	1.8	0.7	0.0	4.5	2.3	83.5	3.1	1.0	0.6	1.2	1.2	100	95.0	1,396,037
	Middle	0.0	0.6	1.1	0.2	0.4	19.8	2.1	62.8	2.1	1.4	0.4	7.5	1.7	100	88.5	1,341,950
	Fourth	0.1	4.1	2.2	0.0	1.0	34.3	0.5	20.0	0.6	0.2	0.0	36.4	0.5	100	55.7	1,271,905
	Richest	0.2	17.7	4.2	0.1	0.7	14.5	0.1	2.0	0.3	0.0	0.0	59.8	0.5	100	16.9	1,197,748

*SHHS indicator 29: Solid fuel use (Proportion of residents in households who use solid fuels -- wood, charcoal, crop residues and dung -- as the primary source of domestic energy for cooking)

In the Sudan as a whole, almost three-quarters (72 percent) of all households use solid fuels (mainly wood and charcoal) for cooking (Table CH.8). Differentials with respect to household wealth and the educational level of the household head are significant; for example, households in the poorest wealth index quintile are six times more likely to use solid fuels for cooking than those in the richest quintile.

In general, the main solid fuels used are wood (used by 54 percent of households) and coal/lignite (used by 14 percent of households). Intriguingly, 20 percent of households use 'other' solid fuels. The best educated and wealthiest segments of the population also use liquid propane gas.

Solid fuel use for cooking is much more widespread in the South (93 percent) than in the country as a whole (73 percent; Figure CH.8a). Natural gas (9 percent) and biogas (8 percent) are used by an appreciable proportion of households in Warrap State, but otherwise wood (Figure CH.8b) and charcoal to an extent (Figure CH.8c), are the main sources of fuel for cooking in Southern Sudan.

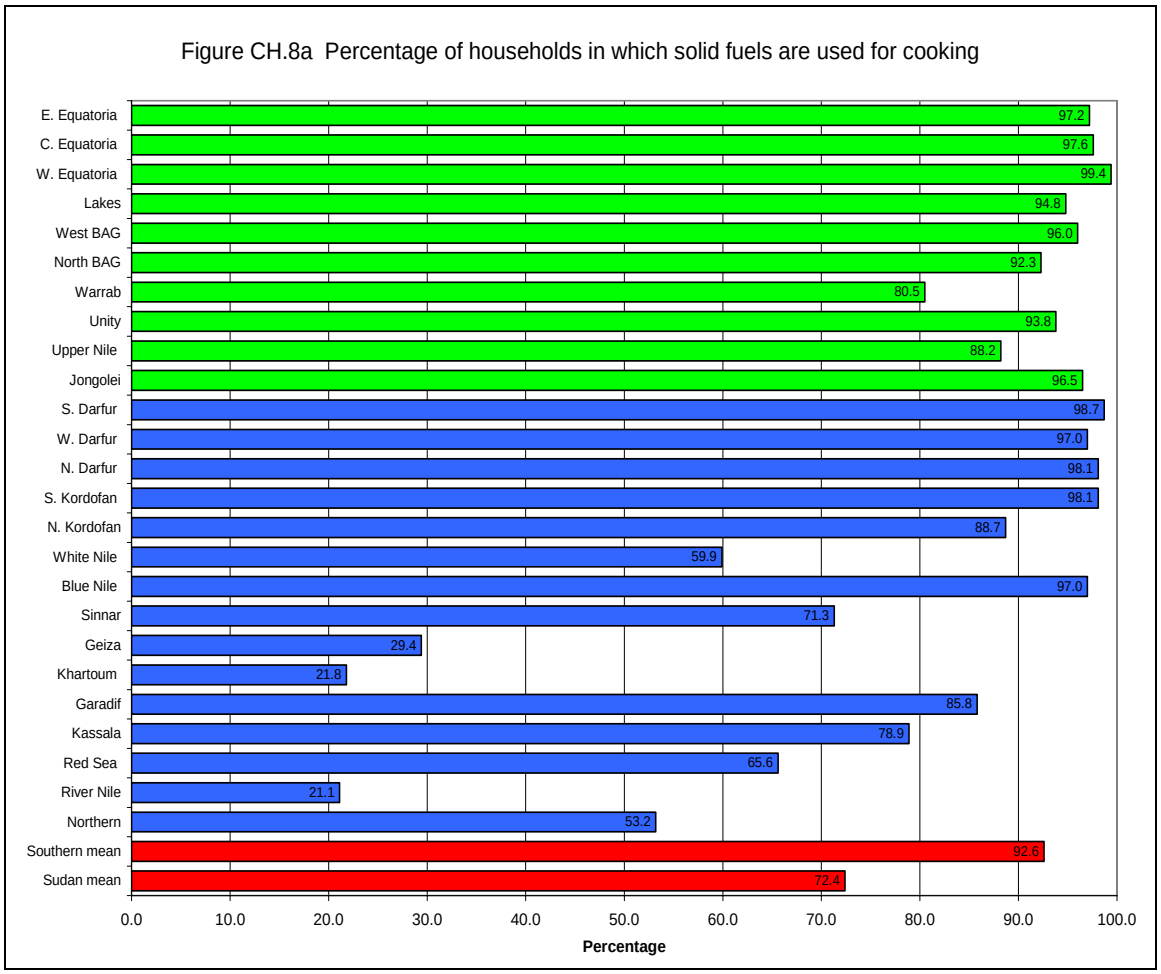

Figure CH.8a Percentage of households in which solid fuels (coal, wood, charcoal, crop residues, and dung) are used as the primary source of energy for domestic cooking

In the country, households in the 10 States of Southern Sudan are more likely to use wood as fuel for cooking food. (Figure CH.8b). Thus whereas in the States of Western and Eastern Equatoria, and Lakes, over 90 percent of households use mainly wood for cooking, in Jonglei and Upper Nile, this figure is below 75 percent.

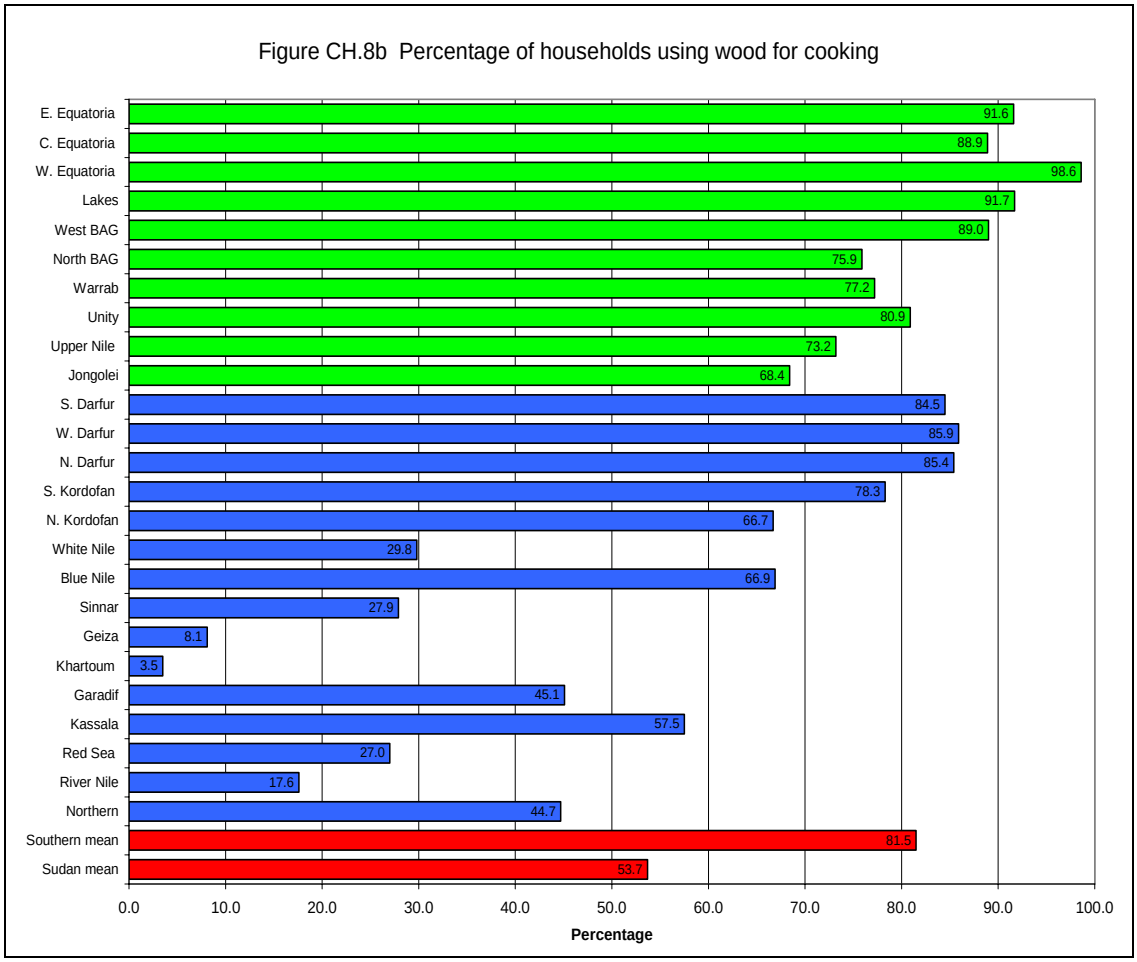

Figure CH.8b Percentage of households in which wood is the primary source of energy for domestic cooking

Charcoal is most likely to be used in Upper Nile (13 percent of households) and Central Equatoria (8 percent of households; Figure CH.8c), while in Western Equatoria, Warrap and Lakes, it is used by less than 2 percent of households.

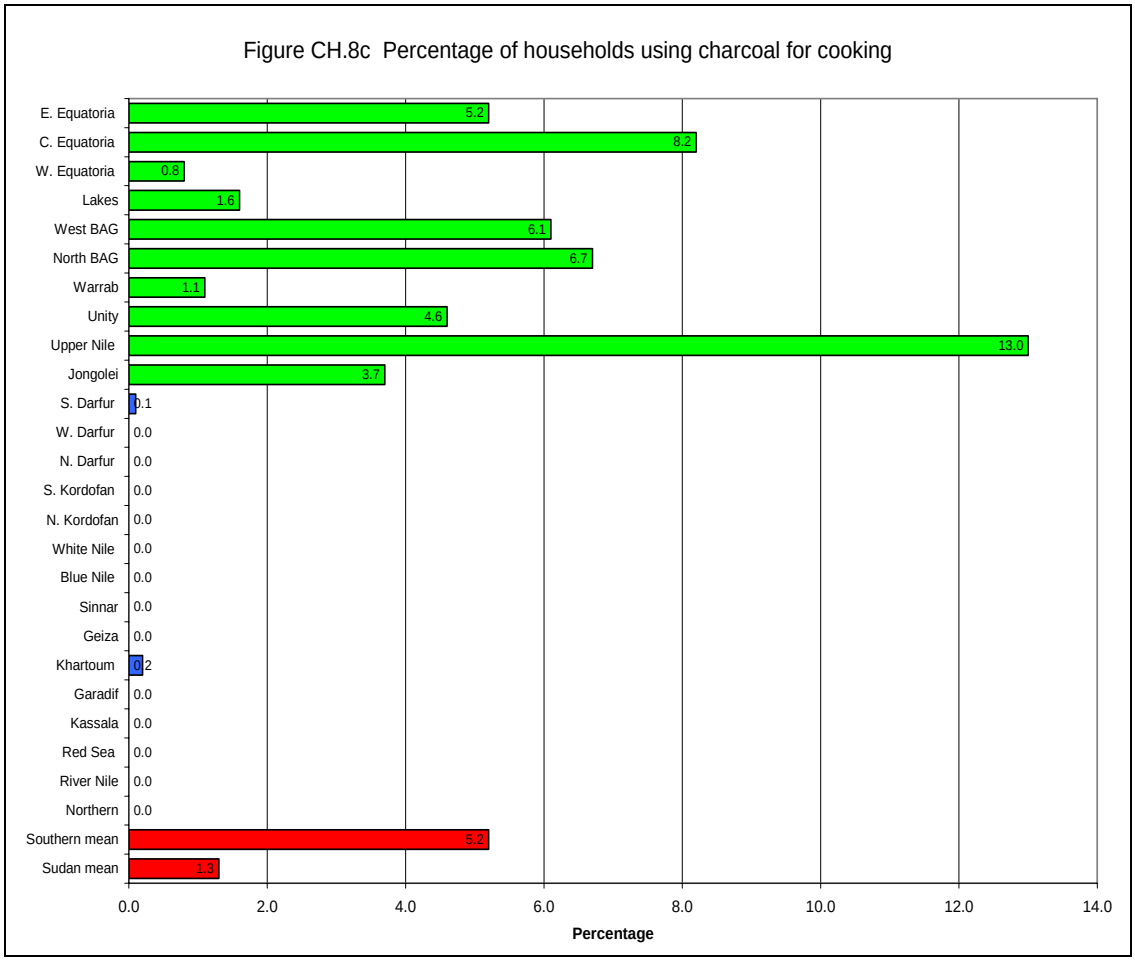

Figure CH.8c Percentage of households in which charcoal is the primary source of energy for domestic cooking

4.3.8 Malaria

Malaria is a leading cause of death in children under age five in the Sudan. It also contributes to anaemia in children and is a common cause of school absenteeism. Preventive measures, especially the use of mosquito nets treated with insecticide (ITNs), can dramatically reduce malaria mortality rates among children. In areas where malaria is common, international recommendations suggest treating any fever in children as if it were malaria and immediately giving the child a full course of recommended anti-malarial tablets. Children with severe malaria symptoms, such as fever or convulsions, should be taken to a health facility. Also, children recovering from malaria should be given extra liquids and food and, younger children, should continue breastfeeding.

The questionnaire incorporates questions on the availability and use of bed nets, both at household level and among children under five years of age, as well as anti-malarial treatment, and intermittent preventive therapy for malaria. See Table CH.9.

Table CH.9: Availability of insecticide treated nets
Percent of households with at least one insecticide treated net (ITN), Sudan , 2006

		Percentage of households with at least one mosquito net	Percentage of households with at least one insecticide treated net (ITN)*	Number of households
State	Northern	14.6	11.2	112,522
	River Nile	31.8	22.2	168,535
	Red Sea	34.0	23.8	141,271
	Kassala	33.8	19.2	316,757
	Gadarif	43.0	9.4	270,533
	Khartoum	21.7	13.4	860,348
	Gezira	34.0	23.2	625,927
	Sinnar	61.6	40.2	222,509
	Blue Nile	60.8	29.1	112,245
	White Nile	55.1	39.9	259,638
	North Kordofan	31.9	17.1	422,599
	South Kordofan	41.0	20.9	287,880
	North Darfur	39.6	20.6	284,110
	West Darfur	29.1	6.4	367,028
	South Darfur	45.8	28.8	547,828
	Jonglei	38.8	4.8	216,875
	Upper Nile	68.5	33.3	188,215
	Unity	78.5	19.7	89,366
	Warrap	24.9	7.5	241,439
	North Bahr al_Ghazal	26.2	3.7	211,241
	West Bahr al_Ghazal	39.9	3.7	64,565
	Lakes	60.1	23.3	131,682
	West Equatoria	29.3	10.9	110,127
	Central Equatoria	29.8	9.4	161,701
	East Equatoria	16.1	3.9	173,175
Education of household head	None	31.6	13.7	3,532,734
	Primary	38.8	21.9	1,266,563
	Secondary +	46.8	26.0	1,267,122
	Non-standard curriculum	42.7	22.7	485,815
	Missing/DK	49.2	27.6	35,879
Wealth index quintiles	Poorest	25.1	9.1	1,380,473
	Second	34.5	14.8	1,396,037
	Middle	42.5	21.5	1,341,950
	Fourth	40.2	24.5	1,271,905
	Richest	43.0	23.3	1,197,748
Total		**36.8**	**18.4**	**6,588,113**

*SHHS indicator 30: *Household availability of mosquito net* (Proportion of households with at least one mosquito net)

In the Sudan as a whole, the survey results indicate that 18 percent of households have at least one insecticide treated net (Table CH.9). Twice as many households have at least one untreated net. The poorest and least educated households are less likely to have mosquito nets, treated or untreated, than richer and better-educated households, but the differentials are lower than might be expected. Thus, for example, while only 14 percent of households whose head had received no formal education had an insecticide-treated net, the figure for those with secondary education was still only 26 percent.

There are large differences in the percentage of households with at least one ITN across the different States, and to a lesser degree, between the 10 States. (Figure CH.9). The average figure for the South is just 12 percent, as opposed to 18 percent for the country as a whole. Figures for the different Southern States vary tremendously, with ITN coverage in Upper Nile (33 percent) roughly ten times as good as that in Jonglei, Western and Northern Bahr El Ghazal, and Eastern Equatoria. (All 3-5 percent)

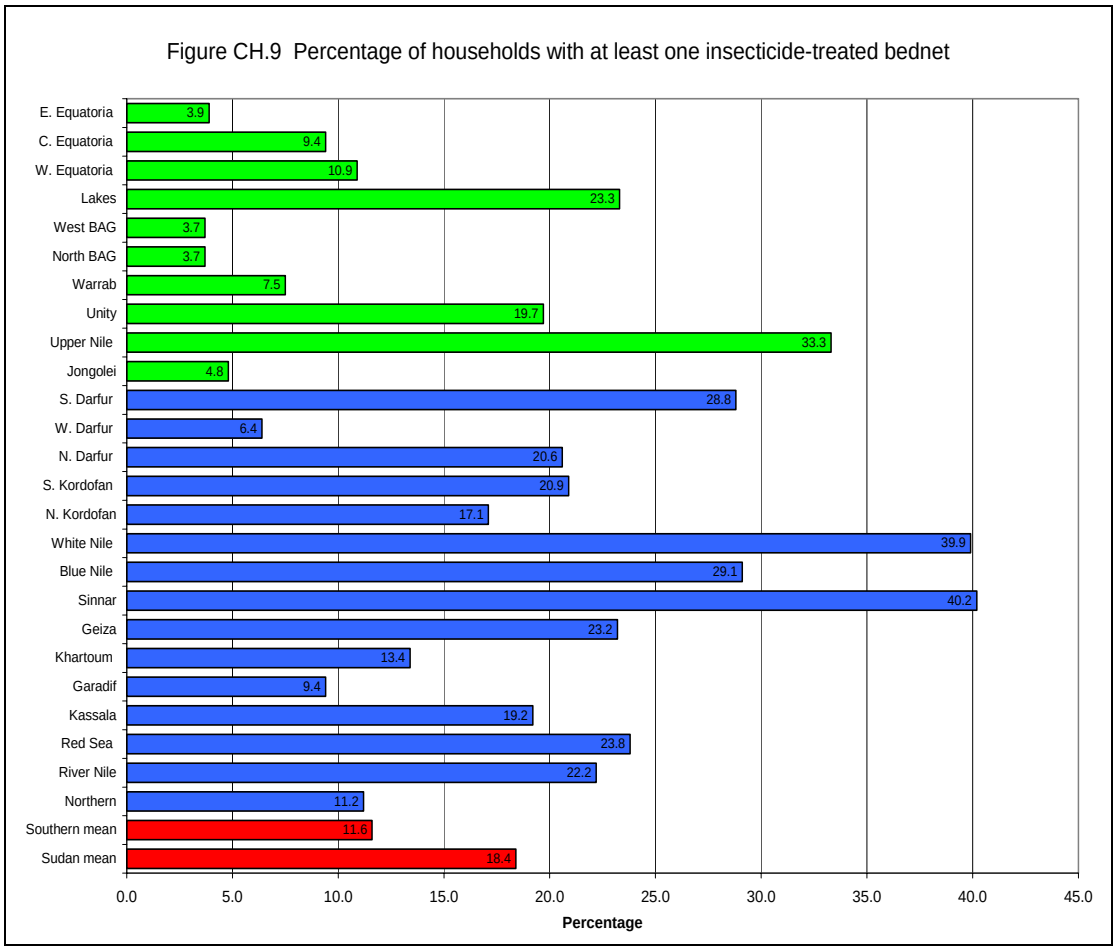

Figure CH.9 Percentage of households with at least one insecticide-treated net

4.3.9 Prevalence of malaria and treatment of children with anti-malarial drugs

Questions on the prevalence and treatment of fever were asked for all children under age five, and the results are shown in Table CH.10.

Table CH.10: Treatment of children with anti-malarial drugs
Percentage of children 0-59 months of age who were ill with fever in the last two weeks who received anti-malarial drugs, Sudan, 2006

		Had a fever in last two weeks	Number of children aged 0-59 months	Children with a fever in the last two weeks who were treated with:													Number of children with fever in last two weeks
				Anti-malarials: SP/Fansidar	Anti-malarials: Chloroquine	malarials: Armodiaquine	Anti-malarials: Quinine	Artemisinin based combinations	malarials: Other Anti-malarial	Any appropriate anti-malarial drug*	Other medications: Paracetamol/ Panadol/ Acetaminophan	Other medications: Aspirin	Other medications: Ibuprofen	Other medications : Other	Don't know appropriate anti-malarial drug within 24 hours of onset of symptoms **		
Sex	Male	21.3	3,060,302	9.6	46.0	3.7	3.5	4.3	1.5	55.8	17.9	5.7	1.1	4.6	0.4	2.4	653,151
	Female	20.4	2,895,494	9.7	43.6	3.3	2.7	3.3	1.8	52.4	13.7	5.7	0.7	3.2	0.7	2.8	591,305
State	Northern	7.0	71,281	2.3	39.6	2.3	0.0	14.0	0.0	55.9	30.3	0.0	0.0	16.2	0.0	0.0	5,007
	River Nile	14.1	108,078	9.5	72.4	1.2	1.2	11.4	1.2	88.6	34.0	0.0	0.0	15.1	0.0	1.1	15,209
	Red Sea	3.9	92,640	0.0	70.9	0.0	0.0	0.0	0.0	70.9	24.9	0.0	0.0	4.5	0.0	0.0	3,618
	Kassala	10.9	228,581	17.4	61.3	4.8	1.1	4.8	0.0	86.0	37.8	4.2	0.0	4.8	0.0	0.0	24,804
	Gadarif	11.2	277,710	0.0	29.4	0.9	1.8	7.3	0.0	39.5	12.8	0.9	0.9	5.5	0.9	0.0	30,971
	Khartoum	7.9	728,062	1.7	70.8	8.0	1.7	2.9	0.0	85.1	31.6	3.4	0.0	3.4	0.0	3.4	57,720
	Gezira	17.3	498,259	12.8	52.9	0.0	3.8	20.7	0.0	83.4	16.2	0.0	1.5	7.1	0.0	2.1	86,340
	Sinnar	12.5	184,375	5.5	47.0	0.9	5.2	6.1	0.0	62.0	16.8	0.0	0.0	5.7	0.0	0.0	23,128
	Blue Nile	17.4	135,715	4.6	45.8	0.5	1.0	3.6	0.0	53.9	13.2	0.0	0.0	15.1	0.0	0.0	23,654
	White Nile	14.8	243,446	6.7	55.1	3.5	0.7	12.7	0.0	76.7	21.4	0.7	0.0	3.5	0.7	0.7	36,082
	North Kordofan	13.1	380,655	0.0	57.0	0.0	0.0	0.9	0.9	58.7	15.7	3.5	0.0	10.5	0.9	1.8	49,762
	South Kordofan	9.4	277,708	4.9	51.2	0.0	1.2	3.7	0.0	58.6	13.4	2.4	1.3	2.4	0.0	0.0	26,099
	North Darfur	4.1	268,487	8.1	62.2	0.0	0.0	5.4	0.0	75.7	18.9	0.0	2.7	2.7	0.0	2.7	11,038
	West Darfur	11.6	300,867	0.0	42.4	0.0	0.0	0.0	0.0	42.4	10.9	3.3	1.1	1.1	1.1	0.0	34,993
	South Darfur	14.9	502,544	3.0	45.9	0.8	0.8	3.0	0.0	48.9	12.8	0.0	3.0	11.3	0.0	0.0	75,015
	Jonglei	34.3	243,417	2.7	26.2	0.4	0.8	0.0	0.4	26.9	1.9	1.2	0.0	0.8	1.5	0.0	83,494
	Upper Nile	36.3	171,127	13.3	48.2	8.3	1.8	5.5	0.5	56.0	25.7	5.5	0.9	2.8	0.9	1.8	62,176
	Unity	48.8	120,333	31.3	66.0	9.5	8.3	8.3	8.0	72.2	12.8	13.5	2.3	0.3	1.3	5.8	58,771
	Warrap	51.7	238,751	7.6	35.1	5.0	0.5	0.0	6.9	41.3	14.4	16.1	0.5	0.2	0.5	3.4	123,336
	Northern BEG	47.1	215,262	14.0	35.8	2.7	3.5	0.8	2.3	41.6	14.4	7.4	1.9	1.2	0.0	5.8	101,323
	Western BEG	45.0	75,022	7.4	30.5	2.6	0.7	0.0	1.8	37.9	1.8	12.5	0.0	0.0	1.1	1.8	33,785
	Lakes	49.2	155,869	11.5	29.0	2.5	1.8	0.0	2.1	33.3	4.1	7.1	0.0	1.4	0.0	3.2	76,613
	West Equatoria	53.4	85,109	10.7	39.9	3.1	4.1	0.3	1.3	45.9	19.8	2.2	0.6	2.5	0.6	1.9	45,487
	Central Equatoria	42.0	189,908	7.8	42.6	0.7	10.2	0.5	0.2	56.3	25.3	3.1	0.7	3.1	0.7	6.9	79,852
	East Equatoria	46.9	162,590	23.4	49.8	13.2	11.4	1.5	1.0	58.5	16.2	14.4	1.7	6.7	1.5	3.7	76,178

Table CH.10 (cont.): Treatment of children with anti-malarial drugs
Percentage of children 0-59 months of age who were ill with fever in the last two weeks who received anti-malarial drugs, Sudan, 2006

		Had a fever in last two weeks	Number of children aged 0-59 months	Children with a fever in the last two weeks who were treated with:													Number of children with fever in last two weeks
				Anti-malarials: SP/Fansidar	Anti-malarials: Chloroquine	Anti-malarials: Armodiaquine	Anti-malarials: Quinine	Anti-malarials: Artemisnin based combinations	Anti-malarials: Other Anti-malarial	Any appropriate anti-malarial drug*	Other medications: Paracetamol/Panadol/ Acetaminophan	Other medications: Aspirin	Other medications: Ibuprofen	Other medications : Other	Don't know	Any appropriate anti-malarial drug within 24 hour of onset of symptoms**	
Age	0-11 months	16.6	1,288,626	6.1	46.3	3.0	2.6	2.8	1.6	52.4	16.9	3.7	0.6	5.0	0.6	2.8	213,792
	12-23 months	22.6	1,142,094	9.9	46.8	3.1	3.0	4.1	2.7	57.7	19.2	5.8	1.3	4.3	0.8	2.2	258,226
	24-35 months	23.5	1,262,671	10.7	43.8	3.6	3.2	4.2	1.5	54.7	14.5	6.5	0.7	3.8	0.5	2.6	296,923
	36-47 months	19.9	1,291,161	9.4	45.1	3.0	2.9	3.8	1.3	53.4	15.6	5.7	1.0	3.8	0.3	2.2	256,769
	48-59 months	22.5	971,246	11.6	42.5	4.7	3.9	3.8	1.0	52.0	13.1	6.5	0.8	2.9	0.6	3.3	218,745
Mother's education	None	25.5	3,709,763	9.6	41.8	4.1	3.2	1.9	2.1	48.3	12.4	6.7	0.8	2.7	0.7	2.5	947,704
	Primary	15.3	1,430,060	8.8	56.9	1.5	3.2	7.4	0.5	71.7	24.8	3.0	1.2	6.8	0.3	2.6	218,899
	Secondary	9.0	722,652	13.1	46.4	2.5	2.3	19.0	0.0	78.3	36.9	1.3	2.3	12.3	0.0	3.3	64,906
	Non-standard curriculum	11.7	81,410	6.6	48.7	0.0	0.0	0.0	0.0	52.3	12.0	0.0	0.0	12.7	0.0	3.0	9,536
	Missing/DK	28.6	11,911	13.1	95.0	0.0	0.0	13.1	0.0	100.0	19.2	0.0	0.0	0.0	0.0	0.0	3,410
Wealth index quintiles	Poorest	33.6	1,264,533	10.7	37.1	4.8	3.0	1.4	2.0	42.6	9.5	6.9	0.9	1.8	0.6	2.1	424,331
	Second	25.7	1,367,061	10.0	43.5	2.9	3.0	1.6	1.6	49.4	15.0	6.9	0.9	2.5	0.8	3.5	351,622
	Middle	17.7	1,319,404	7.6	51.3	2.2	3.6	2.6	2.3	57.9	15.2	4.9	0.8	4.5	0.6	2.5	234,030
	Fourth	11.7	1,161,613	8.4	54.4	4.0	3.7	8.6	0.5	74.6	25.8	2.9	1.0	8.7	0.2	1.8	136,444
	Richest	11.6	843,186	10.5	54.7	2.3	2.5	18.3	0.3	84.3	34.4	2.1	1.2	10.8	0.0	2.8	98,027
Total		20.9	5,955,796	9.6	44.9	3.5	3.1	3.8	1.6	54.2	15.9	5.7	0.9	3.9	0.6	2.6	1,244,455

*SHHS indicator 32: *Anti-malarial treatment (Under-fives)*: (Proportion of children 0-59 months of age who were ill with fever in the last two weeks who received anti-malarial drugs)

**SHHS indicator 33: *Anti-malarial treatment within 24 hours* (Proportion of children aged 0-59 months reported to have had fever in the previous two weeks and were treated with an appropriate anti-malarial drug within 24 hours of onset of symptoms of malaria)

Country-wide, 21 percent of under-five children in the Sudan were ill with fever in the two weeks prior to the survey (Table CH.10).

The findings suggest no clear correlation between a child's age and their likelihood of having a fever. However, fever is markedly less common among children whose mothers have secondary or higher education, or belong to the top two wealth index quintiles, than among children of less educated and poorer mothers.

The average figure for the Sudan as a whole masks stark differences in fever prevalence between the 10 and the majority of the remaining States; while on average less than one in six children in most of the 15 States had suffered from fever in the two weeks prior to the survey, in the Southern States, almost every second child (45 percent) had shown such symptoms (Figure CH. 10). Fever was most prevalent in Western Equatoria (53 percent) and Warrap (52 percent), and was least common in Jonglei (34 percent) and Upper Nile (36 percent).

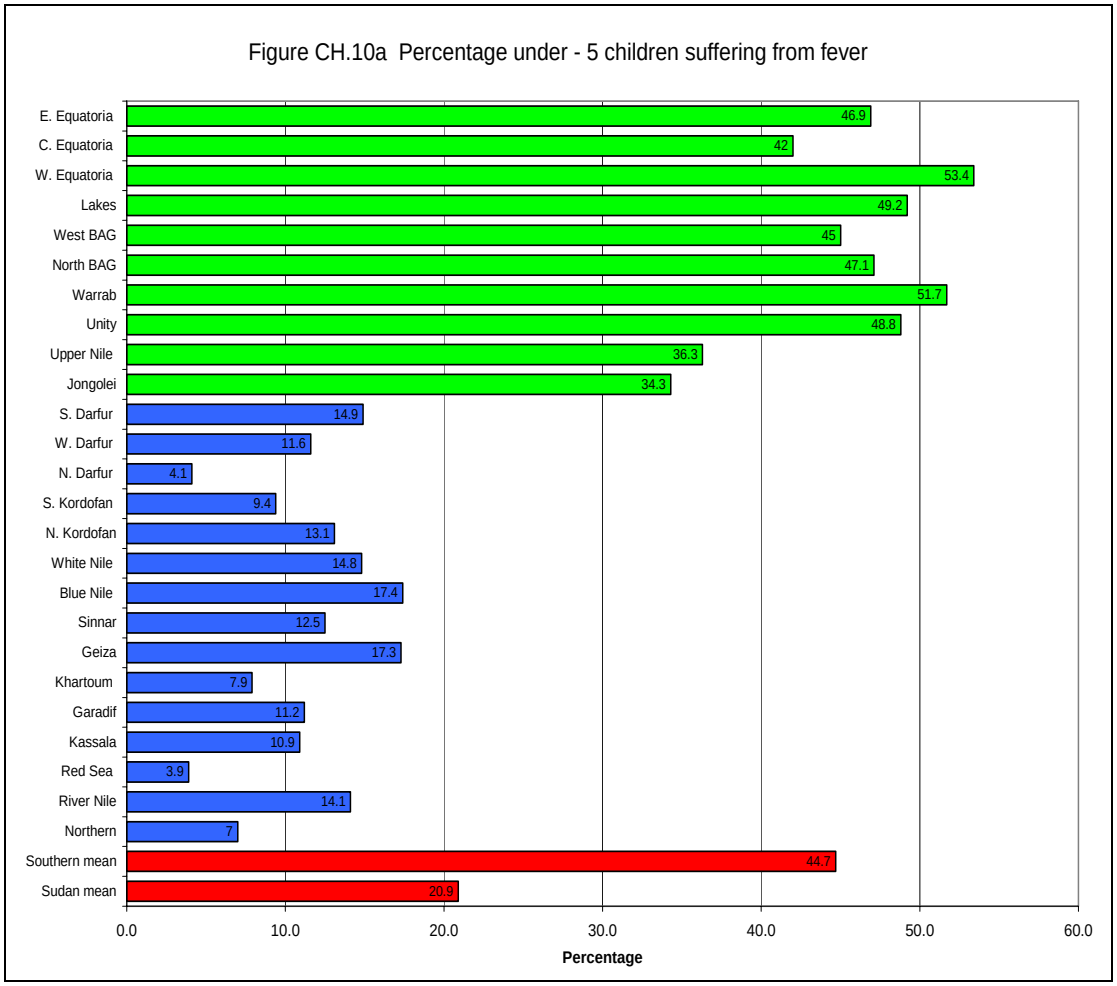

Figure CH.10a Percentage of children aged 0-59 months who were ill with fever in the 2 wks prior to the survey

Mothers were asked to report all of the medicines given to a child to treat the fever, including both medicines given at home and medicines given or prescribed at a health facility. Overall, 54 percent of children with fever in the two weeks prior to the survey were treated with an appropriate anti-malarial drug, although the figure for Southern Sudan (46 percent) was lower (Table CH.10; Figure CH.10b). Appropriate anti-malarial drugs include chloroquine, SP, artemisinin combination drugs, etc. In the Sudan as a whole, 45 percent of children with fever were given chloroquine, 10 percent received SP/Fansidar, 4 percent received Armodiaquine, and 3 percent were given quinine. Less than 4 percent received artemisinin combination therapy, whereby the wealthiest and best-educated sectors of society were far more likely to take this therapy than the poorer and less educated sectors. A large percentage of children (27 percent) were given other types of medicines that are not anti-malarials, including anti-pyretics such as paracetemol, aspirin, or ibuprofen.

In general, the children of mothers with primary or higher education, and of households in the wealthier quintiles, are more likely to be treated appropriately. Little difference was noted between the percentage of boys and girls receiving appropriate anti-malarial drugs. Children with fever in the Southern States, where malaria is known to be prevalent, are nonetheless less likely to have received an appropriate anti-malarial drug (Figure CH.10b). Figures were worst in Jonglei (27 percent) and in Lakes (33 percent), while children from Unity (72 percent) were most likely to have been treated with an appropriate anti-malarial.

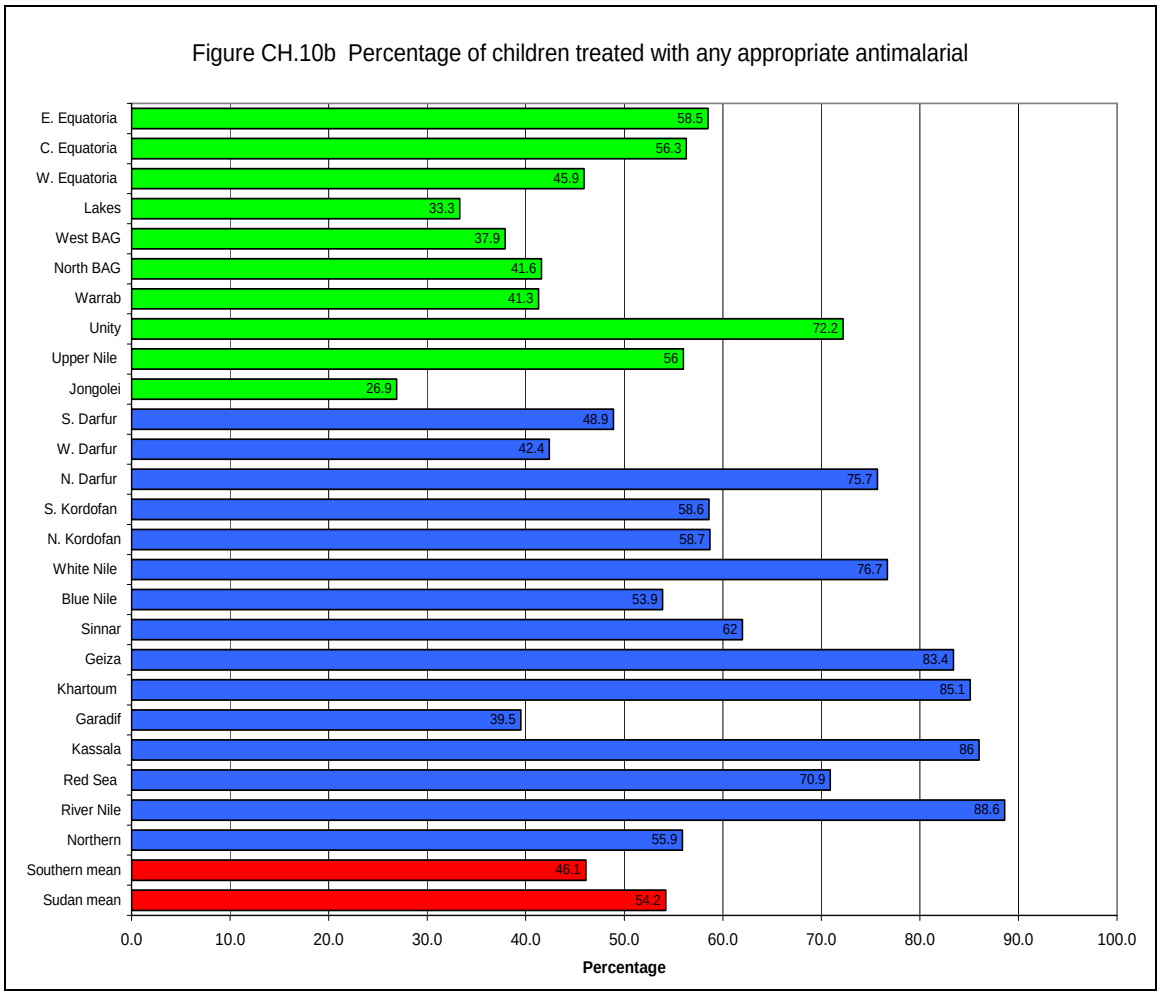

Figure CH.10b Percentage of children aged 0-59 months who were ill with fever in the two weeks prior to the survey and who received anti-malarial drugs

Graph CH.10c shows the percentage of children with suspected malaria who were given an appropriate treatment within 24 hours of the onset of their symptoms. Overall, the figures are woefully low. In the Sudan as a whole, less than 3 percent of children were treated promptly against malaria. Children in the South, where the figure is only 4 percent, fared marginally better. Within the South, appropriate medical treatment was most likely to be dispensed to children in Central Equatoria (7 percent), Northern Bahr El Ghazal (6 percent), and Unity (6 percent). Febrile children in Western Bahr El Ghazal, Upper Nile and Western Equatoria (all 2 percent) were least likely to receive appropriate treatment.

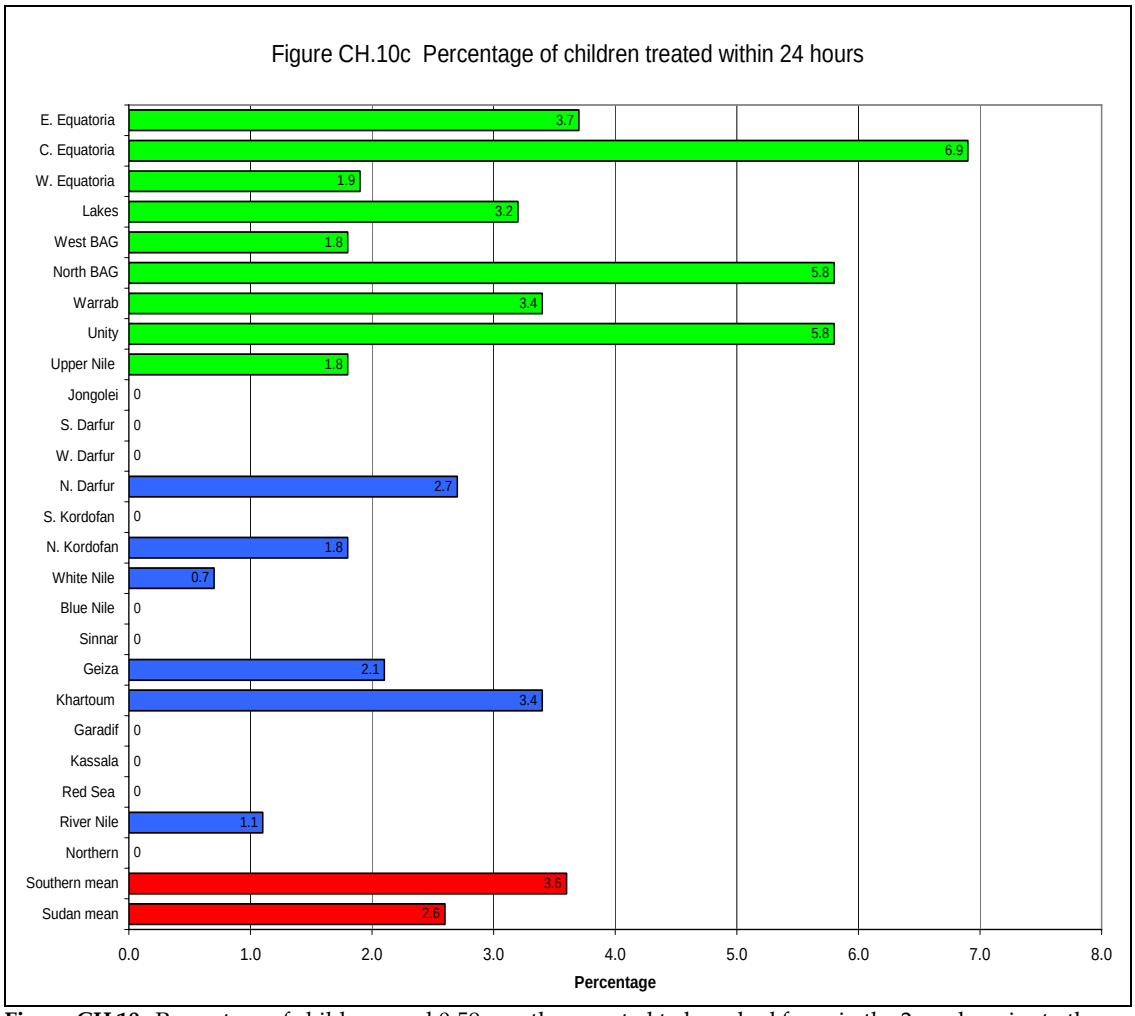

Figure CH.10c Percentage of children aged 0-59 months reported to have had fever in the 2 weeks prior to the survey and who were treated with an appropriate anti-malarial drug within 24 hours of the onset of symptoms of malaria

4.4 Environment

4.4.1 Water and Sanitation

Safe drinking water is a basic necessity for good health. Unsafe drinking water can be a significant carrier of diseases such as trachoma, cholera, typhoid, and schistosomiasis. Drinking water can also be tainted with chemical, physical and radiological contaminants with harmful effects on human health. In addition to its association with disease, access to drinking water may be particularly important for women and children, especially in rural areas, who bear the primary responsibility for carrying water, often for long distances.

The MDG goal is to reduce, by half between 1990 and 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. The World Fit for Children goal calls for a reduction in the proportion of households without access to hygienic sanitation facilities and affordable and safe drinking water by at least one-third.

The list of indicators used in survey was:

Water

- Use of improved drinking water sources
- Use of adequate water treatment method
- Time to source of drinking water
- Person collecting drinking water

Sanitation

- Use of improved sanitation facilities
- Sanitary disposal of child's faeces

The distribution of the population of Southern Sudan by source of drinking water is shown in Figure EN.1a. Less than half the population have access to improved sources of drinking water, and unprotected wells are still the most important source of water across the South. The population using *improved sources* of drinking water are those using any of the following types of supply: piped water (into dwelling, yard or plot), public tap/standpipe, tubewell/borehole, protected well, protected spring, and rainwater collection. Bottled water is considered as an improved water source only if the household is using an improved water source for other purposes, such as hand-washing and cooking.

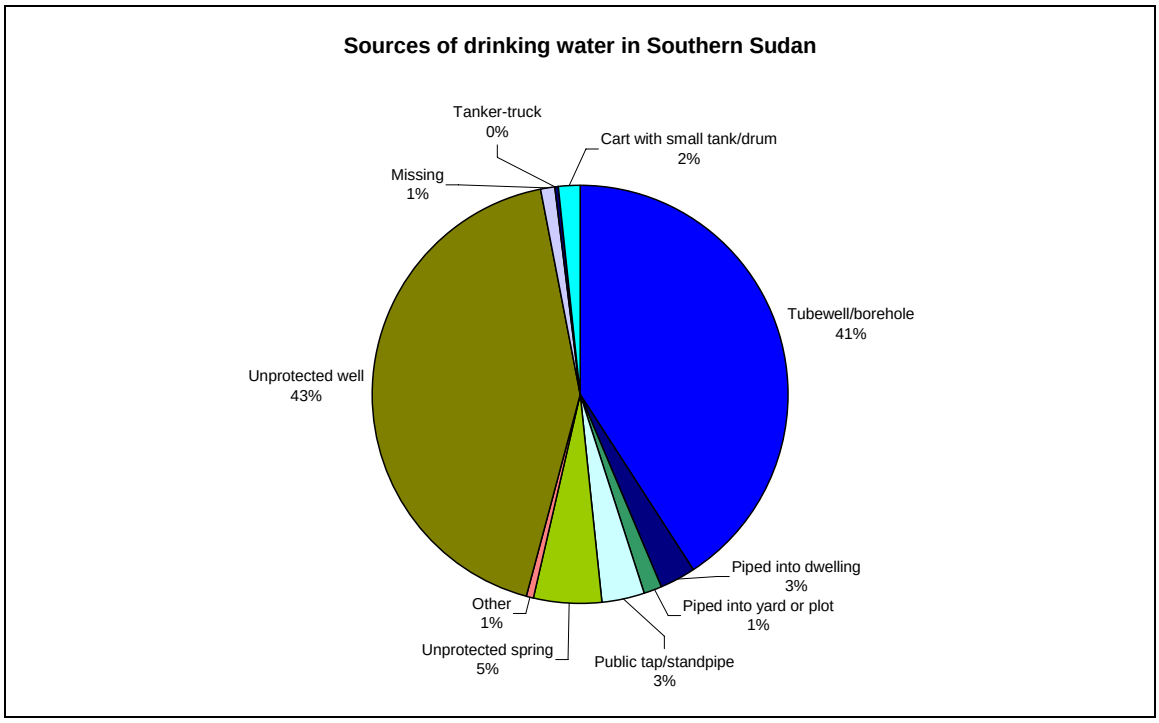

Figure EN.1a Percentage of households drawing their water from each type of water source

Table EN.1 gives an overview of the use of different water sources in the Sudan as a whole.

Table EN.1: Use of improved water sources
Percent distribution of household members according to main source of drinking water and percentage of household members using improved drinking water sources, Sudan, 2006

		Improved sources								Unimproved sources (%)							Missing	Use of improved source of drinking water*	Number of household members
		Piped into Dwelling	Piped into yard/plot	Public Tap/ Stand-pipe	Tube-well/ borehole	Protected well	Protected spring	Rainwater	Bottled water	Unprotected well	Unprotected spring	Tanker truck	Cart with Tank/drum	Surface Water	Bottled Water	Other			
State	Northern	2.9	66.7	4.0	0.0	6.6	0.0	0.0	0.0	3.4	0.0	0.1	6.0	7.2	0.0	3.0	0.0	80.3	634,000
	River Nile	9.8	56.6	5.1	0.1	2.2	0.0	0.0	0.0	1.6	0.0	0.8	3.1	18.2	0.0	2.3	0.2	73.8	990,000
	Red Sea	4.1	18.0	3.1	0.8	5.2	0.3	0.5	1.1	10.5	1.4	4.8	41.5	0.0	0.4	7.6	0.6	33.1	737,000
	Kassala	11.9	20.7	5.1	0.1	0.3	0.6	0.0	0.0	10.1	0.0	9.4	8.3	16.2	0.0	17.4	0.0	38.7	1,728,000
	Gadarif	2.7	4.8	10.3	10.1	9.5	0.0	0.0	0.0	10.9	1.9	0.4	10.0	14.2	0.1	25.1	0.1	37.3	1,728,000
	Khartoum	29.9	45.9	0.5	0.0	3.1	0.0	0.0	0.0	0.4	0.0	0.1	15.9	0.0	0.0	4.0	0.1	79.4	5,761,000
	Gezira	14.1	51.9	8.8	0.1	2.5	0.5	0.0	0.0	4.2	0.2	0.4	4.8	7.8	0.0	4.7	0.0	77.9	3,905,000
	Sinnar	20.1	20.5	11.0	7.2	21.9	0.0	0.0	0.0	2.4	0.0	0.3	4.4	9.5	0.0	2.7	0.0	80.7	1,334,000
	Blue Nile	3.4	6.3	4.2	5.5	20.7	0.1	0.3	0.0	3.9	1.0	3.0	15.3	34.2	0.0	2.0	0.0	40.5	738,000
	White Nile	4.7	27.2	4.8	7.4	0.9	1.0	0.3	0.0	14.4	0.2	1.6	19.1	17.3	0.0	1.0	0.0	46.4	1,676,000
	N. Kordofan	3.7	11.8	15.8	2.4	13.2	0.1	0.0	0.0	10.1	0.0	5.1	8.5	0.0	0.3	29.0	0.0	47.0	2,479,000
	S. Kordofan	0.0	0.0	2.6	7.1	46.2	3.4	0.9	0.0	14.3	1.8	1.4	10.8	0.2	0.0	10.9	0.3	60.2	1,589,000
	N. Darfur	0.9	1.5	9.4	0.1	35.3	1.1	0.0	0.0	24.9	0.1	6.6	3.6	0.9	0.0	15.6	0.1	48.2	1,709,000
	W. Darfur	0.1	1.8	16.0	0.9	20.0	0.8	0.0	0.0	54.1	1.5	0.6	2.3	0.3	0.0	1.0	0.7	39.6	1,776,000
	S. Darfur	0.9	4.1	15.5	0.1	23.3	0.0	0.0	0.0	32.2	0.1	0.9	22.2	0.1	0.0	0.5	0.2	43.9	3,282,000
	Jonglei	1.0	2.5	9.5	9.0	0.0	0.0	0.0	0.2	68.3	0.9	1.7	5.3	0.0	0.0	0.4	1.2	22.2	1,511,544
	Upper Nile	4.0	1.7	7.4	47.0	0.0	0.0	0.0	0.0	36.1	0.6	0.0	1.5	0.0	0.0	0.0	1.8	60.0	1,041,410
	Unity	12.5	0.9	4.3	39.5	0.0	0.0	0.0	0.0	40.0	0.1	0.2	0.5	0.0	0.1	0.1	1.8	57.1	589,718
	Warrap	0.7	0.3	1.6	58.6	0.0	0.0	0.0	0.0	33.0	4.6	0.0	0.6	0.0	0.0	0.1	0.5	61.2	1,505,818
	NBG	7.1	4.8	3.3	33.8	0.0	0.0	0.0	0.0	44.7	3.0	0.0	1.7	0.0	0.0	0.0	1.8	48.8	1,415,054
	WBG	5.7	1.1	1.6	28.8	0.0	0.0	0.0	0.0	57.2	4.5	0.0	0.2	0.0	0.0	0.2	0.7	37.2	417,967
	Lakes	1.7	0.2	0.5	65.1	0.0	0.0	0.0	0.0	29.6	1.2	0.0	0.0	0.0	0.3	1.0	0.3	67.4	956,443
	W. Equatoria	0.0	0.0	1.1	34.0	0.0	0.0	0.0	0.0	33.3	31.6	0.0	0.0	0.0	0.0	0.0	0.0	35.1	680,750
	C. Equatoria	0.9	0.5	0.0	35.5	0.0	0.0	0.0	0.0	43.8	10.4	0.0	4.6	0.0	0.0	3.9	0.4	36.6	1,072,047
	E. Equatoria	0.5	0.0	0.0	58.8	0.0	0.0	0.0	0.0	35.4	4.1	0.0	0.0	0.0	0.0	0.1	1.1	59.3	913,244
SUDAN		8.7	19.0	6.8	11.8	9.5	0.4	0.1	0.0	20.4	1.6	1.5	9.2	4.4	0.0	6.4	0.4	56.1	40,169,996
Education of household head	None	3.3	10.1	7.2	17.7	10.6	0.4	0.1	0.0	28.8	1.9	1.5	7.9	4.0	0.0	5.9	0.5	49.4	21,119,292
	Primary	9.7	27.7	6.4	6.4	9.0	0.4	0.1	0.0	12.4	2.0	1.4	11.2	4.8	0.1	8.6	0.1	59.6	7,921,476
	Secondary+	22.4	33.1	6.0	5.1	5.3	0.1	0.0	0.1	7.5	0.8	1.6	10.4	2.5	0.1	4.7	0.2	72.2	7,760,887
Wealth index quintiles	Poorest	0.7	0.3	6.0	29.9	10.6	0.4	0.2	0.0	41.7	3.6	0.4	1.5	1.5	0.0	3.1	0.2	48.0	7,896,425
	Second	2.0	1.5	7.2	17.0	15.2	0.7	0.1	0.0	33.7	2.6	1.5	6.0	4.7	0.0	7.2	0.6	43.7	8,054,925
	Middle	1.9	5.5	11.1	9.6	13.5	0.5	0.1	0.0	21.2	1.7	1.9	11.7	8.8	0.1	11.7	0.9	42.1	8,074,894
	Fourth	5.6	35.8	8.2	2.6	6.9	0.2	0.0	0.0	5.3	0.2	2.3	18.1	6.0	0.0	8.6	0.1	59.4	8,036,427
	Richest	32.7	51.3	1.5	0.4	1.1	0.0	0.0	0.1	0.8	0.1	1.5	8.3	0.7	0.1	1.5	0.0	87.1	8,107,324

*SHHS indicator 34: *Use of improved drinking water sources* (Proportion of households using improved sources of drinking water (piped water; public tap; borehole/pump; protected well; protected spring; rainwater)

Findings indicate that 56 percent of the population in Sudan is using an improved source of drinking water (Table EN.1). However, it is important to note that in the 10 Southern States, improved sources of drinking water are mostly referred to as water from the few existing boreholes/tubewell and the mean time for access to these water boreholes is 45 minutes. Considering background characteristics, there is a clear positive correlation between the head of household's education and household's likelihood of having access to an improved source of drinking water. Interestingly, households in the poorest wealth index quintile are more likely to have access to improved sources of drinking water than those in the second and middle quintiles; however, figures for those in the richest quintile are roughly twice as high as for those in other wealth quintiles.

Findings indicate that in the Country as a whole, households from the 10 Southern States are less likely to have access to improved water sources. (Figure EN.1b). Southern States with particularly poor access to improved sources of drinking water include Jonglei (22 percent), Western Equatoria (35 percent), Central Equatoria (37 percent); and Western Bahr El Ghazal (37 percent; Figure EN.1).

There are, however, considerable differences between the 10 States and the majority of the remaining States in the country in terms of the types of improved water sources used (Table EN.1). Most of the households in the 15 States are much more likely to have water piped into their houses or yards, or to have a protected well. Households in the 10 Southern States are much more likely to draw water from a tubewell /borehole, or from an unprotected well.

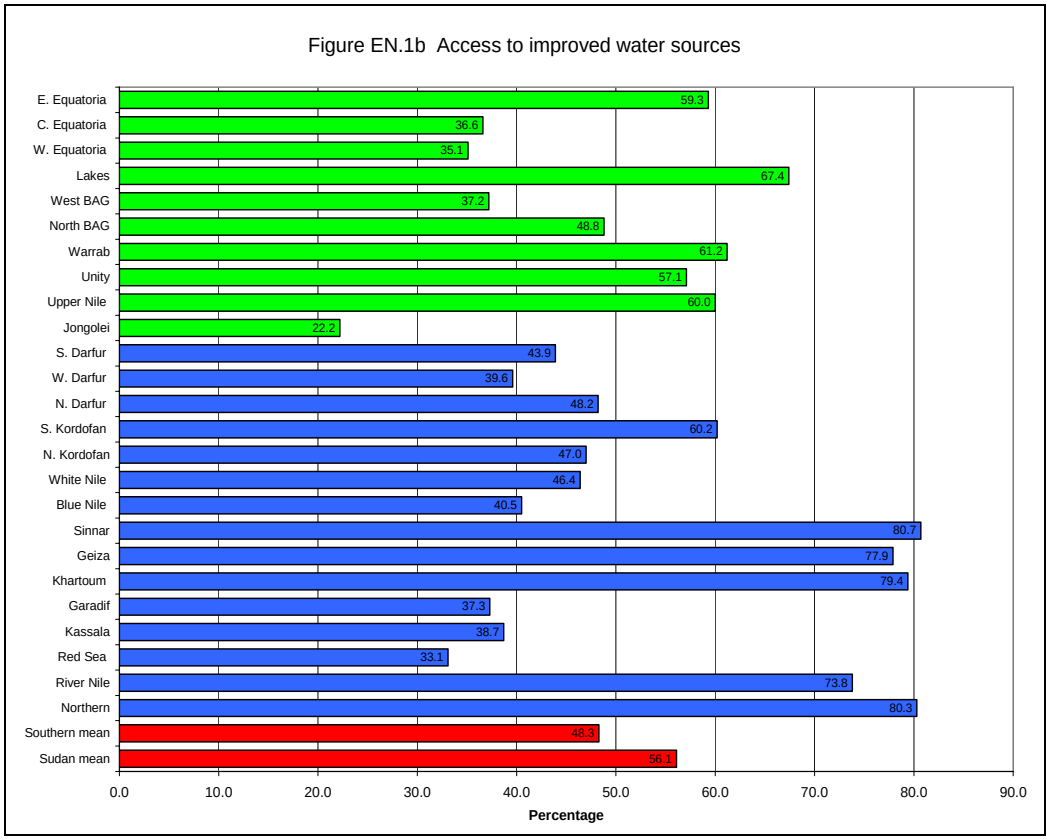

Figure EN.1b Percentage of households using improved sources of drinking water (piped water; public tap; borehole/pump; protected well; protected spring; rainwater)

Use of in-house water treatment in the Sudan is presented in Table EN.2.

Table EN.2: Household water treatment

Distribution of household population according to drinking water treatment method used in the household and percentage of household members who applied an appropriate water treatment method, Sudan, 2006

		Water treatment method used in the household (%)													
		None	Boil	Add bleach/ chlorine	Use water filter	Solar disinfection	Let it stand and settle	Other	Don't know	Appropriate water treatment method * %	Number of household members	sources: Appropriate water treatment method %	Number of household members	sources: Approprate water treatment method %	Number of household members
State	Northern	81.6	0.0	2.1	0.0	0.0	15.1	1.8	0.2	2.1	634,000	1.8	509,129	3.3	124,871
	River Nile	68.9	0.0	0.9	0.4	0.0	28.8	0.5	0.6	1.3	990,000	1.6	731,063	0.5	258,937
	Red Sea	72.9	0.4	1.5	0.6	0.0	6.1	18.7	0.9	2.4	737,000	3.1	236,327	2.1	500,673
	Kassala	88.7	1.9	3.9	0.2	0.0	5.2	1.1	0.0	5.9	1,728,000	6.0	668,722	5.8	1,059,278
	Gadarif	96.3	0.3	0.4	0.1	0.0	1.5	1.2	0.2	0.8	1,728,000	0.7	643,949	0.9	1,084,051
	Khartoum	95.9	0.4	0.8	1.4	0.0	1.9	0.0	0.0	2.4	5,761,000	2.9	4,573,978	0.5	1,187,022
	Gezira	92.5	0.1	0.6	0.0	0.0	5.1	2.0	0.2	0.7	3,905,000	0.7	3,043,703	0.7	861,297
	Sinnar	94.0	0.0	0.1	0.1	0.1	1.0	4.7	0.3	0.4	1,334,000	0.5	1,076,303	0.0	257,697
	Blue Nile	90.2	0.0	0.2	2.8	0.0	3.5	3.6	0.1	3.0	738,000	3.3	299,074	2.9	438,926
	White Nile	85.5	0.0	1.3	0.1	0.0	0.9	11.7	0.5	1.4	1,676,000	0.4	777,525	2.4	898,475
	N. Kordofan	96.1	0.2	0.9	0.3	0.0	0.8	2.1	0.3	1.3	2,479,000	2.5	1,165,728	0.2	1,313,272
	S. Kordofan	99.1	0.0	0.1	0.0	0.0	0.2	0.5	0.0	0.1	1,589,000	0.0	957,094	0.3	631,906
	N. Darfur	89.6	0.2	0.2	0.4	0.1	8.5	1.6	0.0	1.0	1,709,000	0.6	824,266	1.3	884,734
	W. Darfur	81.1	0.4	0.6	0.2	0.8	16.3	0.5	0.0	1.9	1,776,000	1.2	702,638	2.4	1,073,362
	S. Darfur	96.6	0.2	0.2	0.2	0.0	0.9	2.1	0.0	0.5	3,282,000	0.2	1,440,258	0.7	1,841,742
	Jonglei	87.3	3.4	3.3	1.8	0.4	5.4	0.4	1.4	7.0	1,511,544	7.2	332,345	6.9	1,179,199
	Upper Nile	80.4	7.5	4.3	7.1	1.7	6.6	4.8	0.8	12.4	1,041,410	14.7	624,700	9.0	416,711
	Unity	76.1	3.9	1.5	4.9	0.6	15.7	0.2	1.1	8.1	589,718	5.4	336,914	11.6	252,805
	Warrap	91.9	5.9	0.4	0.7	0.0	1.7	0.0	0.0	6.4	1,505,818	6.3	922,014	6.4	583,804
	NBG	81.3	14.5	0.1	2.6	0.1	2.9	0.1	0.0	16.5	1,415,054	23.3	691,205	10.1	723,849
	WBG	59.3	31.4	0.2	7.9	0.4	2.6	0.0	0.2	37.5	417,967	40.8	155,351	35.5	262,616
	Lakes	87.3	10.5	0.4	2.3	0.1	5.1	0.0	0.4	11.6	956,443	8.5	644,437	18.1	312,006
	W. Equatoria	68.0	28.1	0.0	4.0	0.0	1.5	0.0	0.0	30.4	680,750	38.5	238,894	26.1	441,856
	C. Equatoria	77.4	14.8	2.3	11.6	0.5	8.2	0.7	0.6	20.2	1,072,047	15.1	392,608	23.1	679,439
	E. Equatoria	97.2	0.9	0.2	2.1	0.0	0.7	0.0	0.2	2.3	913,244	2.7	541,735	1.8	371,510
SUDAN		**89.4**	**2.8**	**1.0**	**1.4**	**0.1**	**4.6**	**2.0**	**0.2**	**4.5**	**40,169,996**	**4.1**	**22,529,959**	**5.0**	**17,640,037**
Education of household head	None	88.8	3.9	0.8	1.5	0.2	4.8	1.7	0.3	5.3	21,119,292	5.3	10,435,873	5.3	10,683,419
	Primary	90.7	2.1	1.0	0.7	0.1	4.0	2.2	0.2	3.4	7,921,476	2.5	4,718,947	4.8	3,202,529
	Secondary+	88.8	1.4	1.3	2.2	0.1	5.2	2.2	0.2	4.4	7,760,887	3.9	5,593,597	5.7	2,167,291
Wealth index quintiles	Poorest	89.6	4.5	0.7	1.3	0.2	4.2	0.7	0.3	5.8	7,896,425	6.6	3,792,220	5.1	4,104,206
	Second	87.4	5.5	0.7	1.9	0.2	4.9	1.4	0.3	7.1	8,054,925	7.5	3,520,132	6.8	4,534,793
	Middle	88.5	2.9	1.0	1.8	0.2	4.9	3.1	0.3	4.6	8,074,894	3.6	3,393,944	5.3	4,680,951
	Fourth	90.5	0.4	0.9	0.4	0.1	4.8	3.4	0.1	1.7	8,036,427	1.2	4,771,161	2.3	3,265,266
	Richest	91.2	0.6	1.4	1.4	0.0	4.5	1.3	0.2	3.3	8,107,324	3.3	7,052,503	3.2	1,054,822

*SHHS indicator 35: *Appropriate water treatment* (Proportion of household members using an appropriate method for treatment of drinking water)

Households were asked of ways they may be treating water at home to make it safer to drink–boiling, adding bleach or chlorine, using a water filter, and using solar disinfection were considered as proper treatment of drinking water. The table shows that the vast majority (89 percent) of households, especially in the 15 States of the Sudan, undertake no water treatment whatsoever (Table EN.2). The data suggest there are no trends in water treatment according to educational background or wealth index quintile. Southern households are more likely to boil water before drinking, or use a water filter, and in general, households in most of the 10 Southern States are more likely to treat drinking water appropriately.(Figure EN. 2). This was true for households in Western Bahr El Ghazal (38 percent) and Western Equatoria (30 percent). The figures were lowest for Eastern Equatoria (2 percent), Warrap, Jonglei, and Unity (all 6-8 percent).

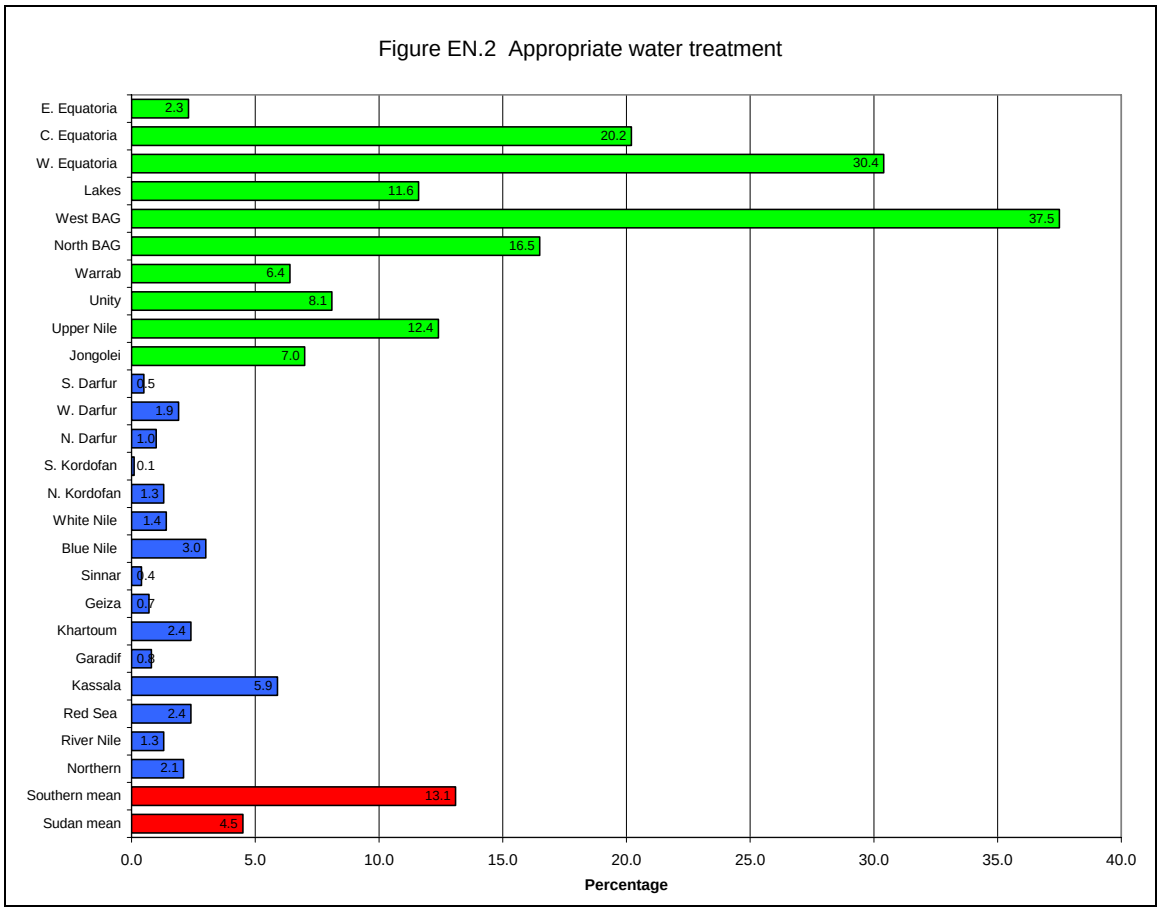

Figure EN.2 Percentage of households using an appropriate method for treatment of drinking water

The amount of time it takes householders to fetch their water is presented in Table EN.3. Note that these results refer to one round trip from home to drinking water source. Information on the number of trips made per day was not collected.

Table EN.3: Time to source of water
Percent distribution of households according to time to go to source of drinking water, get water and return, and mean time to source of drinking water, Sudan, 2006

State	Time to source of drinking water (%)							Mean time to source of drinking water* (in minutes)	Number of households
	Water on premises	Less than 15 minutes	15-30 minutes	30-60 minutes	1 hour or more	Don't know	Missing		
Northern	80.4	9.1	3.7	3.7	2.9	0.2	0.0	23.0	112,522
River Nile	68.2	9.0	6.0	10.7	4.9	0.9	0.2	27.9	168,535
Red Sea	30.8	12.1	8.6	8.0	18.7	20.7	1.0	84.9	141,271
Kassala	29.0	9.1	4.6	12.8	38.0	6.4	0.3	67.1	316,757
Gadarif	31.1	12.5	22.0	19.0	9.2	5.6	0.6	28.0	270,533
Khartoum	77.5	6.4	5.8	5.3	2.8	1.3	0.8	32.6	860,348
Gezira	65.2	8.8	9.0	12.0	4.7	0.2	0.1	28.2	625,927
Sinnar	41.2	19.8	13.6	15.7	9.5	0.3	0.0	30.7	222,509
Blue Nile	16.8	16.7	18.8	28.3	17.6	1.6	0.3	35.7	112,245
White Nile	32.0	9.7	11.8	21.0	24.8	0.2	0.5	65.4	259,638
N. Kordofan	23.8	21.9	18.8	14.9	19.7	0.8	0.1	45.8	422,599
S. Kordofan	5.9	27.7	24.0	18.4	20.3	3.2	0.6	38.9	287,880
N. Darfur	15.5	16.0	15.6	24.5	23.5	4.4	0.5	45.9	284,110
W. Darfur	1.6	30.3	20.8	26.2	16.6	2.6	1.8	28.8	367,028
S. Darfur	5.2	17.6	22.3	28.1	20.5	6.3	0.0	43.9	547,828
Jonglei	7.9	18.8	16.2	19.0	27.3	8.2	2.7	54.2	216,875
Upper Nile	6.2	19.2	14.5	27.8	23.1	5.8	3.4	45.3	188,215
Unity	14.8	16.6	11.7	30.8	23.8	1.3	1.1	42.5	89,366
Warrap	1.7	45.1	12.8	14.3	16.6	8.7	0.8	32.9	241,439
NBG	14.8	23.6	11.9	22.3	19.1	5.0	3.2	42.5	211,241
WBG	8.2	26.5	23.3	20.4	16.2	4.2	1.2	36.4	64,565
Lakes	4.7	8.8	13.0	30.4	35.3	6.8	1.0	52.1	131,682
W. Equatoria	0.2	16.5	13.8	29.0	40.2	0.3	0.0	53.6	110,127
C. Equatoria	1.3	10.3	16.2	30.9	40.6	0.4	0.2	57.6	161,701
E. Equatoria	2.7	20.5	15.3	35.3	14.4	10.6	1.1	36.2	173,175
SUDAN	**30.1**	**16.4**	**13.8**	**18.2**	**17.0**	**3.7**	**0.8**	**42.9**	**6,588,113**
Education of household head									
None	15.6	19.2	15.5	22.0	22.0	4.7	1.1	45.3	3,532,734
Primary	39.7	15.2	12.6	16.4	13.4	2.4	0.3	41.2	1,266,563
Secondary +	59.7	10.0	8.9	10.6	8.1	2.2	0.4	36.6	1,267,122
Wealth index quintiles									
Poorest	2.2	21.3	16.0	24.9	29.4	5.4	0.8	50.2	1,380,473
Second	6.3	21.3	18.1	24.0	25.5	3.9	0.9	44.4	1,396,037
Middle	12.8	20.0	19.6	23.8	18.8	3.7	1.3	40.8	1,341,950
Fourth	50.7	14.3	10.8	13.5	7.4	3.1	0.4	31.1	1,271,905
Richest	87.9	3.1	2.9	2.6	1.0	2.0	0.4	28.4	1,197,748

The mean time to source of drinking water is calculated based on those households which do not have water on the premises.

*SHHS indicator 36: *Time to source of drinking water* (Proportion of households taking one hour or more to go to source of drinking water, get water and return)

Table EN.3 shows that for 30 percent of households in the Sudan, with vest majority in the 15 States, the drinking water source is on the premises. Considering background characteristics, figures for the better educated and those in the wealthier quintiles are noticeably higher than those for less educated and poorer wealth index quintiles. Thus for example 88 percent of households in the top wealth quintile have

a source of drinking water on their premises, while the figure for those in the lowest wealth quintile is only 2 percent. For those households which do not have water on the premises, the poorer and less educated also have to travel further than their richer and better-educated compatriots.

Figures also vary greatly between the different Sudanese States and in particular between 10 and 15 States of the country with only 6 percent households having a source of water on the premises (Figure EN.3a).

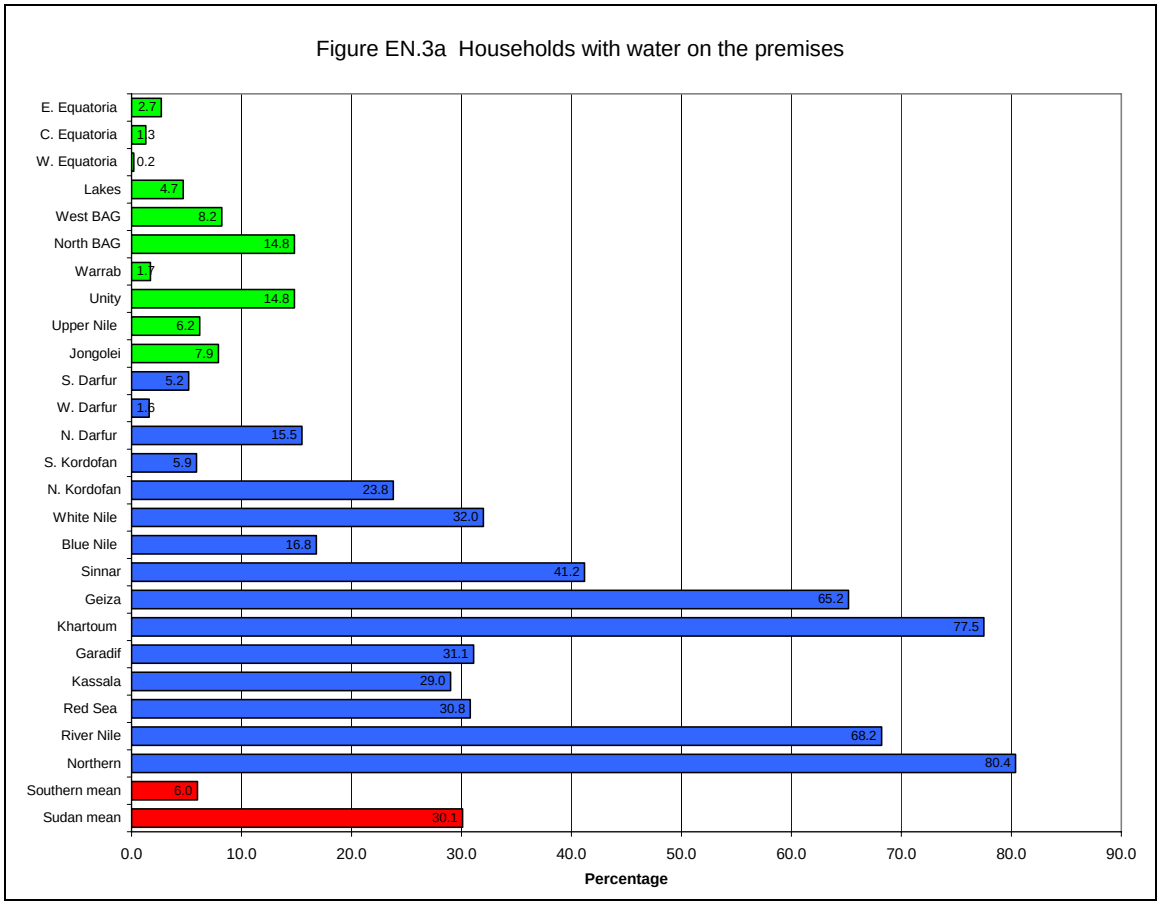

Figure EN.3a Percentage of households with a source of water on the premises

Of those households which have no water on the premises, the mean time needed for a round trip to fetch water is shown in Figure EN.3b. The mean figure for Southern Sudan is 45 minutes, as opposed to 43 minutes for the country as a whole. Within the South, householders from Central Equatoria required longest to fetch their water (58 minutes), while those in Warrap took least time (33 minutes). One striking finding is that 40 percent of households from Western and Central Equatoria claimed they had to travel an hour or more to fetch water (Table EN.3).

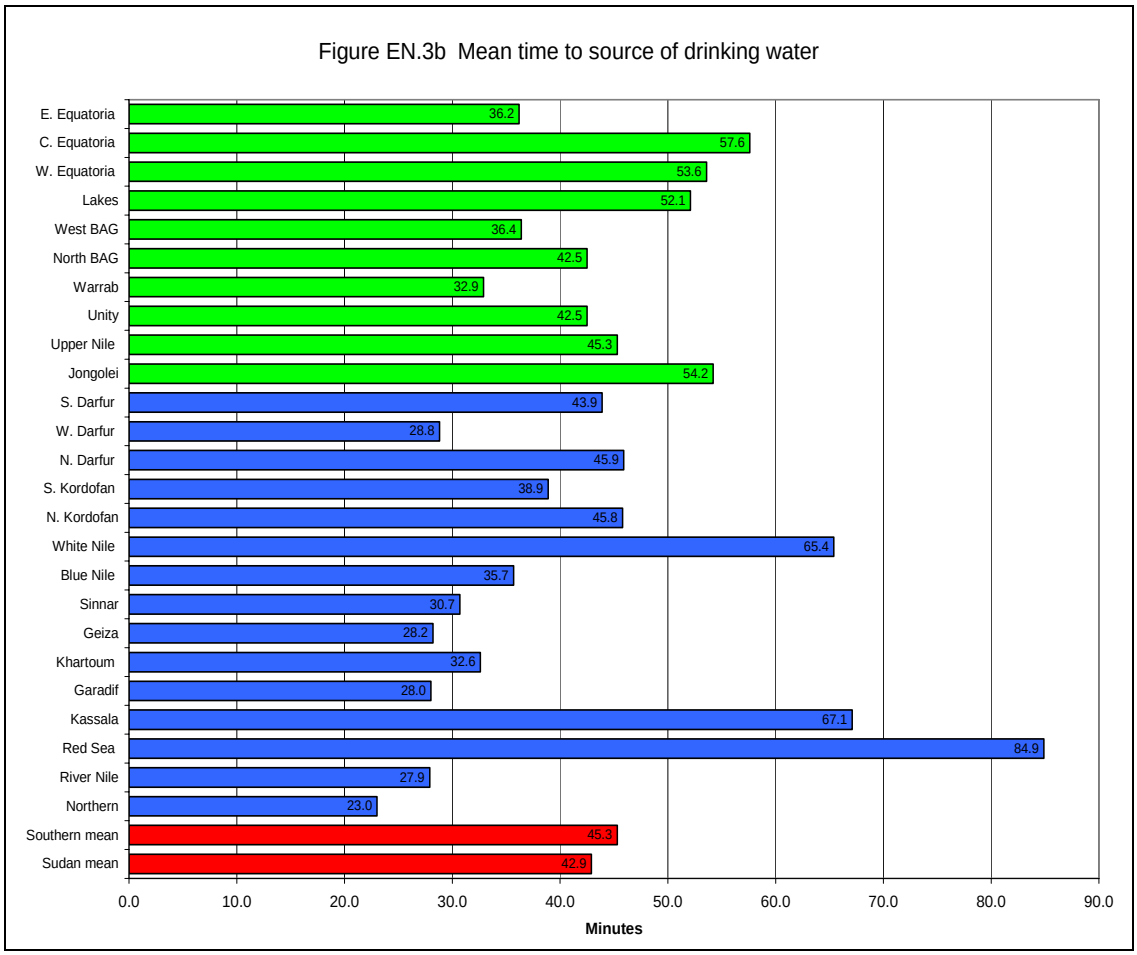

Figure EN.3b Mean number of minutes taken for a round trip to fetch drinking water

Table EN.4 shows the person within the household who usually collected water

Table EN.4: Person collecting water
Percent distribution of households according to the person collecting water used in the household, Sudan, 2006

		Person collecting drinking water (%)							
		Adult woman	Adult man	Female child (under 15)	Male child (under 15)	DK	Missing	Total	Number of households
State	Northern	52.9	29.2	5.7	9.8	0.9	1.5	100.0	22,070
	River Nile	43.6	45.6	3.5	2.2	2.5	2.6	100.0	53,604
	Red Sea	12.9	74.6	1.6	1.0	1.7	8.1	100.0	96,745
	Kassala	15.5	50.6	10.7	15.3	5.9	2.0	100.0	224,988
	Gadarif	22.8	42.6	14.3	17.5	0.4	2.3	100.0	186,330
	Khartoum	29.3	48.5	6.9	7.1	0.0	8.2	100.0	193,119
	Gezira	60.1	24.8	6.5	5.7	0.3	2.5	100.0	217,548
	Sinnar	50.3	21.5	11.1	12.8	0.7	3.7	100.0	130,931
	Blue Nile	41.4	24.3	14.3	15.4	0.4	4.2	100.0	93,427
	White Nile	26.3	38.8	9.5	21.5	0.0	3.9	100.0	176,532
	N. Kordofan	40.6	31.6	11.6	13.7	0.4	2.1	100.0	321,935
	S. Kordofan	67.4	21.3	6.2	2.8	0.9	1.4	100.0	270,974
	N. Darfur	59.0	19.9	8.9	8.0	0.1	4.1	100.0	240,134
	W. Darfur	69.7	12.2	10.4	4.9	1.3	1.4	100.0	361,114
	S. Darfur	48.8	22.3	13.1	11.9	1.4	2.4	100.0	519,112
	Jonglei	84.8	3.3	6.3	0.7	2.0	3.0	100.0	199,407
	Upper Nile	86.7	2.2	3.2	0.0	1.4	6.5	100.0	176,498
	Unity	83.4	3.3	9.9	0.9	0.0	2.5	100.0	75,985
	Warrap	85.1	4.6	6.0	0.3	0.0	4.0	100.0	237,285
	North BEG	85.0	3.5	6.3	0.4	0.7	4.1	100.0	180,253
	West BEG	83.4	3.5	8.7	0.8	0.0	3.6	100.0	59,257
	Lakes	87.2	5.3	5.8	0.5	0.2	1.0	100.0	125,098
	W. Equatoria	88.6	8.3	2.1	0.4	0.1	0.4	100.0	109,882
	C. Equatoria	90.9	5.5	2.4	0.3	0.5	0.4	100.0	158,421
	E. Equatoria	91.5	2.0	2.6	0.6	0.1	3.3	100.0	168,490
Education of household head	None	65.1	16.9	8.3	5.8	1.0	2.9	100.0	2,981,497
	Primary	51.2	29.2	7.4	8.4	0.8	3.0	100.0	762,986
	Secondary +	47.2	31.7	7.2	8.6	1.4	3.9	100.0	509,261
	Non-standard curriculum	40.3	31.2	12.2	12.9	0.5	3.0	100.0	315,630
	Missing/DK	66.6	18.1	7.7	4.4	0.5	2.6	100.0	29,762
Wealth index quintiles	Poorest	75.2	11.9	7.2	3.1	0.4	2.2	100.0	1,349,513
	Second	66.1	16.8	8.5	5.6	0.8	2.2	100.0	1,308,391
	Middle	49.3	25.2	10.1	10.5	1.0	3.9	100.0	1,169,408
	Fourth	36.9	37.6	7.9	11.8	1.9	3.9	100.0	627,489
	Richest	22.0	54.8	4.6	7.8	2.6	8.3	100.0	144,335
Total		**59.1**	**21.5**	**8.3**	**7.0**	**1.0**	**3.0**	**100.0**	**4,599,136**

When the source of drinking water is not on the premises, for the majority of households an adult female is usually the person collecting the water (Table EN.4). This is especially likely (87 percent, on average) in the States of Southern Sudan, where female children were also more likely to fetch water than men or boys.

4.4.2 Use of sanitary means of excreta disposal

Inadequate disposal of human excreta and personal hygiene is associated with a range of diseases including diarrhoeal diseases and polio. Improved sanitation facilities for excreta disposal include: flush or pour flush to a piped sewer system, septic tank, or latrine; ventilated improved pit latrine, pit latrine with slab, and composting toilet. Table EN.5 shows the types of toilet facility used in Sudanese households.

Table EN.5 Use of sanitary means of excreta disposal: Percent distribution of household population according to type of toilet used by the household and the percentage of household members using sanitary means of excreta disposal, Sudan, 2006

		Type of toilet facility used by household																
		Improved sanitation facility						Unimproved sanitation facility									Percentage of population using sanitary means of excreta disposal *	Number of household members
		Flush to piped sewer system	Flush to septic tank	Flush to pit (latrine)	Ventilated Improved Pit latrine (VIP)	Pit latrine with slab	Compost-ing toilet	Flush to some-where else	Flush to unknown place/not sure/DK where	Pit latrine without slab/ open pit	Bucket toilet/ han-ging latrine	No facilities or bush or field	Other	Missing	Total		
State	Northern	0.0	1.8	5.1	5.9	66.8	0.1	1.5	0.0	2.9	0.1	0.0	14.3	1.5	0.0	100.0	79.7	634,000
	River Nile	0.0	6.5	1.4	30.0	45.1	0.1	0.0	0.0	7.8	0.0	0.0	7.5	1.2	0.4	100.0	83.2	990,000
	Red Sea	0.0	8.8	8.4	15.8	17.9	0.3	0.2	0.5	2.1	0.0	0.2	43.8	1.3	0.7	100.0	51.3	737,000
	Kassala	0.0	7.1	6.4	11.8	13.7	0.0	0.4	0.2	11.8	0.0	0.0	47.2	1.3	0.2	100.0	38.9	1,728,000
	Gadarif	0.0	0.2	2.2	4.3	7.8	0.0	0.1	0.0	30.4	0.0	0.0	53.2	1.8	0.0	100.0	14.6	1,728,000
	Khartoum	2.6	6.3	6.8	7.5	54.2	0.7	0.4	0.4	13.7	0.0	0.0	3.1	3.9	0.5	100.0	78.0	5,761,000
	Gezira	0.1	3.9	1.8	10.1	16.1	0.9	0.4	0.2	38.9	1.1	0.0	22.8	4.7	0.0	100.0	31.9	3,905,000
	Sinnar	0.4	1.9	2.9	10.2	10.7	1.0	0.1	0.1	33.2	0.0	0.0	38.8	1.7	0.0	100.0	26.1	1,334,000
	Blue Nile	0.0	0.2		7.4	0.9	0.3	0.1	0.0	57.5	0.0	0.0	30.0	1.0	0.5	100.0	10.7	738,000
	White Nile	0.2	1.0		9.9	16.8	0.2	0.2	0.4	28.3	0.0	0.0	39.5	0.6	0.1	100.0	31.0	1,676,000
	N. Kordofan	1.4	2.1	1.7	10.5	12.5	0.0	0.2	0.0	35.9	0.0	0.0	34.1	1.4	0.2	100.0	28.3	2,479,000
	S. Kordofan	0.2	0.0	0.7	9.5	3.4	0.4	0.1	0.1	25.5	0.0	0.0	57.8	1.7	0.5	100.0	14.2	1,589,000
	N. Darfur	0.0	0.3	1.3	12.7	17.6	0.4	0.0	0.0	38.3	0.2	0.0	22.0	7.1	0.2	100.0	32.2	1,709,000
	W. Darfur	0.0	0.0	2.0	8.3	19.6	0.0	0.0	0.0	14.2	0.0	0.2	54.1	0.9	0.7	100.0	29.8	1,776,000
	S. Darfur	0.0	0.6	2.2	9.7	7.6	0.1	0.0	0.0	42.0	0.0	0.0	37.7	0.1	0.0	100.0	20.1	3,282,000
	Jonglei	0.7	0.2	0.0	0.0	2.9	1.1	0.0	0.0	6.8	0.2	0.2	82.9	3.8	1.2	100.0	5.0	1,511,544
	Upper Nile	0.7	1.0	0.0	0.0	5.8	0.0	0.0	0.0	1.4	0.1	0.3	83.7	4.1	3.0	100.0	7.5	1,041,410
	Unity	0.4	0.5	0.0	0.0	1.5	3.1	0.0	0.0	1.3	0.5	0.0	90.5	0.4	1.8	100.0	5.5	589,718
	Warrap	0.0	0.2	0.0	0.0	1.7	0.0	0.0	0.0	0.3	0.0	0.0	96.8	0.0	1.0	100.0	1.9	1,505,818
	North BEG	1.1	0.8	0.0	0.0	2.2	1.2	0.0	0.0	1.6	0.1	0.5	91.2	0.0	1.3	100.0	5.3	1,415,054
	West BEG	1.0	0.6	0.0	0.0	5.6	1.3	0.0	0.0	0.7	0.0	0.5	89.2	0.1	1.1	100.0	8.5	417,967
	Lakes	0.1	0.1	0.0	0.0	5.2	0.2	0.0	0.0	0.7	0.0	0.0	85.1	8.3	0.3	100.0	5.6	956,443
	W. Equatoria	0.0	0.0	0.0	0.0	10.9	0.3	0.0	0.0	44.4	0.0	0.3	44.0	0.2	0.0	100.0	11.2	680,750
	C. Equatoria	0.2	0.0	0.0	0.0	13.2	0.3	0.0	0.0	34.5	0.0	0.0	46.9	4.0	0.9	100.0	13.6	1,072,047
	E. Equatoria	0.0	0.1	0.0	0.0	4.8	0.1	0.0	0.0	4.3	0.0	0.6	89.2	0.5	0.4	100.0	5.0	913,244

Education of household head	None	0.3	0.6	0.6	4.9	10.6	0.4	0.0	0.1	17.5	0.1	0.1	61.7	2.5	0.6	100.0	17.4	21,119,292
	Primary	0.6	1.8	2.2	8.7	25.6	0.4	0.1	0.1	29.8	0.1	0.0	27.6	2.6	0.3	100.0	39.3	7,921,476
	Secondary +	1.6	7.6	7.1	12.9	30.7	0.6	0.6	0.1	23.7	0.0	0.1	12.6	2.2	0.2	100.0	60.4	7,760,887
	Non-standard curriculum	0.3	2.3	2.9	8.4	20.7	0.8	0.1	0.4	31.6	0.4	0.0	29.6	1.8	0.6	100.0	35.5	3,147,234
	Missing/DK	0.0	0.9	2.9	5.2	7.8	0.0	0.0	0.4	27.3	0.0	0.0	50.0	5.0	0.4	100.0	16.9	221,106
Wealth index quintiles	Poorest	0.1	0.0	0.0	0.8	2.3	0.2	0.0	0.0	5.2	0.0	0.1	89.3	1.7	0.4	100.0	3.4	7,896,425
	Second	0.2	0.2	0.1	2.7	6.2	0.4	0.0	0.0	17.8	0.1	0.1	69.2	2.6	0.5	100.0	9.7	8,054,925
	Middle	0.1	0.3	0.2	6.9	10.7	0.4	0.0	0.0	34.7	0.0	0.1	42.9	2.5	1.1	100.0	18.7	8,074,894
	Fourth	0.2	0.6	1.4	16.1	27.0	0.2	0.0	0.0	36.2	0.3	0.0	13.7	3.9	0.4	100.0	45.5	8,036,427
	Richest	2.4	10.3	10.1	10.8	44.4	1.1	0.8	0.5	17.2	0.2	0.0	0.8	1.3	0.0	100.0	79.1	8,107,324
Total		**0.6**	**2.3**	**2.4**	**7.5**	**18.2**	**0.4**	**0.2**	**0.1**	**22.3**	**0.1**	**0.1**	**42.9**	**2.4**	**0.5**	**100.0**	**31.4**	**40,169,996**

*SHHS indicator 37: *Use of adequate sanitary means of excreta disposal* (Proportion of household members using improved sanitation facilities (toilet connected to sewage system; any other flush toilet; improved pit latrine; traditional pit latrine); MDG indicator 31

Thirty–one percent of the population of the Sudan is living in households using improved sanitation facilities (Table EN.5). Background characteristics correlate strongly with the likelihood a household uses a sanitary means of exposing their excreta. Thus for example only 3 percent of the lowest wealth quintile used improved sanitation facilities, while the figure for the richest quintile is 79 percent.

There are very significant differences between States, and between the 10 and 15 States of the country (Figure EN.5). Thus in the South on average only 6 percent of households use sanitary means of excreta disposal, with most of the remainder using either a pit latrine without a slab, or even more likely, the bush. Within the South, households in the State of Central Equatoria (14 percent) are most likely to use sanitary means of excreta disposal, while the figure is lowest for Warrap (1.5 percent), where most households (97 percent) have no toilet facilities whatsoever (Table EN.5).

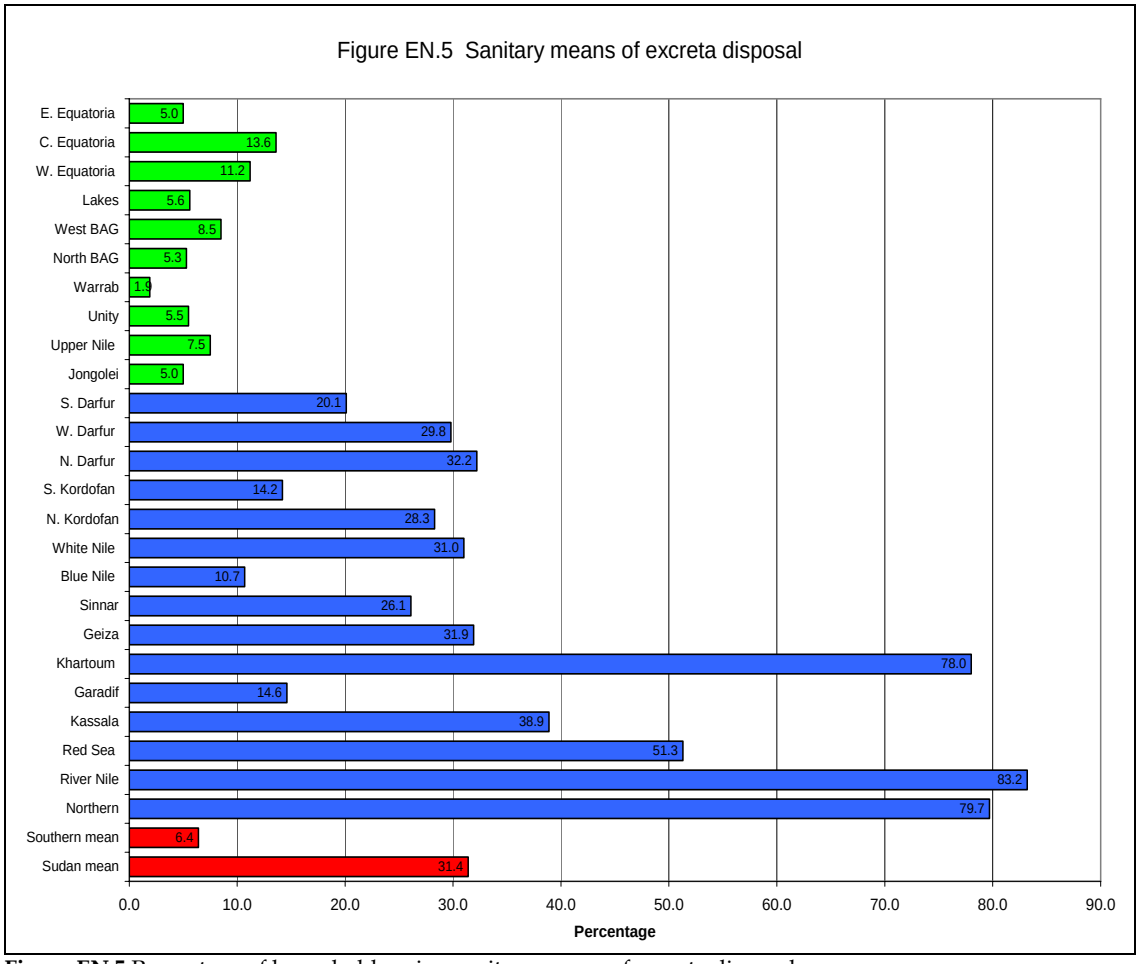

Figure EN.5 Percentage of households using sanitary means of excreta disposal

An overview of the percentage of households with improved sources of drinking water and sanitary means of excreta disposal is presented in Table EN.6.

Table EN.6: Use of improved water sources and improved sanitation
Percentage of household population using both improved drinking water sources and sanitary means of excreta disposal, Sudan, 2006

		Percentage of household population using improved sources of drinking water	Percentage of household population using sanitary means of excreta disposal	Percentage of household population using improved sources of drinking water and using sanitary means of excreta disposal*	Number of household members
State	Northern	80.3	79.7	68.3	634,000
	River Nile	73.8	83.2	62.9	990,000
	Red Sea	33.1	51.3	22.3	737,000
	Kassala	38.7	38.9	25.6	1,728,000
	Gadarif	37.3	14.6	9.6	1,728,000
	Khartoum	79.4	78.0	65.5	5,761,000
	Gezira	77.9	31.9	30.2	3,905,000
	Sinnar	80.7	26.1	23.1	1,334,000
	Blue Nile	40.5	10.7	5.7	738,000
	White Nile	46.4	31.0	22.5	1,676,000
	N. Kordofan	47.0	28.3	21.5	2,479,000
	S. Kordofan	60.2	14.2	7.2	1,589,000
	North Darfur	48.2	32.2	20.6	1,709,000
	West Darfur	39.6	29.8	18.5	1,776,000
	South Darfur	43.9	20.1	11.4	3,282,000
	Jonglei	22.2	5.0	1.4	1,511,544
	Upper Nile	60.0	7.5	4.9	1,041,410
	Unity	57.1	5.5	3.6	589,718
	Warrap	61.2	1.9	1.9	1,505,818
	North BEG	48.8	5.3	3.1	1,415,054
	West BEG	37.2	8.5	4.4	417,967
	Lakes	67.4	5.6	3.8	956,443
	W. Equatoria	35.1	11.2	2.4	680,750
	C. Equatoria	36.6	13.6	5.8	1,072,047
	E. Equatoria	59.3	5.0	3.9	913,244
Education of household head	None	49.4	17.4	11.8	21,119,292
	Primary	59.6	39.3	29.6	7,921,476
	Secondary +	72.2	60.4	49.5	7,760,887
	Non-standard curriculum	52.8	35.5	26.7	3,147,234
	Missing/DK	55.0	16.9	11.1	221,106
Wealth index quintiles	Poorest	48.0	3.4	2.1	7,896,425
	Second	43.7	9.7	5.4	8,054,925
	Middle	42.1	18.7	10.9	8,074,894
	Fourth	59.4	45.5	30.2	8,036,427
	Richest	87.1	79.1	69.6	8,107,324
	Total	56.1	31.4	23.8	40,169,996

*SHHS indicator 38: *Use of improved drinking water sources and adequate sanitary means of excreta disposal* (Proportion of household members using both improved drinking water sources and using sanitary means of excreta disposal)

In the Sudan as a whole, an average of 24 percent of households were found to be using both improved sources of drinking water and sanitary means of excreta disposal. Considering background characteristics, there were strong positive

correlations between households' access to improved sources of drinking water and sanitation and both the educational background of the household head and the wealth quintile to which the household belonged. For example, 70 percent of households belonging to the top wealth quintile had access to both improved sources of drinking water and sanitary means of excreta disposal, while for households in the bottom wealth quintile, the figure was only 2 percent.

Similarly there are strong variations in the figures between the 10 and 15 States. Indeed, the mean figure for the Southern States is only 3 percent. Within these States, there is relatively little variation, with Central Equatoria having the highest figure (6 percent), and the situation for water and sanitation being worst in Jonglei (1 percent).

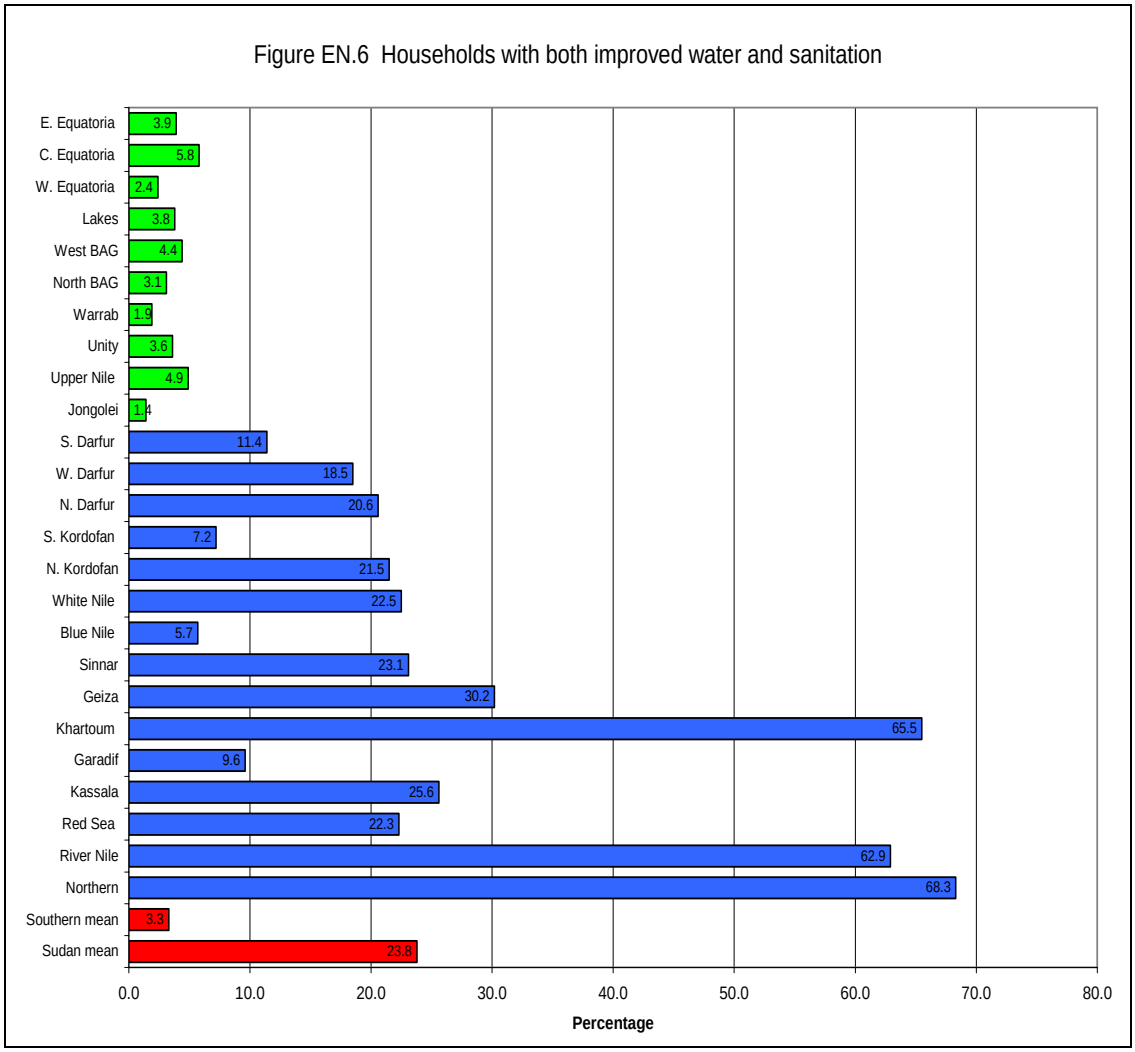

Figure EN.6 Percentage of households using both improved sources of drinking water and sanitary means of excreta disposal

4.5 Reproductive Health

4.5.1 Contraception

Appropriate family planning is important to the health of women and children. One, it prevent pregnancies that are too early or too late. Two, it extends the period between births and three, limits the number of children. A World Fit for Children goal is access by all couples to information and services to prevent pregnancies that are too early, too closely spaced, too late or too many.

In the Sudan as a whole, use of contraception was reported by 8 percent of women currently married or in union (Table RH.1). Figures vary noticeably among women from different wealth or educational backgrounds. Thus only 2 percent of women from the poorest wealth quintile reported using any method of contraception, while this figure was 22 percent for women from the richest quintile. Similarly, while only 3 percent of those women without any formal education used a method of contraception, almost one in five (18 percent) of women with secondary education or higher education used some method of contraception.

Among the Southern States the mean rate of contraception use is only 3.5 percent (Figure RH.1). Within this very low figure, the rate is highest in Central Equatoria (8 percent), followed by Northern Bahr El Ghazal, Eastern Equatoria and Upper Nile (roughly 5 percent). Figures are lowest in Western Equatoria, where only 1.4 percent of women said they or their partners used any form of contraception.

Neither a woman's age nor the number of her living children appear to have an appreciable bearing on her use of contraception.

The most popular method of contraception in Sudan as a whole is the contraceptive pill, which is used by almost one in twenty married women (Table RH.1). However, in Southern Sudan use of the pill is negligible. Southern women are most likely to use the lactational amenorrhea method (LAM), which is still only used by roughly 2 percent of women of child-bearing age. Figures for this method were highest in Central Equatoria (5.3 percent) and lowest or almost non-existent in Western Equatoria (0.8 percent). There was also a very negligible figure with regards to other methods of contraception used in the South. The insignificant figures included condoms (0.8 percent), pill (0.2 percent), diaphragm (0.1 percent) and the withdrawal method (0.1 percent). Female sterilisation appeared to be shunned as a method of contraception in Southern Sudan.

Table RH.1 : Use of contraception
Percentage of women aged 15-49 years married or in union who are using (or whose partner is using) a contraceptive method, Sudan, 2006

		Percent of women (currently married or in union) who are using:											Total	Any modern method	Any traditional method	Any method *	Number of women currently married or in union
		Not using any method	Female sterilization	Pill	IUD	Injections	Condom	Diaphragm/ foam/jelly	LAM	Periodic abstinence	Withdrawal	Other					
State	Northern	77.6	1.0	12.8	1.2	1.2	0.2	0.0	3.9	0.9	1.2	0.0	100.0	16.4	6.0	22.4	80,375
	River Nile	84.4	0.6	11.6	0.9	0.9	0.1	0.0	0.6	0.6	0.4	0.0	100.0	14.1	1.5	15.6	126,124
	Red Sea	90.1	0.2	7.6	0.3	0.3	0.2	0.0	0.9	0.1	0.4	0.0	100.0	8.5	1.4	9.9	108,322
	Kassala	95.8	0.1	3.6	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	100.0	4.0	0.2	4.2	264,208
	Gadarif	94.1	0.1	3.9	0.1	0.1	0.0	0.0	1.1	0.5	0.0	0.0	100.0	4.3	1.6	5.9	239,075
	Khartoum	79.7	1.0	13.5	1.5	2.0	0.0	0.0	1.7	0.4	0.2	0.0	100.0	18.0	2.3	20.3	784,957
	Gezira	87.0	1.4	7.6	0.1	0.7	0.0	0.0	2.7	0.5	0.0	0.0	100.0	9.8	3.2	13.0	506,228
	Sinnar	90.1	0.1	7.5	0.0	0.5	0.1	0.0	1.2	0.5	0.0	0.0	100.0	8.2	1.7	9.9	174,542
	Blue Nile	97.5	0.0	1.3	0.1	0.8	0.0	0.0	0.1	0.1	0.1	0.0	100.0	2.2	0.4	2.5	111,008
	White Nile	92.8	0.0	5.1	0.3	0.5	0.0	0.0	0.9	0.0	0.4	0.0	100.0	5.9	1.4	7.2	232,863
	North Kordofan	90.9	0.4	5.6	0.4	0.4	0.0	0.0	2.2	0.1	0.0	0.0	100.0	6.8	2.3	9.1	336,469
	South Kordofan	98.1	0.3	1.2	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	100.0	1.7	0.2	1.9	222,417
	North Darfur	98.1	0.0	1.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	100.0	1.6	0.3	1.9	229,453
	West Darfur	99.0	0.0	0.7	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	100.0	0.7	0.3	1.0	253,171
	South Darfur	97.6	0.1	1.2	0.1	0.1	0.0	0.0	0.4	0.3	0.0	0.0	100.0	1.7	0.7	2.4	421,434
	Jonglei	99.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	100.0	0.0	0.1	0.1	294,554
	Upper Nile	95.5	0.0	0.2	0.0	0.0	0.9	0.0	3.0	0.0	0.0	0.4	100.0	1.1	3.3	4.5	205,110
	Unity	97.5	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.1	0.5	100.0	0.0	2.5	2.5	116,075
	Warrap	97.1	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.3	0.1	100.0	0.0	2.9	2.9	252,672
	North Bahr El Ghazal	94.7	0.0	0.3	0.0	0.0	2.3	0.0	2.8	0.0	0.0	0.0	100.0	2.5	2.8	5.3	316,675
	West Bahr El Ghazal	96.4	0.0	0.0	0.0	0.0	0.8	0.0	2.7	0.0	0.0	0.2	100.0	0.8	2.9	3.6	94,292
	Lakes	97.2	0.0	0.0	0.0	0.0	0.0	0.1	2.5	0.0	0.0	0.1	100.0	0.1	2.6	2.8	185,556
	West Equatoria	98.6	0.0	0.2	0.0	0.0	0.5	0.0	0.8	0.0	0.0	0.0	100.0	0.6	0.8	1.4	115,641
	Central Equatoria	92.5	0.0	0.2	0.0	0.0	0.7	0.6	5.3	0.0	0.1	0.5	100.0	1.6	5.9	7.5	179,986
	East Equatoria	95.2	0.0	0.7	0.0	0.0	2.3	0.1	1.7	0.0	0.0	0.0	100.0	3.1	1.7	4.8	154,898

Table RH.1 (cont.) : Use of contraception
Percentage of women aged 15-49 years married or in union who are using (or whose partner is using) a contraceptive method, Sudan, 2006

		Percent of women (currently married or in union) who are using:											Total	Any modern method	Any traditional method	Any method *	Number of women currently married or in union
		Not using any method	Female sterilization	Pill	IUD	Injections	Condom	Diaphragm/ foam/jelly	LAM	Periodic abstinence	Withdrawal	Other					
Age	15-19	95.8	0.0	2.8	0.0	0.0	0.2	0.0	1.0	0.1	0.0	0.0	100.0	3.1	1.1	4.2	393,800
	20-24	94.7	0.0	2.8	0.2	0.4	0.3	0.1	1.5	0.0	0.1	0.0	100.0	3.7	1.6	5.3	1,004,416
	25-29	93.1	0.0	4.0	0.1	0.2	0.5	0.0	1.7	0.1	0.2	0.1	100.0	4.8	2.1	6.9	1,433,050
	30-34	90.1	0.2	6.2	0.1	0.6	0.3	0.0	2.0	0.4	0.1	0.0	100.0	7.4	2.5	9.9	1,076,422
	35-39	91.2	0.7	5.0	0.7	0.2	0.1	0.0	1.6	0.2	0.2	0.0	100.0	6.7	2.0	8.8	1,072,848
	40-44	90.1	0.8	5.0	0.8	1.2	0.0	0.0	1.4	0.5	0.1	0.1	100.0	7.8	2.1	9.9	609,326
	45-49	94.0	1.5	2.5	0.4	0.8	0.2	0.0	0.6	0.0	0.0	0.0	100.0	5.3	0.6	6.0	416,244
Number of living children	0	98.8	0.0	0.4	0.0	0.0	0.2	0.0	0.4	0.1	0.0	0.0	100.0	0.6	0.5	1.2	771,939
	1	93.4	0.1	4.4	0.2	0.3	0.3	0.1	1.1	0.1	0.1	0.0	100.0	5.3	1.3	6.6	790,674
	2	91.7	0.0	5.6	0.2	0.3	0.2	0.0	1.6	0.1	0.1	0.0	100.0	6.5	1.8	8.3	867,487
	3	90.3	0.1	5.6	0.6	0.7	0.3	0.0	1.9	0.2	0.2	0.1	100.0	7.3	2.4	9.7	902,656
	4+	91.2	0.7	4.5	0.4	0.6	0.3	0.0	1.9	0.3	0.1	0.0	100.0	6.4	2.4	8.8	2,673,350
Education	None	97.0	0.1	1.0	0.1	0.0	0.3	0.0	1.3	0.0	0.0	0.1	100.0	1.6	1.4	3.0	3,687,236
	Primary	85.6	0.6	9.1	0.7	1.2	0.2	0.0	2.2	0.4	0.1	0.0	100.0	11.7	2.7	14.4	1,999,753
	Secondary +	82.3	1.2	12.8	0.8	0.6	0.0	0.0	1.0	0.7	0.7	0.0	100.0	15.3	2.4	17.7	310,183
	Missing/DK	93.0	0.0	4.6	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	100.0	7.0	0.0	7.0	8,934
Wealth index quintiles	Poorest	98.1	0.0	0.1	0.0	0.0	0.2	0.0	1.4	0.0	0.1	0.1	100.0	0.4	1.6	1.9	1,288,177
	Second	97.2	0.0	0.4	0.0	0.0	0.5	0.1	1.6	0.0	0.0	0.1	100.0	1.0	1.7	2.8	1,350,638
	Middle	95.8	0.0	1.7	0.0	0.3	0.4	0.0	1.6	0.1	0.0	0.0	100.0	2.5	1.7	4.2	1,233,014
	Fourth	89.9	0.3	6.9	0.4	0.3	0.0	0.0	1.4	0.5	0.2	0.0	100.0	8.0	2.0	10.1	1,104,915
	Richest	77.7	1.5	14.9	1.3	1.9	0.0	0.0	1.9	0.5	0.2	0.0	100.0	19.7	2.6	22.3	1,029,361
	Total	**92.4**	**0.3**	**4.3**	**0.3**	**0.5**	**0.3**	**0.0**	**1.6**	**0.2**	**0.1**	**0.0**	**100.0**	**5.7**	**1.9**	**7.6**	**6,006,106**

*SHHS indicator 62: *Contraceptive prevalence* (Proportion of women currently married or in union aged 15-49 years who are using (or whose partner is using) a contraceptive method (either modern or traditional); MDG indicator 19c

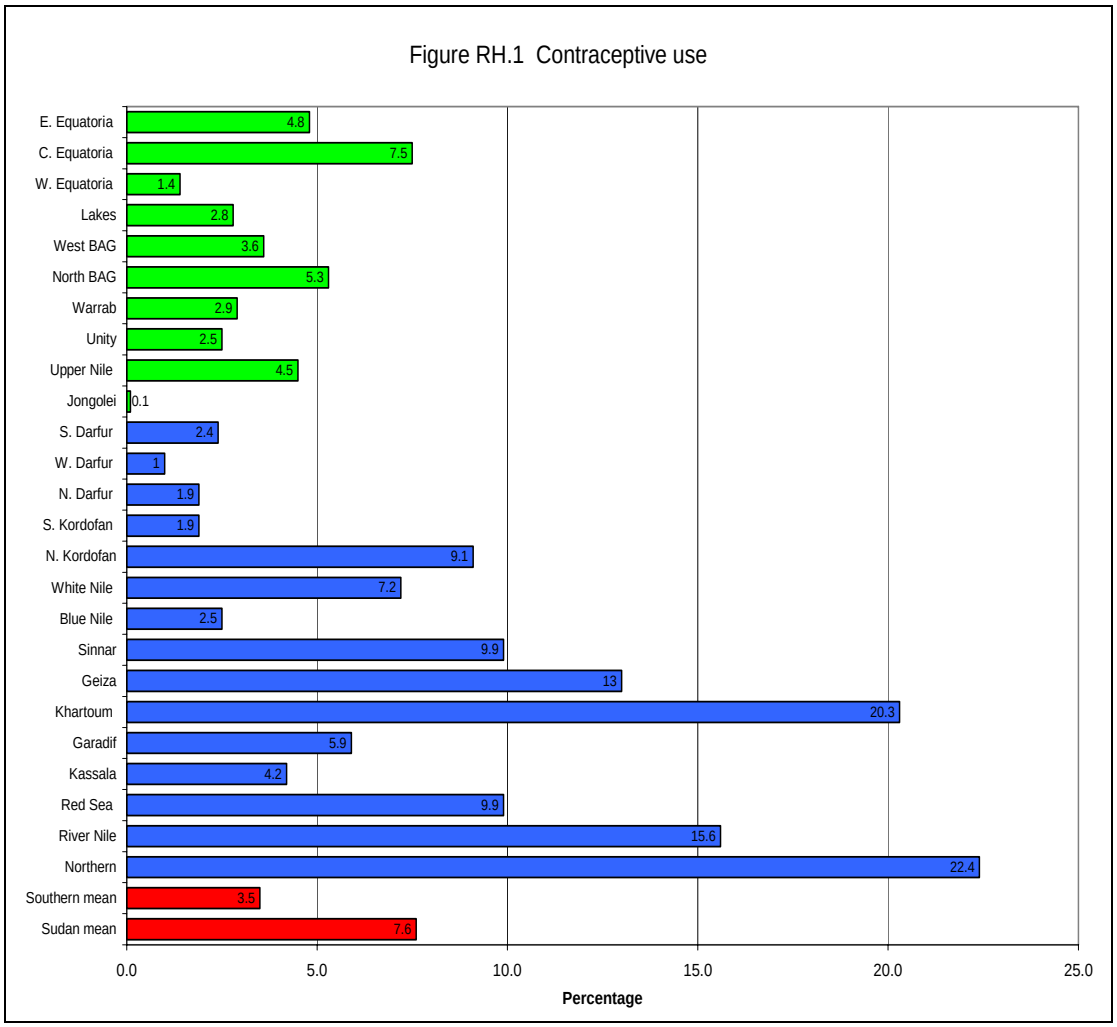

Figure RH.1 Percentage of women currently married or in union aged 15-49 years who are using (or whose partner is using) a contraceptive method, either modern or traditional.

4.5.2 Unmet Need

Unmet need[3] for contraception refers to fecund women who are not using any method of contraception, but who wish to postpone the next birth or who wish to stop childbearing altogether. Unmet need is identified in MICS by using a set of questions eliciting current behaviours and preferences pertaining to contraceptive use, fecundity, and fertility preferences.

Women in unmet need for spacing includes women who are currently married (or in union), fecund (are currently pregnant or think that they are physically able to become pregnant), currently not using contraception, and want to space their births. Pregnant women are considered to want to space their births when they did not

[3] Unmet need measurement in MICS is somewhat different than that used in other household surveys, such as the Demographic and Health Surveys (DHS). In DHS, more detailed information is collected on additional variables, such as postpartum amenhorrea, and sexual activity. Results from the two types of surveys are strictly not comparable.

want the child at the time they got pregnant. Women who are not pregnant are classified in this category if they want to have another child, but want to have the child at least two years later, or after marriage.

Women in unmet need for limiting are those women who are currently married (or in union), fecund (are currently pregnant or think that they are physically able to become pregnant), currently not using contraception, and want to limit their births. The latter group includes women who are currently pregnant but had not wanted the pregnancy at all, and women who are not currently pregnant but do not want to have another child.

Total unmet need for contraception is simply the sum of unmet need for spacing and unmet need for limiting.

Using information on contraception and unmet need, the percentage of demand for contraception satisfied is also estimated from the survey data. Percentage of demand for contraception satisfied is defined as the proportion of women currently married or in union who are currently using contraception, of the total demand for contraception. The total demand for contraception includes women who currently have an unmet need (for spacing or limiting), plus those who are currently using contraception.

Table RH.2A shows the results of the survey on contraception and attitudes towards pregnancy. Data from some States are missing from the table and therefore findings should be viewed with circumspection.

Table RH.2: Unmet need for contraception
Percentage of women aged 15-49 years (currently married or in union) and currently pregnant Sudan, 2006

		Percentage of women aged 15-49 years (currently married or in union) and currently pregnant who at the time they became pregnant did:				Percentage of women aged 15 – 49 years (currently married or in union) and not currently pregnant				Unmet need	Number of women currently married or in union
		…want to become pregnant then?	…want to wait until later?	…not want to have any more children?	Total	Want to be pregnant? Yes	No	Missing	Total		
State	Northern	37.0	42.9	20.1	100.0	26.9	73.1	--	100.0	18.3	80,375
	River Nile	54.4	36.0	9.6	100.0	36.0	62.0	2.1	100.0	14.2	126,124
	Red Sea	--	--	--	--	39.4	58.8	1.8	100.0	5.4	108,322
	Kassala	35.5	64.5		100.0	28.5	71.5	--	100.0	3.7	264,208
	Gadarif	73.3	13.3	13.4	100.0	40.4	59.6	--	100.0	4.3	239,075
	Khartoum	43.7	43.1	13.2	100.0	27.5	69.0	3.5	100.0	16.1	784,957
	Gezira	43.6	40.2	16.2	100.0	39.5	56.5	4.0	100.0	10.6	506,228
	Sinnar	39.6	45.8	14.6	100.0	31.9	68.1	--	100.0	8.3	174,542
	Blue Nile	--	--	--	--	29.3	67.7	3.0	100.0	2.4	111,008
	White Nile	28.8	43.1	28.1	100.0	26.1	72.2	1.7	100.0	10.5	232,863
	N. Kordofan	59.4	40.6		100.0	33.8	60.0	6.2	100.0	5.5	336,469
	S. Kordofan	--	--	--	--	38.4	53.9	7.6	100.0	1.1	222,417
	N. Darfur	66.7		33.3	100.0	35.3	58.8	5.9	100.0	1.6	229,453
	W. Darfur	--	--	--	--	50.0	50.0	--	100.0	0.3	253,171
	S. Darfur	25.0	50.0	25.0	100.0	36.7	63.3	--	100.0	3.0	421,434
	Jonglei	--	--	--	--	50.0	--	50.0	100.0	0.0	294,554
	Upper Nile	100.0			100.0	62.5	12.5	25.0	100.0	0.2	205,110
	Unity	--	--	--	--	50.0	40.0	10.0	100.0	1.0	116,075
	Warrap	100.0			100.0	35.7	53.6	10.7	100.0	1.9	252,672
	North BEG	--	--	--	--	23.1	69.2	7.7	100.0	1.2	316,675
	West BEG	33.3	66.7		100.0	21.1	73.7	5.3	100.0	4.6	94,292
	Lakes	--	--	--	--	80.0	20.0	--	100.0	0.2	185,556
	W. Equatoria	--	--	--	--	33.3	41.7	25.0	100.0	0.8	115,641
	C. Equatoria	--	--	--	--	30.4	69.6	--	100.0	1.9	179,986
	E. Equatoria	66.7	33.3		100.0	38.5	50.0	11.5	100.0	1.9	154,898

Table RH.2 (cont.): Unmet need for contraception
Percentage of women aged 15-49 years (currently married or in union) and currently pregnant Sudan, 2006

		Percentage of women aged 15-49 years (currently married or in union) and currently pregnant who at the time they became pregnant did:				Percentage of women aged 15 – 49 years (currently married or in union) and not currently pregnant				Unmet need	Number of women currently married or in union
		…want to become pregnant then?	…want to wait until later?	…not want to have any more children?	Total	Want to be pregnant? Yes	No	Missing	Total		
Age	15 – 19	54.0	46.0		100.0	40.8	49.0	10.3	100.0	--	--
	20 - 24	31.9	57.2	10.9	100.0	28.1	67.6	4.3	100.0	--	--
	25 - 29	53.2	29.0	17.8	100.0	32.2	63.4	4.4	100.0	--	--
	30 - 34	53.7	33.5	12.8	100.0	40.1	56.0	3.9	100.0	--	--
	35 - 39	44.6	43.0	12.4	100.0	39.9	56.5	3.7	100.0	--	--
	40 - 44	55.7	13.6	30.7	100.0	27.0	70.9	2.2	100.0	--	--
	45 - 49	59.1	40.9		100.0	18.9	78.8	2.3	100.0	--	--
Education	None	47.1	44.3	8.6	100.0	34.4	60.4	5.2	100.0	2.2	3,687,236
	Primary	46.1	35.7	18.3	100.0	32.8	64.6	2.7	100.0	11.0	1,999,753
	Secondary +	56.1	43.9	--	100.0	26.3	68.7	5.0	100.0	12.0	310,183
	Missing/DK	--	--	--	--	--	--		--	0.0	8,934
Wealth index quintiles	Poorest	--	--	--	100.0	35.0	59.0	6.0	100.0	0.9	1,288,177
	Second	60.9	30.1	9.0	100.0	38.7	53.2	8.1	100.0	1.1	1,350,638
	Middle	38.3	51.9	9.9	100.0	32.4	63.7	3.9	100.0	3.0	1,233,014
	Fourth	38.3	49.9	11.8	100.0	33.1	64.1	2.8	100.0	9.3	1,104,915
	Richest	55.9	23.5	20.6	100.0	31.4	65.3	3.3	100.0	16.9	1,029,361
Total		47.4	38.3	14.3		32.5	63.9	3.6		5.7	6,006,106

*SHHS indicator 63: *Unmet need for family planning* (Proportion of women aged 15-49 years who are currently married or in union and want to space their births or limit the number of children and who are not currently using contraception)

In the country as a whole, the findings suggest that roughly half of women who are currently pregnant, and who are currently married or in union, wished to become pregnant at the time they did so. Most of those who would rather not have become pregnant would have liked to have become pregnant later, but some said they did not wish to have any more children at all. There appear to be no clear trends amongst women of different age, educational background, or wealth quintile, but this may be due to missing data.

There is insufficient data on the Southern States to make any meaningful statements specific to the situation in the South.

Table RH.2 also shows that country-wide, one in three (33 percent) women not currently pregnant does wish to become pregnant. The youngest not-pregnant women (aged 15-19) and the not-pregnant women in the age group 30-40 appear keenest to become pregnant, while those women in the age group 45-49 are least inclined to become pregnant.

In terms of background characteristics, those non-pregnant women with least education were slightly more inclined to become pregnant (34 percent) than those with more education (26 percent for those with secondary and higher education); differences according to the wealth index quintile to which a woman belongs are very slight.

There are considerable differences between States in the percentage of not-pregnant women who wish to become pregnant. In general, Southern women are slightly more inclined (37 percent) to become pregnant. A majority of non-pregnant women wish to become pregnant in Lakes (80 percent) and in Upper Nile (62 percent), while in Jonglei and Unity the figure is 50 percent. Women in Western Bahr El Ghazal (21 percent) and Northern Bahr El Ghazal (23 percent) are least inclined to become pregnant.

On average, 6 percent of Sudanese women indicated that their need for contraception was currently unmet, whereby those women without formal education and in the lower wealth quintiles tended not to indicate a need for more contraception. This need was greatest amongst the richest (17 percent) and most educated (12 percent) women.

However, this figure again varied significantly between States, and the mean figure for the South (1.2 percent) was considerably low (Figure RH.2). Within the Southern States, the unmet need for contraception was highest in Western Bahr El Ghazal (4.6 percent). In the other Southern States the mean figure was always below 2 percent, and was lowest in Lakes and in Upper Nile (both 0.2 percent).

As mentioned above, the lack of data for some Southern States indicates that there may be a particularly high margin of error in these figures.

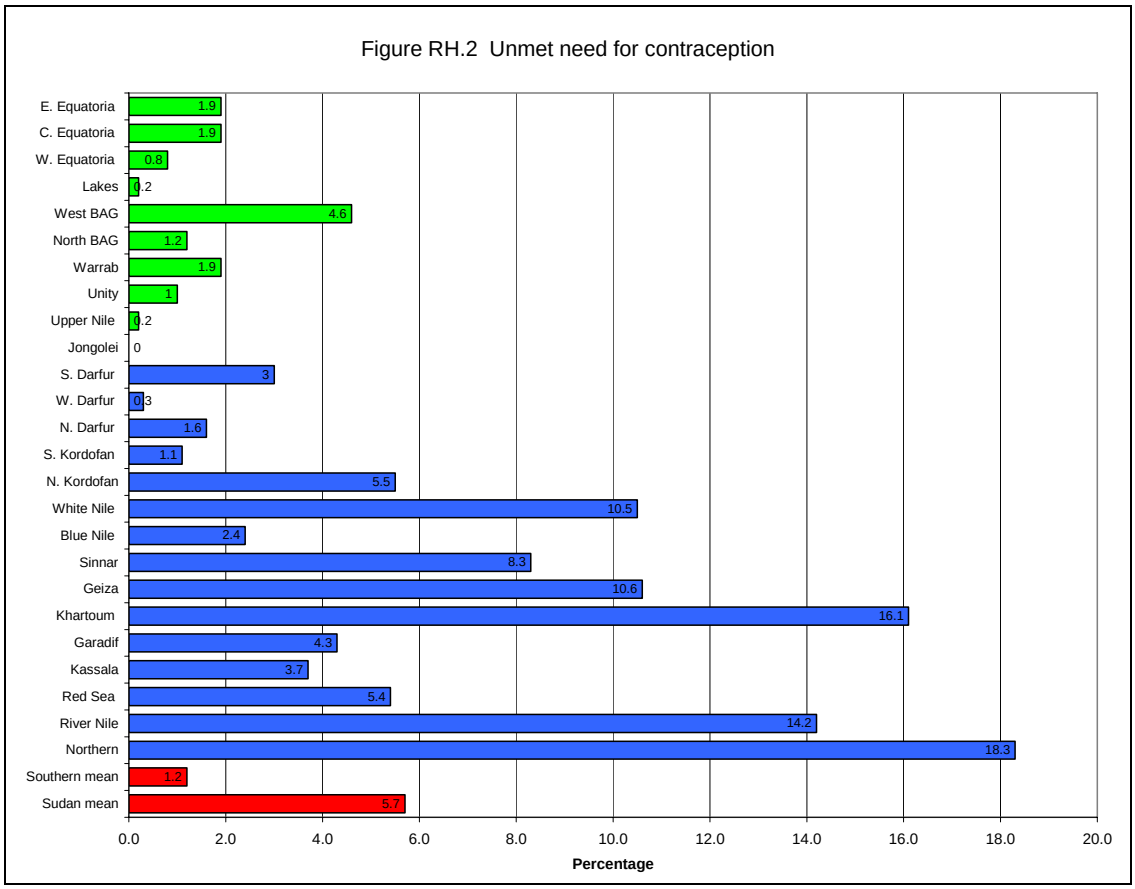

Figure RH.2 Percentage of women aged 15-49 years who are currently married or in union and want to space their births or limit the number of their children, and who are not currently using contraception

4.5.3 Antenatal Care

The antenatal period presents important opportunities for reaching pregnant women with a number of interventions which may be vital to their health and well-being and that of their infants. Better understanding of foetal growth and development and its relationship to the mother's health has resulted in increased attention to the potential of antenatal care as an intervention to improve both maternal and newborn health. For example, if the antenatal period is used to inform women and families about the danger signs and symptoms and about the risks of labour and delivery, it may provide the route for ensuring that pregnant women do, in practice, deliver with the assistance of a skilled health care provider. The antenatal period also provides an opportunity to supply information on birth spacing, which is recognized as an important factor in improving infant survival. Tetanus immunisation during pregnancy can be life-saving for both the mother and infant. The prevention and treatment of malaria among pregnant women, management of anaemia during pregnancy and treatment of STIs can significantly improve foetal outcomes and improve maternal health. Adverse outcomes such as low birth weight can be reduced through a combination of interventions to improve women's nutritional status and prevent infections (e.g., malaria and STIs) during pregnancy. More recently, the potential of the antenatal period as an entry point for HIV prevention

and care, in particular for the prevention of HIV transmission from mother to child, has led to renewed interest in access to and use of antenatal services.

WHO recommends a minimum of four antenatal visits based on a review of the effectiveness of different models of antenatal care. WHO guidelines are specific on the content of antenatal care visits, which include:

- Blood pressure measurement
- Urine testing for bateriuria and proteinuria
- Blood testing to detect syphilis and severe anemia
- Weight/height measurement (optional)

Table RH.3 shows the provision of antenatal care (by a doctor, nurse, or midwife) in the Sudan.

Table RH.3: Antenatal care provider
Percent distribution of women aged 15-49 who gave birth in the two years preceding the survey by type of personnel providing antenatal care, Sudan, 2006

		Person providing antenatal care (%)							Total	Any skilled personnel *	Number of women who gave birth in the preceding two years
		Medical doctor	Nurse/ midwife	Auxiliary midwife	Traditional birth attendant	Community health worker	Other/ missing	No antenatal care received			
State	Northern	74.1	4.9	0.0	0.0	0.3	3.4	17.2	100.0	79.1	36,320
	River Nile	74.0	6.8	4.4	0.3	0.0	1.3	13.2	100.0	85.2	52,123
	Red Sea	49.7	8.3	9.6	8.0	0.3	2.4	21.7	100.0	67.6	42,719
	Kassala	40.8	10.9	22.7	4.0	0.0	0.3	21.3	100.0	74.4	105,562
	Gadarif	44.3	7.4	20.1	1.6	2.0	2.4	22.2	100.0	71.8	130,314
	Khartoum	69.8	7.4	11.9	0.3	0.0	3.2	7.5	100.0	89.0	364,733
	Gezira	55.5	11.8	8.6	1.8	0.0	3.0	19.2	100.0	76.0	212,346
	Sinnar	49.4	10.2	10.9	1.4	1.0	3.3	24.0	100.0	70.4	93,892
	Blue Nile	24.4	11.5	17.8	1.2	1.8	2.9	40.4	100.0	53.7	68,166
	White Nile	53.7	8.3	20.8	0.5	0.2	3.1	13.4	100.0	82.8	110,693
	North Kordofan	43.2	11.2	24.5	3.5	2.5	1.0	14.1	100.0	78.9	181,311
	South Kordofan	14.6	15.1	38.4	5.2	0.5	1.4	24.8	100.0	68.1	129,101
	North Darfur	26.1	16.7	25.6	4.7	3.0	3.7	20.1	100.0	68.4	131,960
	West Darfur	17.4	13.7	23.8	7.8	1.1	2.5	33.6	100.0	54.9	153,973
	South Darfur	24.8	20.3	22.4	6.0	0.7	2.4	23.4	100.0	67.5	244,234
	Jonglei	13.5	0.0	0.0	17.1	0.0	5.7	63.7	100.0	13.5	71,870
	Upper Nile	10.8	21.6	0.0	33.0	0.0	4.0	30.7	100.0	32.4	66,975
	Unity	0.0	0.0	0.0	43.8	0.0	2.8	53.4	100.0	0.0	24,656
	Warrap	0.0	16.8	0.0	45.8	0.0	0.0	37.4	100.0	16.8	41,531
	North Bahr El Ghazal	16.8	7.2	0.0	19.2	0.0	14.4	42.5	100.0	24.0	70,702
	West Bahr El Ghazal	12.5	17.0	0.0	30.2	0.0	1.4	38.9	100.0	29.5	41,208
	Lakes	12.0	35.3	0.0	6.0	0.0	0.9	45.7	100.0	47.3	96,107
	West Equatoria	5.4	15.4	0.0	61.3	0.0	0.8	17.1	100.0	20.8	42,633
	Central Equatoria	8.4	19.1	0.0	47.2	0.0	3.0	22.4	100.0	27.5	72,909
	East Equatoria	5.5	13.8	0.0	17.4	0.0	9.6	53.7	100.0	19.3	45,144

Table RH.3 (cont.): Antenatal care provider
Percent distribution of women aged 15-49 who gave birth in the two years preceding the survey by type of personnel providing antenatal care, Sudan, 2006

		Person providing antenatal care (%)							Total	Any skilled personnel *	Number of women who gave birth in the preceding two years
		Medical doctor	Nurse/ midwife	Auxiliary midwife	Traditional birth attendant	Community health worker	Other/ missing	No antenatal care received			
Age	15-19	34.7	14.8	17.1	8.3	0.5	2.2	22.4	100.0	66.5	180,182
	20-24	36.0	12.1	15.5	9.6	1.0	2.2	23.6	100.0	63.7	551,464
	25-29	35.1	12.8	14.3	9.9	0.4	2.6	24.8	100.0	62.2	741,967
	30-34	39.3	13.0	12.7	7.6	0.5	3.3	23.6	100.0	65.0	527,053
	35-39	38.3	12.8	14.9	6.6	1.0	3.2	23.1	100.0	66.0	425,609
	40-44	34.7	11.3	16.9	6.9	0.5	5.2	24.5	100.0	62.9	153,402
	45-49	25.1	13.2	7.2	14.8	0.2	5.4	34.1	100.0	45.5	51,504
Education	None	22.3	13.4	14.5	12.1	0.8	3.0	33.7	100.0	50.3	1,484,988
	Primary	53.5	12.4	15.2	4.5	0.6	2.7	11.2	100.0	81.0	1,001,818
	Secondary +	64.0	8.3	10.5	1.5	0.0	2.7	13.0	100.0	82.9	140,997
	Missing/DK	0.0	12.3	0.0	35.0	0.0	25.1	27.7	100.0	12.3	3,377
Wealth index quintiles	Poorest	12.2	15.0	9.2	15.6	0.7	2.7	44.6	100.0	36.4	468,575
	Second	20.9	13.2	14.7	13.9	1.5	3.3	32.5	100.0	48.8	581,726
	Middle	30.6	13.2	21.6	9.8	0.7	2.3	21.9	100.0	65.4	612,160
	Fourth	50.6	13.6	16.8	2.4	0.2	3.4	12.9	100.0	81.1	547,318
	Richest	74.5	7.8	7.2	0.4	0.1	3.0	7.0	100.0	89.5	421,401
Total		**36.4**	**12.7**	**14.5**	**8.7**	**0.7**	**2.9**	**24.0**	**100.0**	**63.7**	**2,631,180**

*SHHS indicator 65: *Provider of antenatal care* (Proportion of women aged 15-49 years attended at least once during pregnancy in the two years preceding the survey by a skilled health personnel, i.e. a doctor, nurse or midwife

Provision of antenatal care as a whole is mediocre, with a country-wide 64 percent of women receiving antenatal care at least once during the pregnancy (Table RH.3). Mothers in the 45-49 age groups are much less likely (46 percent) than women in younger age-groups to have received antenatal care from skilled personnel.

Considering background characteristics, those women with no formal education are less likely (50 percent) than those with primary (81 percent) or secondary (83 percent) to receive appropriate antenatal care. There is also a strong positive correlation between the wealth index quintile to which a woman belongs and the likelihood she received such care: only 36 percent of women from the poorest wealth quintile received antenatal care from skilled personnel, while for women in the richest quintile, the figure is 90 percent.

Table RH.3 also presents the survey's findings on the type of personnel providing antenatal care to women aged 15-49 years who gave birth in the two years preceding the survey. Figure RH.3a shows the percentage of women receiving antenatal care from a medical doctor.

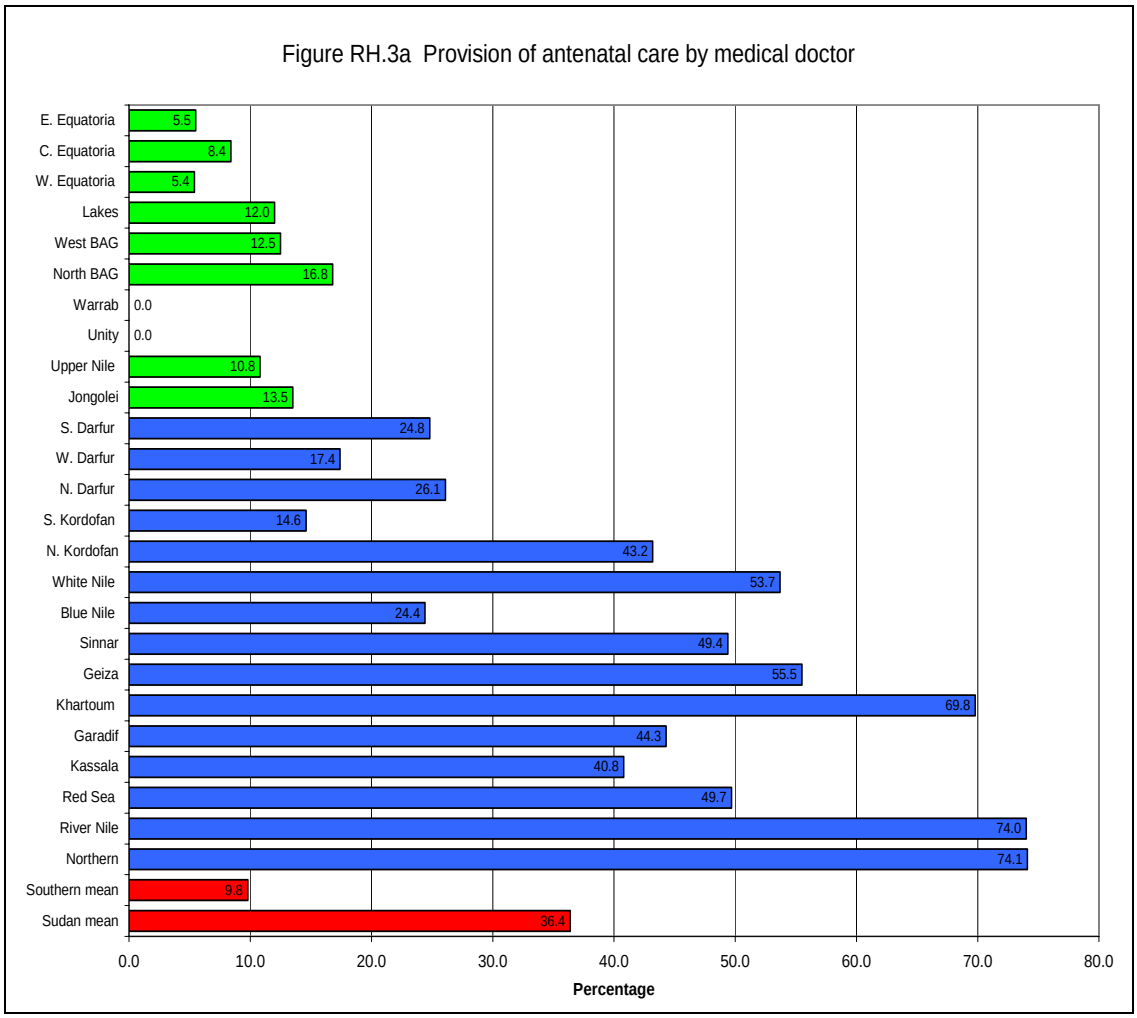

Figure RH.3a Percentage of women who gave birth in the two years preceding the survey to whom a medical doctor provided antenatal care.

Whereas in the Sudan as a whole 1 in 3 (36 percent) women received antenatal care from a medical doctor, in Southern Sudan, the figure was only 1 in 10 (10 percent). Figures were highest for Northern Bahr El Ghazal (17 percent) and Jonglei (14 percent), and lowest for Warrap and Unity, where no women at all received antenatal care from medical doctors.

Figure RH.3b shows the percentage of women who received antenatal care from a qualified nurse or midwife. Women in Southern Sudan were more likely (16 percent) to receive such care from nurses or midwives. The prevalence of this type of care was much higher in Lakes than in other Southern States. It was low in Northern Bahr El Ghazal (7 percent), and again mothers in Unity and Jonglei appear to have received no antenatal care whatsoever from nurses or midwives.

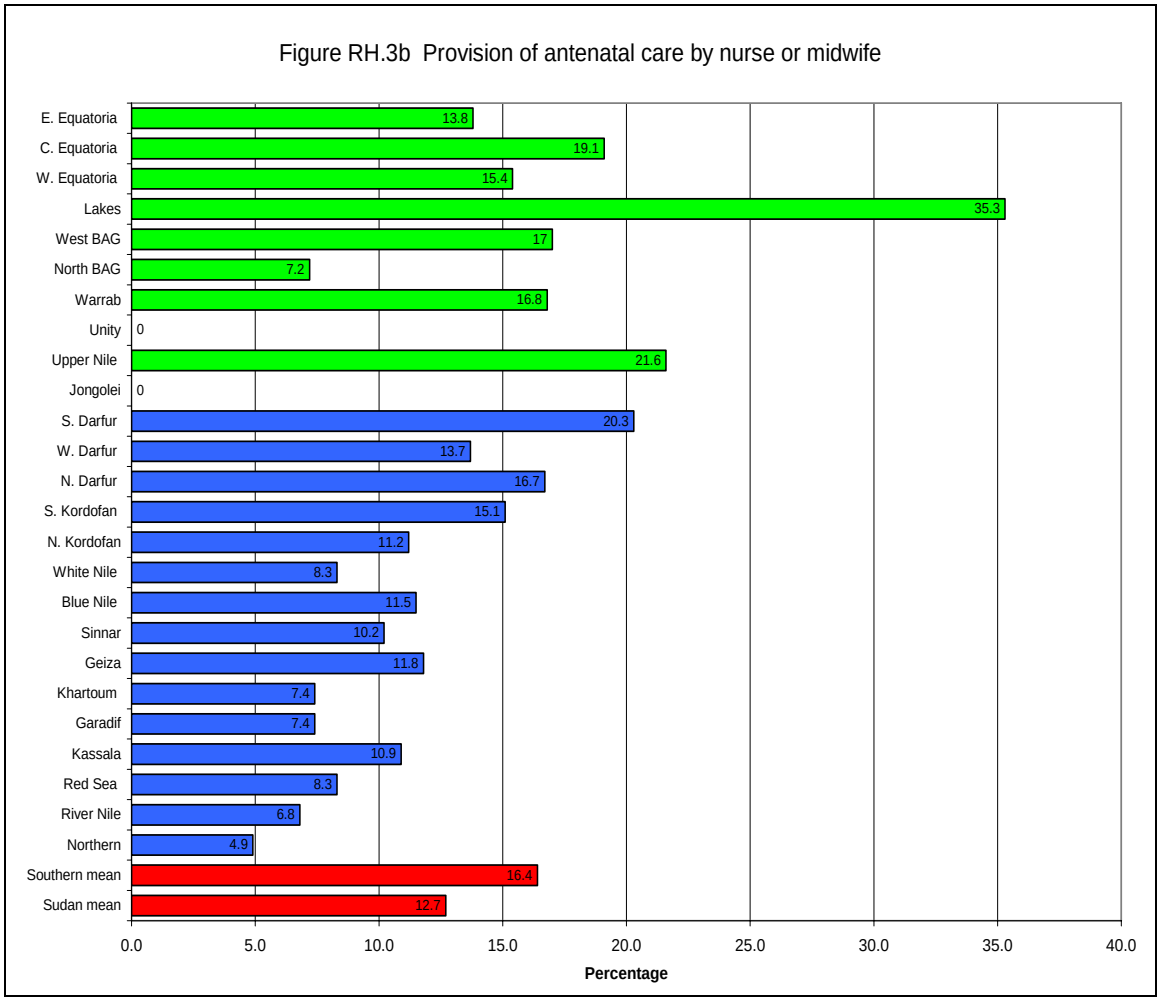

Figure RH.3b Percentage of women who gave birth in the two years preceding the survey to whom a nurse or midwife provided antenatal care.

Women in Southern Sudan were almost twice as likely (29 percent) to receive antenatal care from traditional birth attendants than women from most of the remaining 15 States of the country (15 percent; Figure RH.3c). Over 60 percent of women in Western Equatoria received such care, and the figures for Central Equatoria, Warrap and Unity are all above 40 percent. The figure is lowest for Lakes (6 percent).

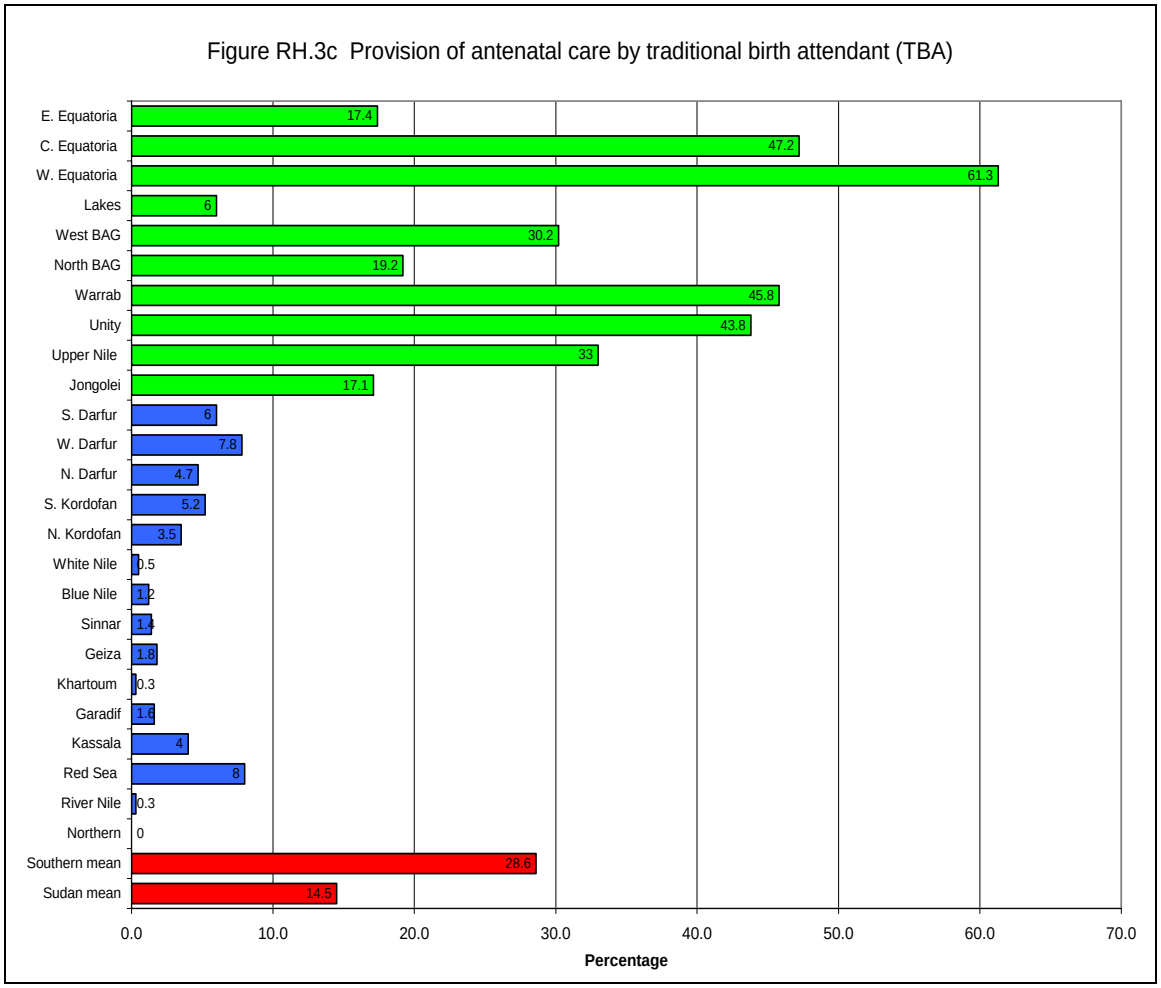

Figure RH.3c Percentage of women who gave birth in the two years preceding the survey to whom a traditional birth attendant provided antenatal care.

Figure RH.3d shows that there are stark differences in the provision of antenatal care between the different States, and particularly between the 15 States (64 percent) and the 10 Southern States (26 percent). Therefore, the findings suggest that while in the States of Khartoum, River Nile and White Nile, well over 80 percent of women receive appropriate antenatal care, in the States such as Unity, Jonglei and Warrap the corresponding figures are well below 20 percent.

In the majority of the 15 States, care by any skilled personnel was most likely to be provided by a medical doctor, while in the 10 Southern States, those receiving appropriate care, a very small percentage, were most likely to have seen a nurse or

midwife. The majority of the women in Southern Sudan were provided care by a not-formally-skilled sector, traditional birth attendants.

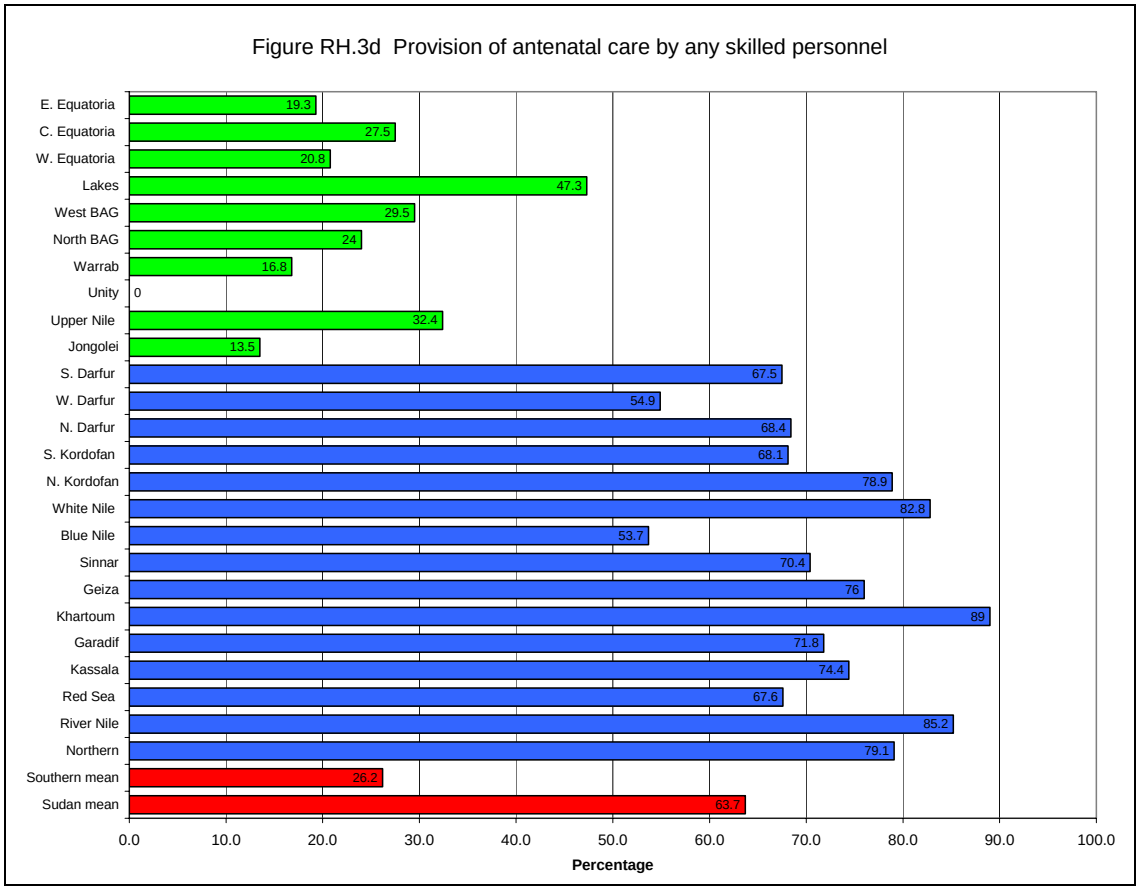

Figure RH.3d Percentage of women who gave birth in the two years preceding the survey to whom antenatal care was provided by any skilled personnel.

Table RH.4 shows the proportion of women who received antenatal care at least once during pregnancy. Also shown is the proportion of women who experienced the following specific aspects of antenatal care: taking of a blood sample, measuring blood pressure, and taking a urine sample.

Table RH.4: Antenatal care content
Percentage of pregnant women receiving antenatal care who gave birth in two years preceding the survey and percentage of pregnant women receiving specific care as part of the antenatal care received, Sudan, 2006

		Percent of pregnant women receiving ANC one or more times during pregnancy*	Percent of pregnant women who had:			Number of women who gave birth in two years preceding survey
			Blood sample taken	Blood pressure measured	Urine specimen taken	
State	Northern	87.2	82.1	78.9	81.7	32,942
	River Nile	87.9	79.7	79.0	79.7	50,334
	Red Sea	79.0	57.5	58.6	54.6	40,868
	Kassala	79.5	60.3	62.0	58.6	103,764
	Gadarif	78.1	45.7	52.6	46.9	126,257
	Khartoum	94.8	90.4	91.0	89.8	339,291
	Gezira	82.7	65.6	64.4	66.2	202,094
	Sinnar	81.2	61.0	57.9	58.0	83,916
	Blue Nile	59.5	28.8	28.1	26.7	65,769
	White Nile	86.6	58.4	57.4	58.6	106,360
	N. Kordofan	88.2	55.8	56.5	55.8	174,121
	S. Kordofan	76.0	42.6	37.9	46.2	126,324
	N. Darfur	80.8	39.7	43.9	41.6	124,738
	W. Darfur	66.4	29.0	37.7	25.2	148,798
	S. Darfur	77.2	33.2	36.4	31.9	235,490
	Jonglei	22.4	9.9	0.0	10.9	112,832
	Upper Nile	44.8	20.5	0.0	17.5	101,984
	Unity	17.4	23.3	0.0	27.5	66,072
	Warrap	36.2	9.0	0.0	12.7	70,063
	North BEG	29.0	27.9	0.0	29.3	116,848
	West BEG	52.9	25.5	0.0	29.2	46,502
	Lakes	50.2	15.4	0.0	22.7	102,544
	W. Equatoria	78.9	18.3	0.0	33.1	44,587
	C. Equatoria	57.2	24.9	0.0	20.9	97,066
	E. Equatoria	33.3	21.8	0.0	26.7	59,019
Age	15-19	72.2	43.6	40.6	44.0	186,736
	20-24	70.0	44.3	38.6	45.8	587,188
	25-29	68.2	43.3	37.6	43.3	797,367
	30-34	69.2	49.7	44.9	48.7	560,936
	35-39	71.7	47.1	44.2	47.8	440,486
	40-44	70.7	48.2	44.8	50.1	153,511
	45-49	59.0	32.1	24.7	34.7	52,359
Education	None	56.8	29.4	22.6	30.0	1,674,119
	Primary	89.0	68.5	66.7	68.7	968,125
	Secondary +	89.9	80.3	80.7	79.9	133,067
	Missing/DK	48.7	40.4	0.0	36.1	3,272
Wealth index quintiles	Poorest	43.2	17.8	8.6	19.1	584,760
	Second	58.0	26.4	19.4	28.0	649,692
	Middle	73.8	43.4	37.7	43.0	632,870
	Fourth	87.9	68.8	67.9	68.2	522,911
	Richest	97.0	90.9	92.8	91.0	388,350
Total		**69.6**	**45.5**	**40.7**	**45.9**	**2,778,583**

*SHHS indicator 64: *Antenatal care* (Proportion of women aged 15-49 years who received ANC at least once during pregnancy in the two years preceding the survey)

On average across the country as a whole, 70 percent of pregnant women received antenatal care at least once during their pregnancy. Women in the age-group 45-49 were less likely (59 percent) to receive antenatal care than women in the other age groups (roughly 70 percent). Women with no formal education were less likely (57 percent) to receive such care than women with primary (89 percent) or secondary (90 percent) education. Similarly, women in the poorest wealth quintile were less than half as likely (43 percent) to receive antenatal care as women in the top wealth quintile (97 percent).

A very similar pattern emerges for the proportion of women with different background characteristics who receive specific antenatal interventions (Table RH.4). In the country as a whole, 46 percent of pregnant women were given a blood test, 41 percent had their blood pressure measured, and 46 percent were asked to provide a urine sample. The richest and best educated women were at least twice as likely to have benefited from such care as the poorest and least educated women. The oldest pregnant women also received less care than younger mothers-to-be.

Women in Southern Sudan were considerably less likely (40 percent) to have received any antenatal care (Figure RH.4). There were stark differences in antenatal care provision among the Southern States. Western Equatoria (79 percent) fared best, followed by Central Equatoria (57 percent). Women in Unity (17 percent) and Jonglei (22 percent) were least likely to have received any antenatal care.

The findings suggest that no women in Southern Sudan had their blood pressure taken (Table RH.4). The proportions of women in Southern Sudan who had blood or urine samples tested was, on average, very low, with women in Warrap State least likely to receive this type of care.

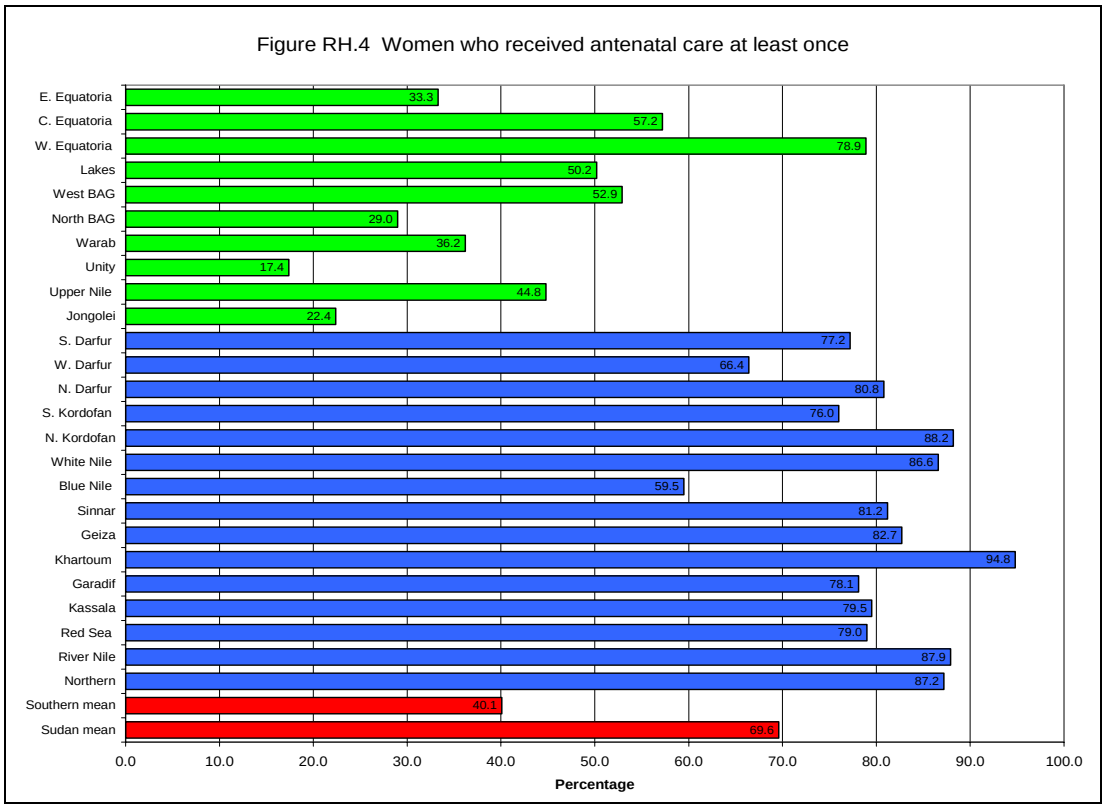

Figure RH.4 Proportion of women aged 15-49 years who received antenatal care at least once during pregnancy in the two years preceding the survey

4.5.4 Assistance at Delivery

Three quarters of all maternal deaths occur during delivery and the immediate post-partum period. The single most critical intervention for safe motherhood is to ensure a competent health worker with midwifery skills is present at every birth, and transport is available to a referral facility for obstetric care in case of emergency. A World Fit for Children goal is to ensure that women have ready and affordable access to skilled attendance at delivery. The indicators are the proportion of births with a skilled attendant and proportion of institutional deliveries. The skilled attendant at delivery indicator is also used to track progress toward the Millennium Development target of reducing the maternal mortality ratio by three quarters between 1990 and 2015.

The MICS included a number of questions to assess the proportion of births attended by a skilled attendant. *A skilled attendant* includes a doctor, nurse, midwife or auxiliary midwife.

Table RH.5 shows the percentage of women who gave birth assisted by the various types of attendant, as well as the percentage of women who delivered with the attendance of any skilled personnel and/or delivered in a health facility.

Table RH.5: Assistance during delivery
Percent distribution of women aged 15-49 with a birth in two years preceding the survey by type of personnel assisting at delivery, Sudan, 2006

		Person assisting at delivery								Total	Any skilled personnel *	Delivered in health facility **	Number of women who gave birth in preceding two years
		Medical doctor	Nurse/ midwife	Auxiliary midwife	Traditional birth attendant	Community health worker	Relative / friend	Other/ missing	No attendant				
State	Northern	2.9	47.2	23.0	1.5	0.3	22.9	1.5	0.7	100.0	73.1	34.3	32,942
	River Nile	17.6	32.0	41.2	6.7	0.7	1.1	0.0	0.7	100.0	90.8	38.5	50,334
	Red Sea	8.1	28.3	27.3	18.9	1.4	7.5	4.9	3.6	100.0	63.7	32.3	40,868
	Kassala	7.7	16.8	40.0	30.4	0.0	2.2	0.3	2.6	100.0	64.5	16.2	103,764
	Gadarif	3.5	10.6	40.7	13.6	0.7	15.2	9.5	6.2	100.0	54.7	13.4	126,257
	Khartoum	16.5	28.4	40.5	7.0	0.3	3.6	0.3	3.3	100.0	85.4	54.0	339,291
	Gezira	15.0	33.7	36.9	10.0	0.0	1.6	0.7	2.1	100.0	85.6	27.4	202,094
	Sinnar	4.9	27.6	35.1	23.2	0.0	4.7	1.1	3.4	100.0	67.6	16.7	83,916
	Blue Nile	1.5	15.3	29.5	17.5	0.5	14.8	1.7	19.0	100.0	46.4	5.0	65,769
	White Nile	3.8	19.5	61.8	5.7	0.3	6.1	1.4	1.5	100.0	85.0	17.2	106,360
	N. Kordofan	2.6	19.4	45.5	26.7	0.8	2.9	1.3	0.8	100.0	67.5	12.7	174,121
	S. Kordofan	2.8	14.9	43.0	29.9	0.8	1.1	1.7	5.8	100.0	60.7	9.1	126,324
	N. Darfur	3.4	22.6	40.0	27.6	0.0	1.3	3.7	1.3	100.0	66.1	6.1	124,738
	W. Darfur	1.4	8.7	21.4	40.6	0.6	11.6	9.3	6.4	100.0	31.6	7.8	148,798
	S. Darfur	2.7	15.6	21.3	35.6	1.2	19.1	1.0	3.5	100.0	39.6	8.4	235,490
	Jonglei	3.3	5.0	0.0	10.6	0.0	40.9	5.3	35.0	100.0	8.3	12.5	112,832
	Upper Nile	1.1	9.0	0.0	21.6	0.0	28.0	4.5	35.8	100.0	10.1	19.0	101,984
	Unity	3.4	10.1	0.0	13.2	0.0	45.3	1.5	26.6	100.0	13.4	13.4	66,072
	Warrap	2.7	9.5	0.0	30.3	0.0	21.3	22.6	13.6	100.0	12.2	10.0	70,063
	North BEG	1.8	3.6	0.0	8.7	0.0	60.5	2.5	22.8	100.0	5.4	13.4	116,848
	West BEG	5.2	8.6	0.0	20.9	0.0	50.8	0.6	13.8	100.0	13.8	12.6	46,502
	Lakes	2.2	11.3	0.0	11.5	0.0	34.4	2.4	38.3	100.0	13.4	11.7	102,544
	W. Equatoria	3.6	6.4	0.0	48.6	0.0	9.6	0.8	31.1	100.0	10.0	6.4	44,587
	C. Equatoria	4.0	4.7	0.0	16.8	0.0	31.4	3.6	39.5	100.0	8.7	15.2	97,066
	E. Equatoria	0.7	4.2	0.0	14.4	0.0	32.3	9.5	38.9	100.0	4.9	22.1	59,019

Table RH.5 (cont.): Assistance during delivery
Percent distribution of women aged 15-49 with a birth in two years preceding the survey by type of personnel assisting at delivery, Sudan, 2006

		Person assisting at delivery								Total	Any skilled personnel *	Delivered in health facility **	Number of women who gave birth in preceding two years
		Medical doctor	Nurse/ midwife	Auxiliary midwife	Traditional birth attendant	Community health worker	Relative/ friend	Other/ missing	No attendant				
Age	15-19	4.4	18.6	24.7	20.7	1.1	15.6	3.5	11.3	100.0	47.8	17.7	186,736
	20-24	3.9	17.6	27.6	19.1	0.6	16.6	3.5	11.2	100.0	49.1	18.1	587,188
	25-29	5.1	16.6	24.4	22.1	0.2	16.1	2.9	12.7	100.0	46.1	17.2	797,367
	30-34	8.0	16.9	27.0	17.5	0.2	16.5	3.3	10.6	100.0	51.9	22.2	560,936
	35-39	7.2	17.6	27.6	18.6	0.3	14.5	3.5	10.8	100.0	52.3	19.3	440,486
	40-44	7.4	20.5	26.8	19.0	0.1	12.8	2.4	11.0	100.0	54.7	26.6	153,511
	45-49	6.1	12.7	15.2	21.2	0.0	19.9	2.4	22.5	100.0	33.9	22.4	52,359
Education	None	2.8	10.8	18.2	24.8	0.4	21.7	4.5	16.9	100.0	31.8	12.0	1,674,119
	Primary	8.9	26.8	39.3	12.5	0.3	7.1	1.3	3.7	100.0	75.1	27.4	968,125
	Secondary +	22.3	30.1	29.6	7.3	0.3	6.4	0.8	3.3	100.0	81.9	54.1	133,067
	Missing/DK	11.4	0.0	0.0	28.7	0.0	36.2	0.0	23.7	100.0	11.4	10.7	3,272
Wealth index quintiles	Poorest	2.7	5.9	6.8	25.8	0.2	29.1	6.0	23.5	100.0	15.4	10.1	584,760
	Second	2.8	10.3	16.8	29.0	0.3	21.1	3.7	16.0	100.0	29.9	11.1	649,692
	Middle	4.6	15.6	31.9	22.6	0.7	12.9	2.4	9.3	100.0	52.1	12.6	632,870
	Fourth	5.0	28.8	43.7	9.8	0.4	6.7	2.2	3.4	100.0	77.5	22.4	522,911
	Richest	19.1	33.4	37.4	3.4	0.0	4.6	0.6	1.5	100.0	89.9	53.9	388,350
Total		**5.9**	**17.3**	**26.1**	**19.7**	**0.4**	**15.9**	**3.2**	**11.7**	**100.0**	**49.2**	**19.4**	**2,778,583**

*SHHS indicator 66: *Births attended by skilled health personnel* (Proportion of births attended by a qualified health personnel (doctor, nurse or midwife); Delivery attended by qualified health personnel); MDG indicator17
**SHHS indicator 67: *Institutional deliveries (Delivered in health facility)*; Proportion of women aged 15-49 years with a birth in the two years preceding the survey who delivered in a health facility

In the Sudan as a whole, just under half (49 percent) of births occurring in the two years prior to the MICS survey were delivered by skilled personnel (Table RH.5).

The more educated and wealthy a woman is, the more likely she is to have delivered with the assistance of a skilled attendant. Women in the age-group 45-49 were least likely to have received any skilled assistance during labour, and these older women were most likely to have a relative or friend attending them, or no attendant at all.

Country-wide, doctors assisted at 6 percent of deliveries. Nurses or midwives assisted at 17 percent of deliveries, while auxiliary midwives were present at 26 percent of births. Traditional birth attendants assisted with 20 percent of births, and relatives or friends attended 16 percent of deliveries. Twelve percent of women gave birth without any attendant whatsoever.

Considering background characteristics, over 1 in 5 (22 percent) women with secondary education or above gave birth under the attendance of a medical doctor. This was the case for only 3 percent of those with no formal education, who were most likely to have been assisted by a traditional birth attendant or a friend/relative, or to have received no assistance during delivery. Richer and poorer women show similar patterns, respectively.

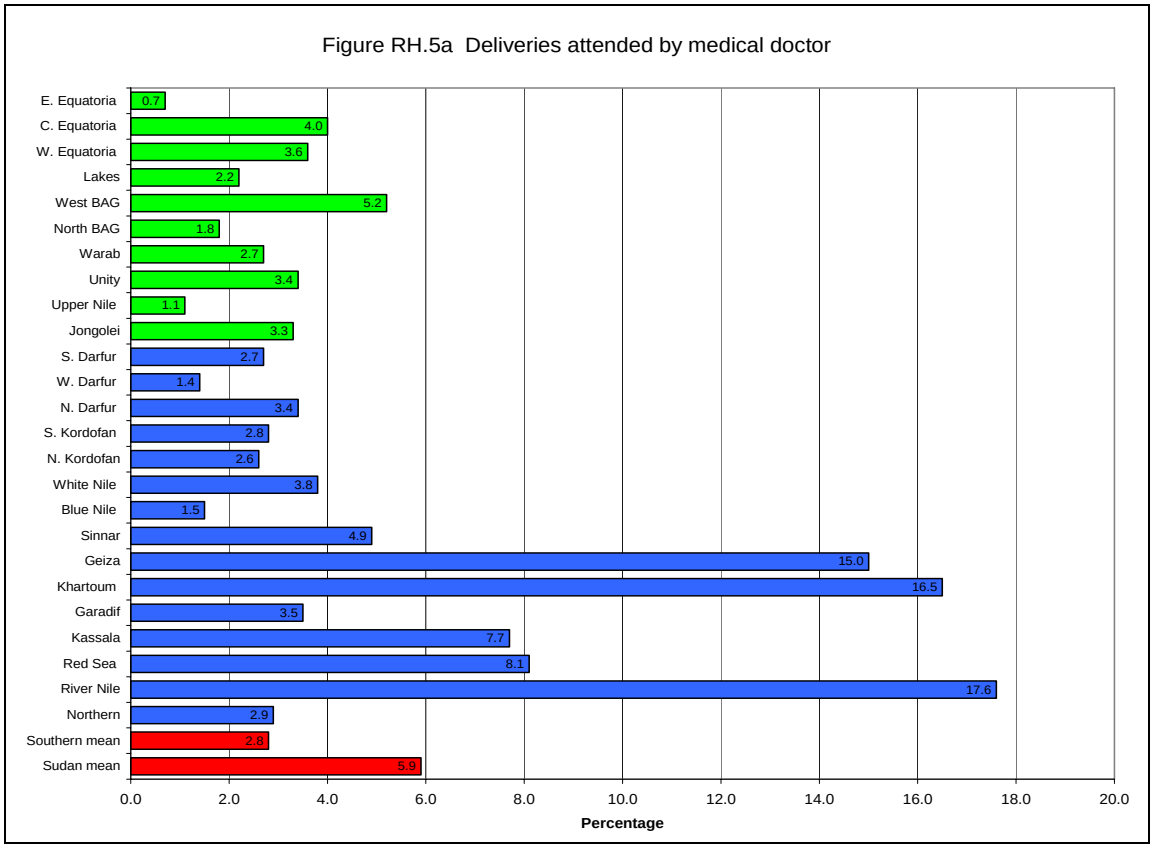

Figure RH.5a The percentage of births in the two years prior to the survey which were attended by a medical doctor

In the South, doctors, nurses and midwives were able to attend fewer births. Auxiliary midwives apparently appeared to be non existent in the Southern States (Figures RH.5a & b). Medical doctors were in attendance during just 3 percent of childbirths on average. Figures were best in Western Bahr El Ghazal (5 percent) and in Central Equatoria (4 percent). Doctors were least likely to be present in Eastern Equatoria (0.7 percent) and in Upper Nile (1 percent).

Nurses and midwives were able to assist at 7 percent of Southern Sudanese births, considerably less than half the national average. They were most likely to be present during childbirth in Lakes State (11 percent) and most likely to be absent in Northern Bahr El Ghazal (4 percent).

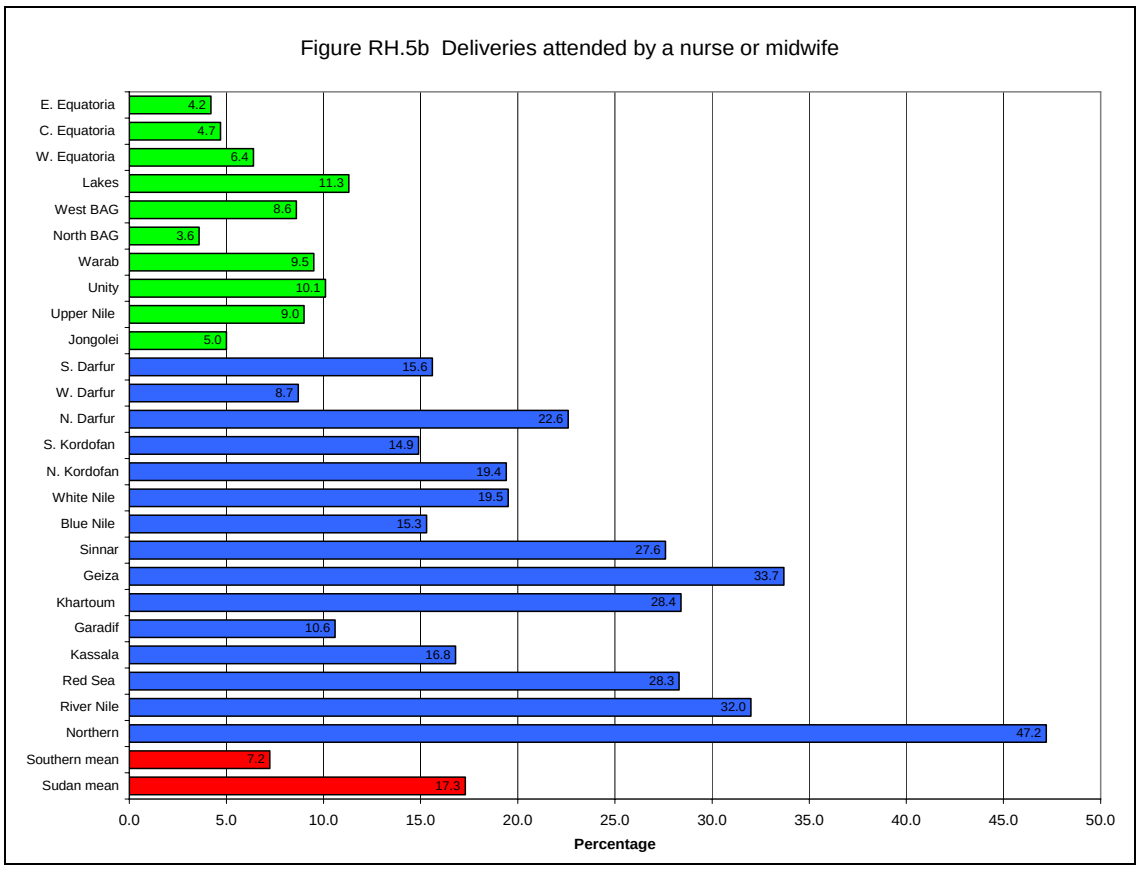

Figure RH.5b The percentage of births in the two years prior to the survey which were attended by a nurse or midwife

Similar proportions (20 percent) of childbirths in the 10 and 15 States were attended by a traditional birth attendant (Figure RH.5c). Within the South, figures vary extremely. For example, almost 1 in 2 women (49 percent) in Western Equatoria were attended by a TBA, while the figure was only 9 percent in Northern Bahr El Ghazal, and 11 percent in Jonglei.

An appreciable proportion of Southern women were assisted by a relative or friend (Figure RH.5d), with the average figure for the South at 36 percent compared with 16 percent for the Sudan as a whole. Within the South, more than 1 in 2 women had an

unqualified friend or relative attending their birth in the States of Northern Bahr El Ghazal (61 percent) and Western Bahr El Ghazal (51 percent). Figures were lowest in Western Equatoria (10 percent).

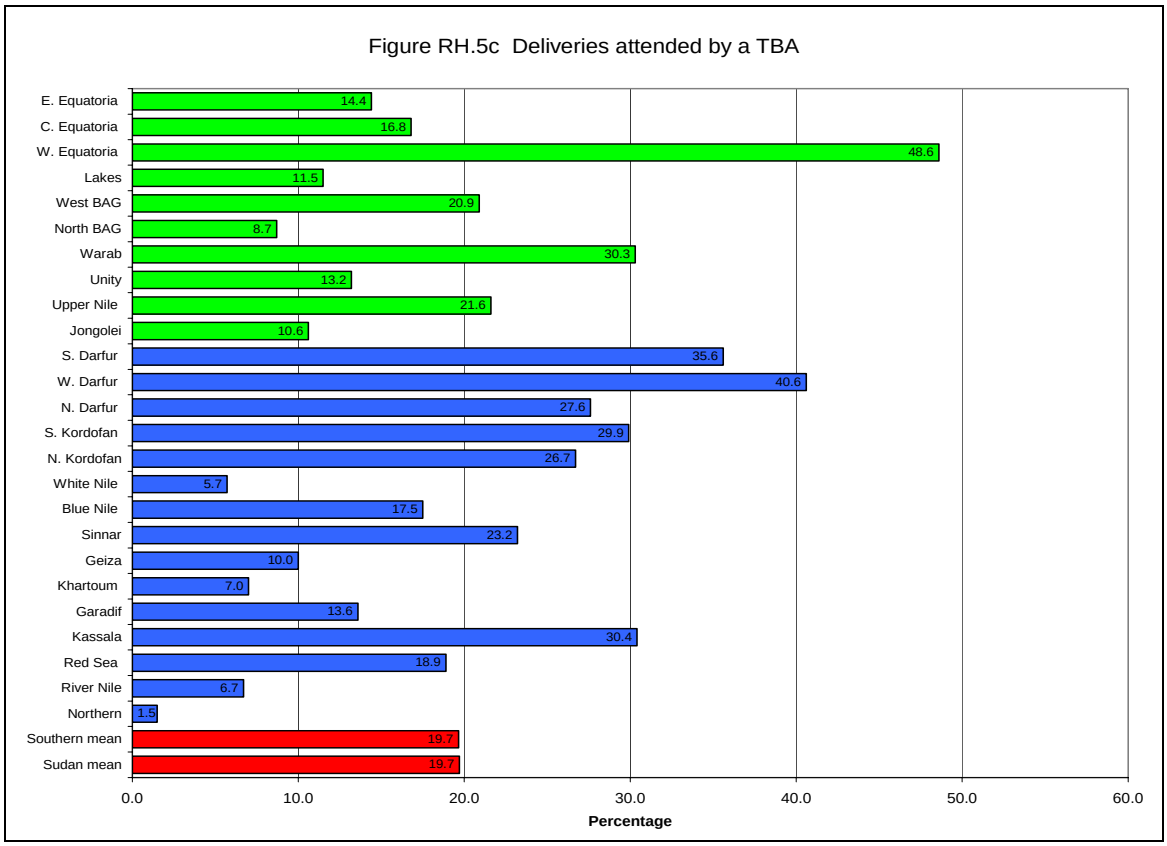

Figure RH.5c The percentage of births in the two years prior to the survey which were attended by a traditional birth attendant.

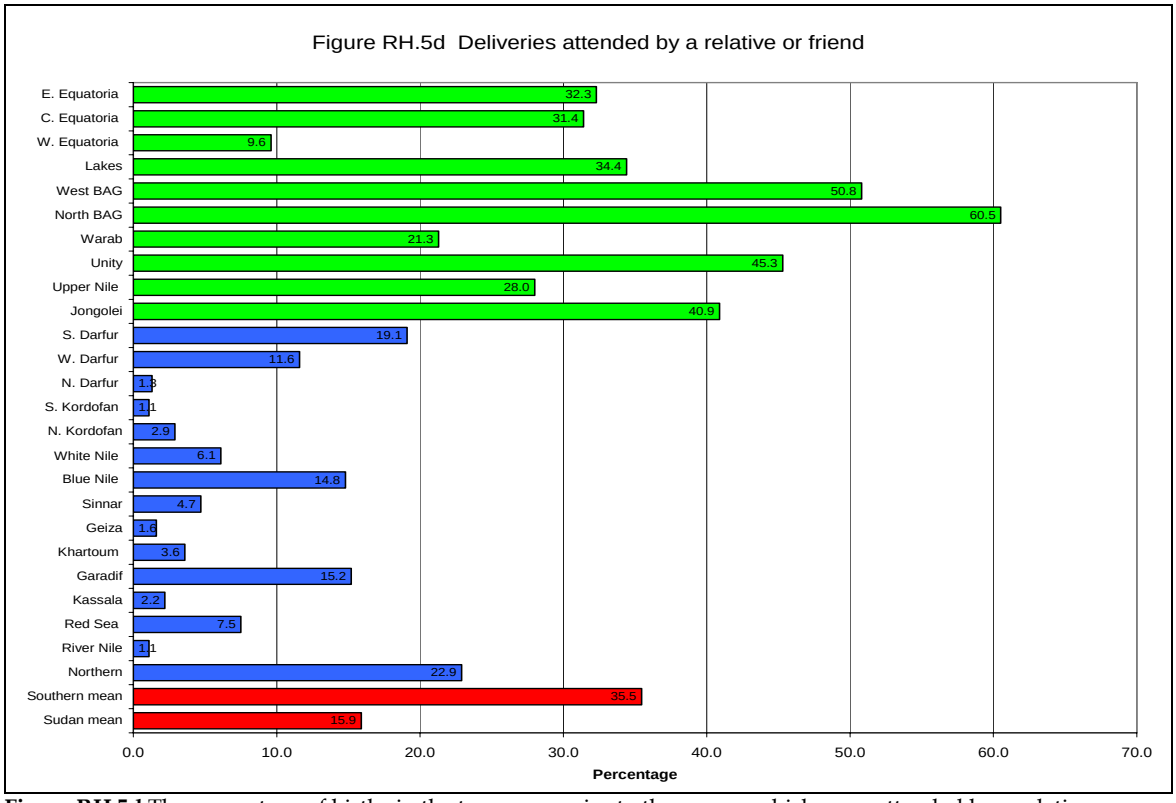

Figure RH.5d The percentage of births in the two years prior to the survey which were attended by a relative or friend

A shockingly high percentage of Southern mothers gave birth without any attendant whatsoever (Figure RH.5e). The Southern mean is 30 percent, roughly three times the national average. More than 1 in 3 women gave birth with no attendant in Central Equatoria (40 percent), Eastern Equatoria (39 percent), Lakes (38 percent), Upper Nile (36 percent) and Jonglei (35 percent). Women in Warrap and Western Bahr El Ghazal were least likely to go through childbirth alone.

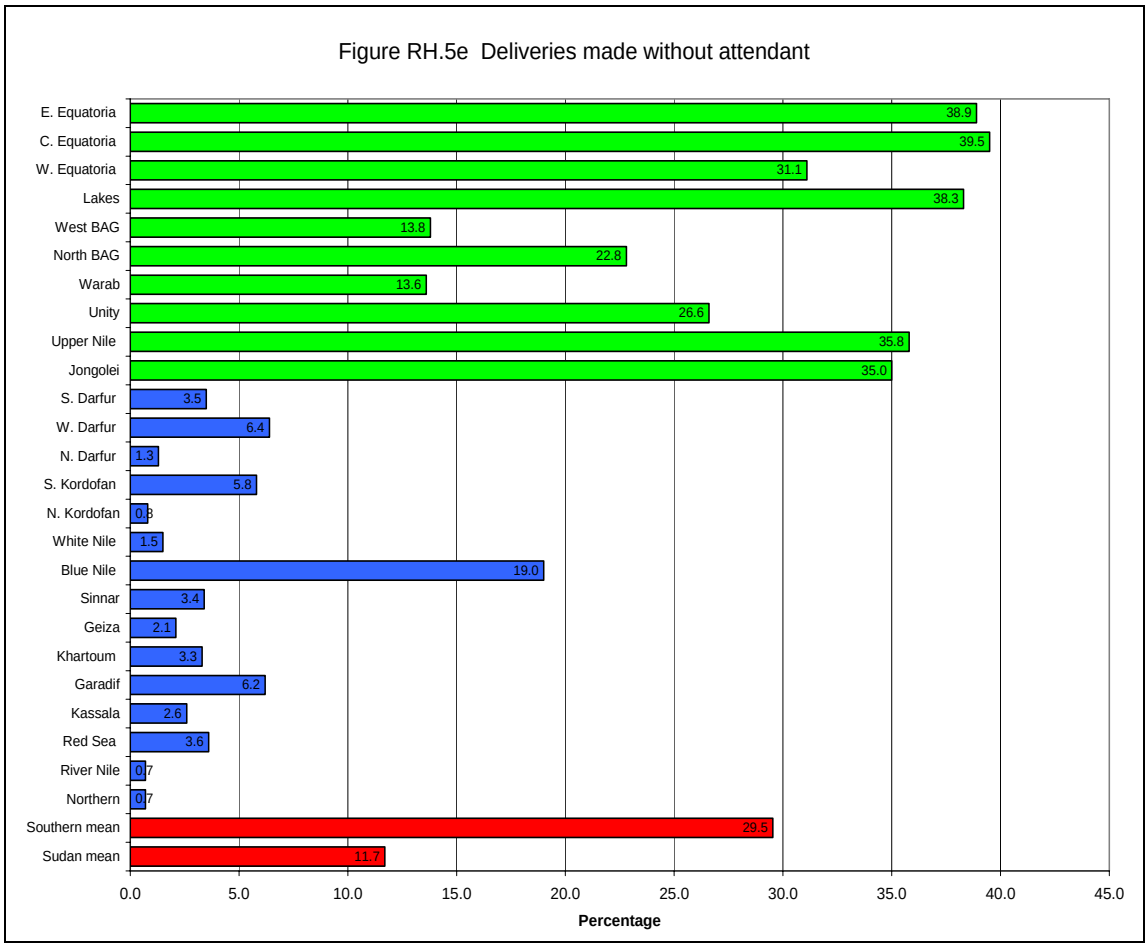

Figure RH.5e The percentage of births in the two years prior to the survey which were made with no attendant whatsoever

Overall, the proportion of deliveries made in the presence of skilled personnel was only 10 percent for the Southern States, against 49 percent for the Sudan as a whole (Figure RH.5f). Figures for the South varied between 14 percent for Western Bahr El Ghazal to 5 percent for Northern Bahr El Ghazal.

In Southern Sudan, 14 percent of women gave birth in a health facility, as opposed to 19 percent for the entire Sudan (Figure RH.5g). Coverage is particularly poor in Western Equatoria (6 percent), while Eastern Equatoria (22 percent) and Upper Nile (19 percent) fare best for this indicator compared to the other Southern States.

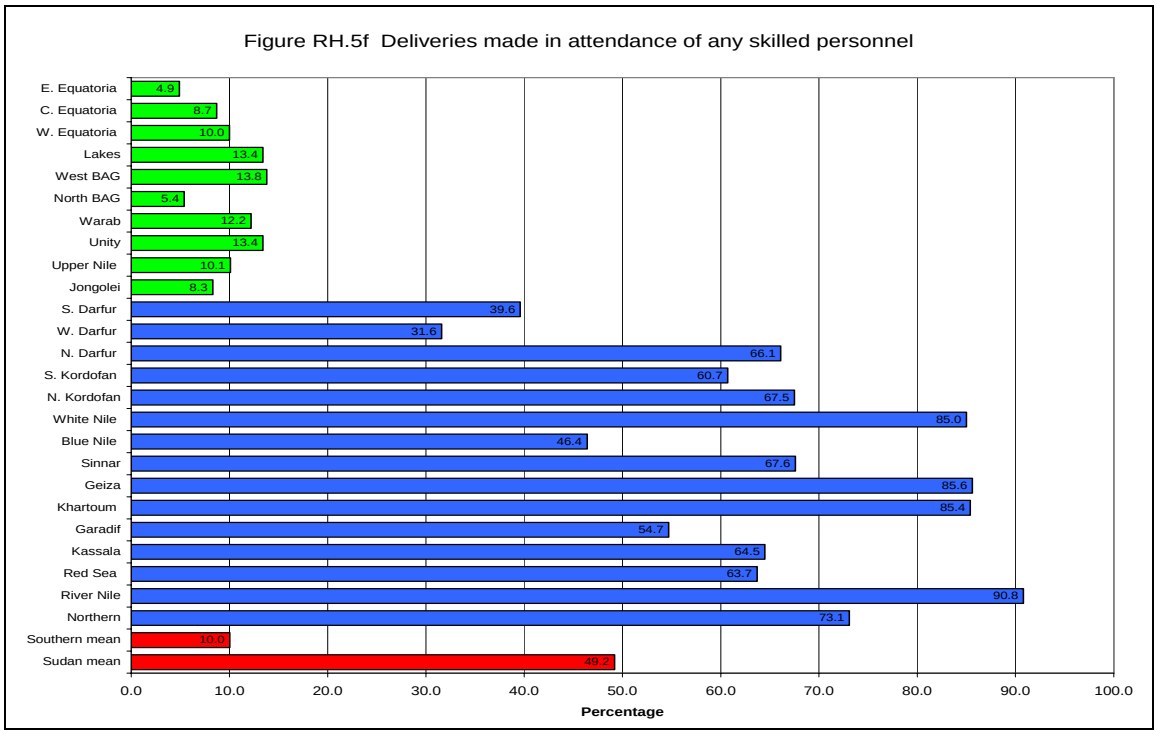

Figure RH.5f The percentage of births in the two years prior to the survey which were attended by any skilled personnel

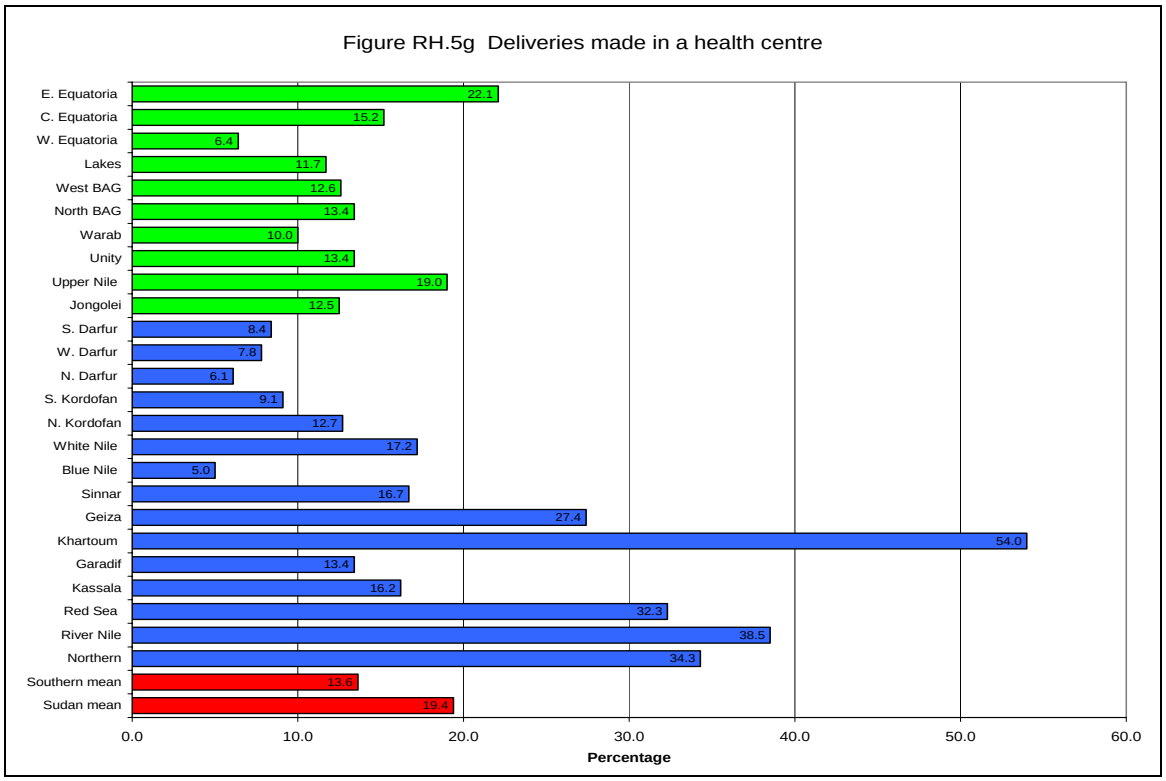

Figure RH.5g The percentage of births in the two years prior to the survey taking place in a health centre

Table RH.6 provides more details on where Sudanese women give birth (i.e. at home, in a Primary Health Care Centre (PHCC), Primary Health Care Unit (PHCU), public hospital, or private hospital). The table shows that the great majority (77 percent) of women give birth at home, and that most of the remainder use a public hospital (13.2 percent). The richest and best-educated women are least likely to give birth at home.

Women in the 10 Southern States are more likely than those in most of the 15 States to give birth at home (81 percent), slightly more likely to use a PHCC (6 percent, as against a national average of 2 percent), and also more likely to use a PHCU (2.3 percent for the South as against 0.9 for the whole of the Sudan). However, they were far less likely to use a public hospital in which to give birth (4 percent vs. 13 percent for the whole of the Sudan). A roughly similar proportion (2 percent) of women across the country gave birth in a private hospital.

Figure RH.6a shows that within the South, women in Western Equatoria (93 percent) are most likely to give birth at home, and that the value of this indicator is lowest in Warrap (66 percent).

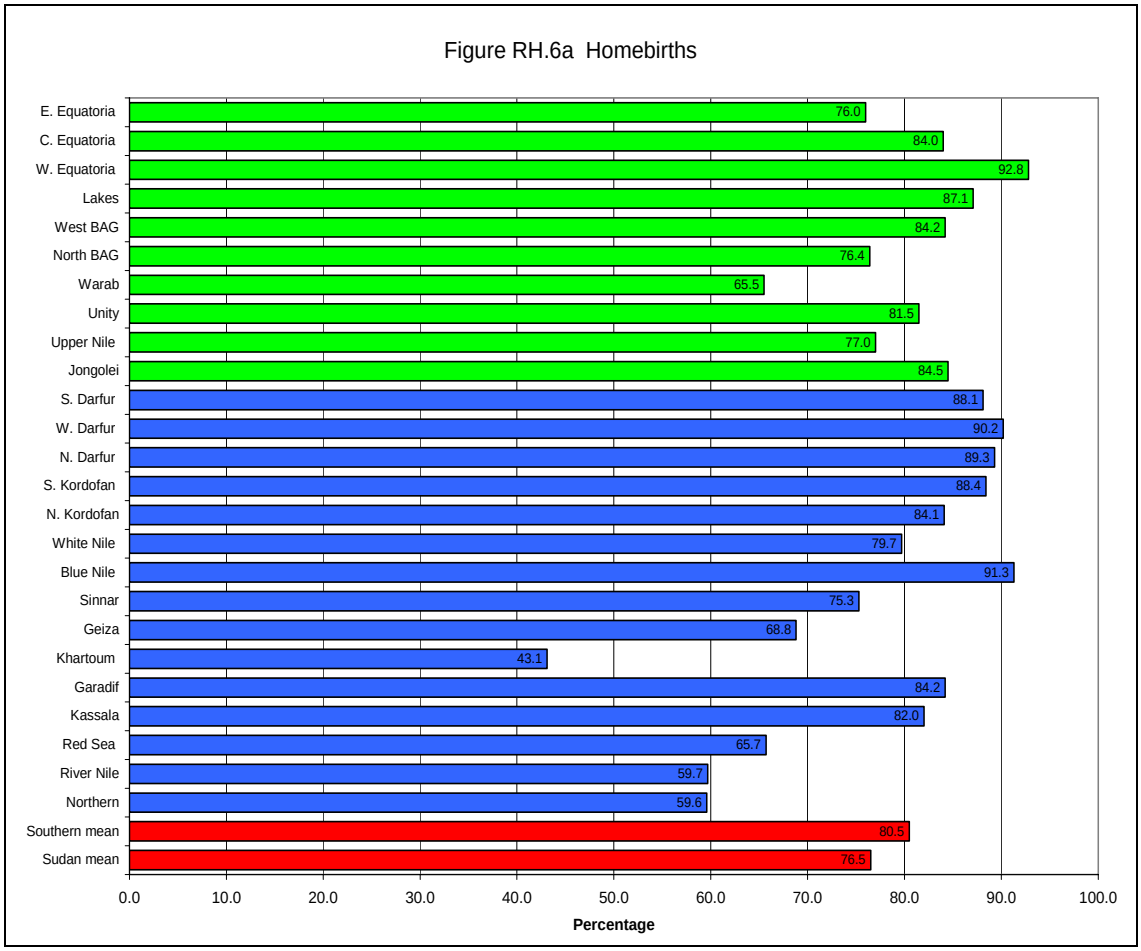

Figure RH.6a The percentage of births in the two years prior to the survey taking at home

Table RH.6
Percent Distribution of Women with Birth in the Preceding Two Years by Place of Delivery, Sudan, 2006

		Place of delivery								
		Home	PHCC	PHCU	Public Hospital	Private Hospital	Other	Missing		
State	Northern	59.6	1.7	0.3	29.8	0.6		8.0		
	River Nile	59.7	0.4		33.6	2.5	0.7	3.1	52,123	100.0
	Red Sea	65.7	1.5	0.4	27.2	1.9	0.6	2.7	42,719	100.0
	Kassala	82.0	0.3	1.0	13.3	1.4	0.3	1.8	105,562	100.0
	Gadarif	84.2	1.8	0.2	10.7	0.2	0.7	2.2	130,314	100.0
	Khartoum	43.1	0.4	0.3	40.8	8.7	0.6	6.2	364,733	100.0
	Gezira	68.8	1.3		22.2	1.6	1.3	4.8	212,346	100.0
	Sinnar	75.3	0.8		13.9	0.3		9.8	93,892	100.0
	Blue Nile	91.3	0.4	0.4	4.1		0.2	3.7	68,166	100.0
	White Nile	79.7	1.0	0.2	12.9	1.7	0.7	3.8	110,693	100.0
	N. Kordofan	84.1	0.2	0.5	10.7	0.7	0.3	3.5	181,311	100.0
	S. Kordofan	88.4	0.8	0.8	6.5		0.8	2.7	129,101	100.0
	N. Darfur	89.3	0.5		4.5	0.2	0.5	5.0	131,960	100.0
	W. Darfur	90.2	2.0	2.0	3.4		0.3	2.2	153,973	100.0
	S. Darfur	88.1	0.5		7.6			3.8	244,234	100.0
	Jonglei	84.5	1.6	0.3	3.0		7.6	3.0	113,204	100.0
	Upper Nile	77.0	7.8	5.2	5.2		0.7	4.1	102,745	100.0
	Unity	81.5	4.9	3.2	4.3		1.0	5.1	68,288	100.0
	Warrap	65.5	6.0	2.2			1.3	25.0	73,551	100.0
	North BEG	76.4	5.8	3.4	0.7		3.4	10.3	123,622	100.0
	West BEG	84.2	6.4	1.2	4.2		0.6	3.3	47,217	100.0
	Lakes	87.1	4.9		4.9		1.7	1.3	103,432	100.0
	W. Equatoria	92.8	0.4	0.4	5.2		0.4	0.8	44,231	100.0
	C. Equatoria	84.0	7.1	1.1	6.4		0.7	0.7	97,937	100.0
	E. Equatoria	76.0	12.0	5.8	3.4		0.7	2.1	60,468	100.0
Education	None	83.8	2.9	1.4	6.2	0.1	1.2	4.5	1,727,895	100.0
	Primary	68.8	1.2	0.4	22.0	2.1	0.7	4.8	1,018,676	100.0
	Secondary +	42.5	0.8		35.5	14.0	1.0	6.3	141,452	100.0
	Missing/DK	70.9	8.5				10.3	10.3	4,119	100.0
Wealth index quintiles	Poorest	85.2	4.1	1.4	3.2		1.3	4.7	597,617	100.0
	Second	84.9	3.0	1.4	5.0		1.6	4.2	670,459	100.0
	Middle	84.3	2.1	1.1	8.6	0.0	0.5	3.3	651,550	100.0
	Fourth	73.6	0.4	0.3	19.7	0.5	0.6	5.0	550,978	100.0
	Richest	42.4	0.8	0.2	39.0	9.5	0.9	7.1	421,540	100.0
	Total	**76.5**	**2.2**	**0.9**	**13.2**	**1.5**	**1.0**	**4.7**	**2,892,143**	**100.0**

Figure RH.6b shows the percentages of deliveries made in all public health institutions (i.e., PHCCs, PHCUs, and public hospitals combined). The Southern mean, at 15 percent, is somewhat lower than the country-wide mean (12 percent), but figures vary greatly among the ten Southern States. Southern women are most likely to give birth in a public health institution if they live in Eastern Equatoria (21 percent) or Upper Nile (18 percent). Women in Jonglei (5 percent) and Western Equatoria (6 percent) are least likely to benefit from such institutions.

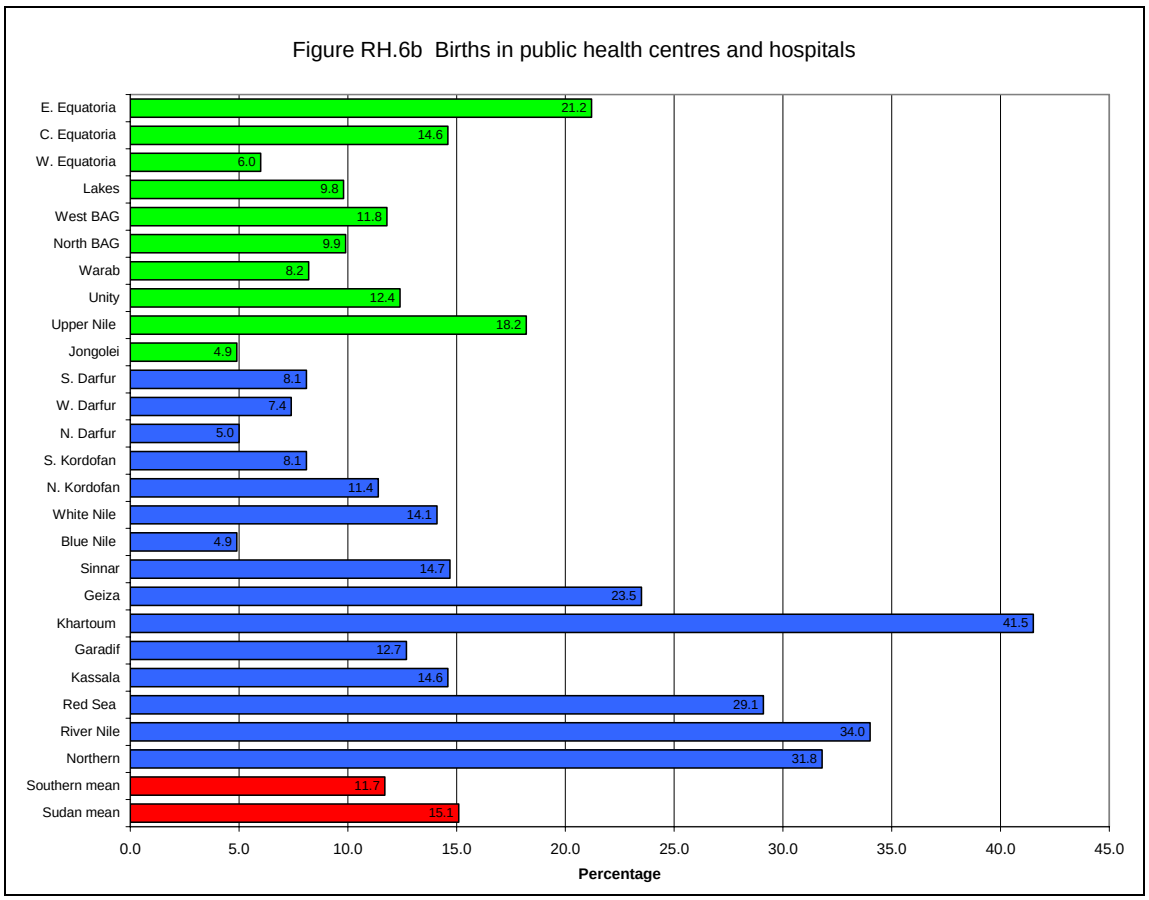

Figure RH.6b Percentage of women who gave birth in either of a PHCC, PHCU, or public hospital, during the 2 years prior to the survey.

Table RH.7 shows the mode of delivery of women with a birth in the two years preceding the survey.

Table RH.7
Percent Distribution of Women with Birth in the Preceding Two Years by Mode of Delivery, Sudan, 2006

		Mode of delivery (%)					Total	
		Vaginal	Forceps	Caesarian	Don't know	Missing	Count	Percent
State	Northern	80.5	1.0	10.6	0.3	7.6	36,320	100.0
	River Nile	82.7		14.2		3.1	52,123	100.0
	Red Sea	89.2	3.4	4.7		2.7	42,719	100.0
	Kassala	92.4	0.7	4.9		2.0	105,562	100.0
	Gadarif	93.5	1.8	2.5		2.2	130,314	100.0
	Khartoum	82.1	0.6	11.2		6.2	364,733	100.0
	Gezira	83.0	0.6	11.6		4.8	212,346	100.0
	Sinnar	85.1	1.0	4.2	0.2	9.6	93,892	100.0
	Blue Nile	94.4	0.7	1.1		3.7	68,166	100.0
	White Nile	91.9	1.2	3.1		3.8	110,693	100.0
	N. Kordofan	93.6	0.5	2.5	0.3	3.2	181,311	100.0
	S. Kordofan	94.1	1.6	1.6		2.7	129,101	100.0
	N. Darfur	92.8	0.7	1.5		5.0	131,960	100.0
	W. Darfur	96.4	0.6	0.8		2.2	153,973	100.0
	S. Darfur	93.3	1.0	1.9		3.8	244,234	100.0
	Jonglei	76.6	4.3	2.6	12.8	3.6	113,204	100.0
	Upper Nile	85.9	5.2	0.7	3.7	4.4	102,745	100.0
	Unity	84.0	1.6	1.8	3.9	8.7	68,288	100.0
	Warrap	61.6	3.0	2.6	6.9	25.9	73,551	100.0
	North BEG	67.1	3.8	5.8	11.0	12.3	123,622	100.0
	West BEG	71.5	11.8	4.2	3.6	8.8	47,217	100.0
	Lakes	91.0	6.4	0.9		1.7	103,432	100.0
	W. Equatoria	92.8	0.8	1.6	0.4	4.4	44,231	100.0
	C. Equatoria	87.6	9.6	1.3	0.7	0.9	97,937	100.0
	E. Equatoria	84.6	3.1	1.0	6.5	4.8	60,468	100.0
Education	None	87.8	2.5	2.0	2.5	5.2	1,727,895	100.0
	Primary	87.1	1.6	6.2	0.2	4.9	1,018,676	100.0
	Secondary +	71.4	0.5	21.3	0.5	6.3	141,452	100.0
	Missing/DK	55.7	18.7	10.3	10.3	5.0	4,119	100.0
Wealth index quintiles	Poorest	84.6	3.7	1.8	4.1	5.9	597,617	100.0
	Second	88.4	2.2	1.9	2.5	4.9	670,459	100.0
	Middle	91.2	2.1	2.5	0.8	3.4	651,550	100.0
	Fourth	89.1	0.8	5.0	0.2	5.0	550,978	100.0
	Richest	77.0	1.1	14.7		7.2	421,540	100.0
Total		**86.7**	**2.1**	**4.5**	**1.6**	**5.1**	**2,892,143**	**100.0**

Within the Sudan as a whole, almost 9 out of 10 children (87 %) were delivered vaginally. Forceps were used nationwide in 2 percent of deliveries, and 5 percent of women gave birth by caesarean section. In general, less educated and poorer women were more likely to give birth naturally through the vaginal canal, but were also more likely to have their babies delivered using forceps. Caesarean deliveries were

more often performed on the better-educated and wealthier women. However, all these differentials are quite small.

Southern babies were more likely to be delivered using forceps (5 percent) than babies in the Sudan as a whole (Figure RH.7a). For the few forceps delivery in the South, figures were highest in Western Bahr El Ghazal (12 percent), followed by Central Equatoria (10 percent). Figures were lowest for Western Equatoria (0.8 percent) and Unity (1.6 percent).

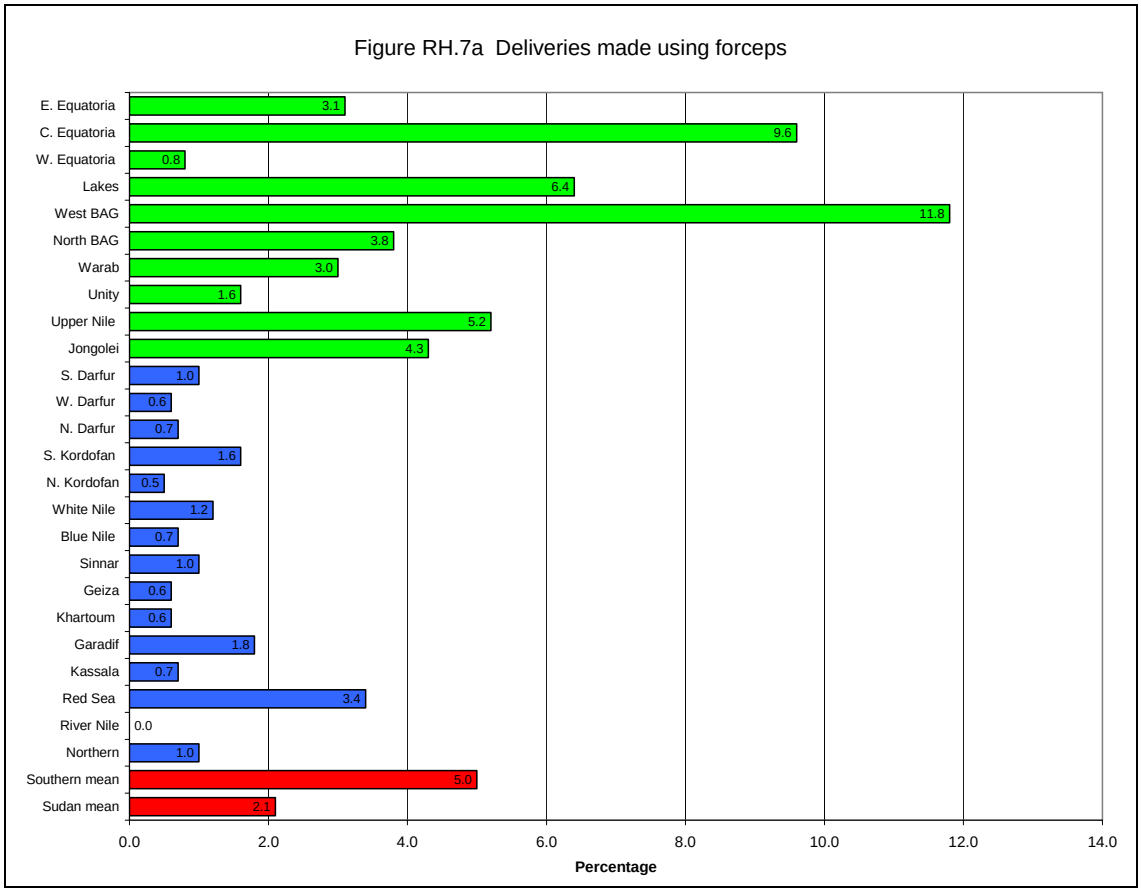

Figure RH.7a Percentage of children born to women during the two years prior to the survey delivered using forceps

Caesarean sections were half as likely to be used on Southern women (2 percent) as on women from the majority of the 15 States (Figure RH.7b). Within the South, their use was highest in Northern Bahr El Ghazal (6 percent) and in Western Bahr El Ghazal (4 percent), and lowest in Upper Nile (0.7 percent) and Lakes (0.9 percent).

Figure RH.7c shows the proportion of vaginal births. Figures for the South are somewhat lower than those in the 15 States, but this may be due to missing data, especially from Warrap and Northern Bahr El Ghazal.

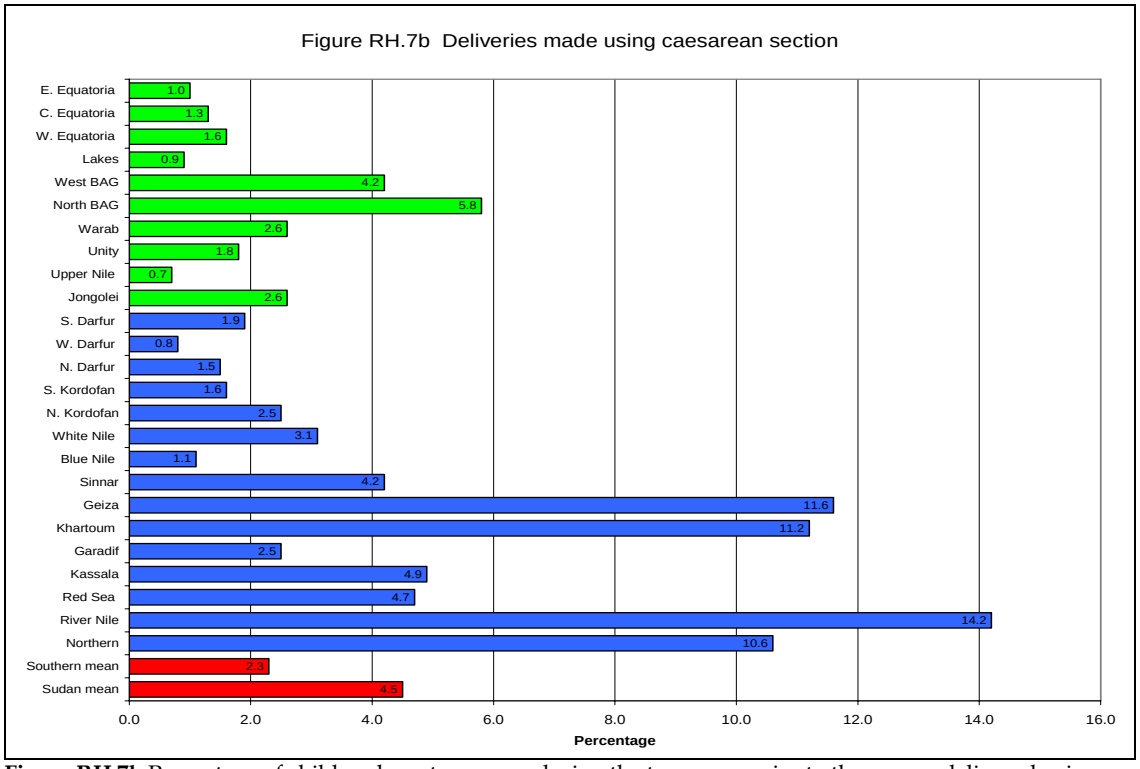

Figure RH.7b Percentage of children born to women during the two years prior to the survey delivered using caesarean section

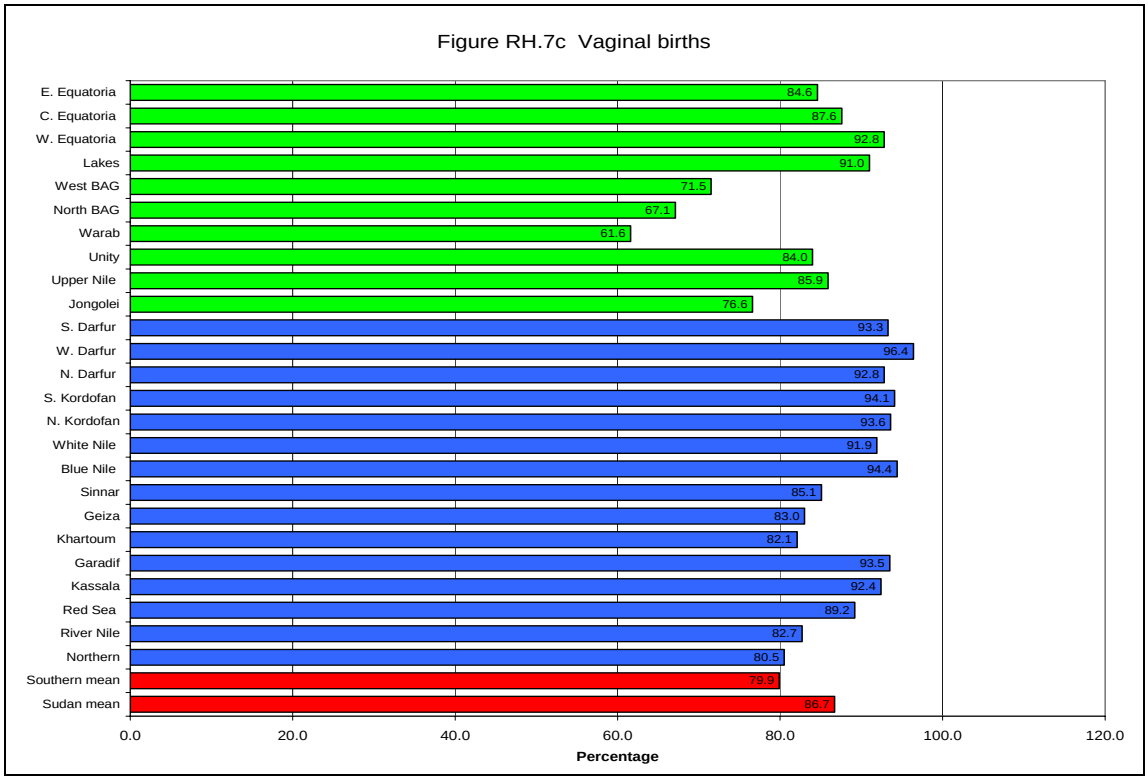

Figure RH.7c Percentage of children born to women during the two years prior to the survey delivered vaginally

Table RH.8 shows the percent distribution of women who used an iron supplement in the two years preceding the survey. For the country as a whole, an average of 41 percent of women had used an iron supplement and 51 percent had not; the remainder were either unsure or their responses are missing. The woman's educational background and the wealth quintile to which she belongs also had a strong bearing on the likelihood that she had taken iron supplements in the two years previous to the study. Thus only 31 percent of women with no formal education had taken iron, while the figure for those women who had secondary education and above was 60 percent. Similarly, only 1 in 4 (24 percent) of the women in the poorest wealth quintile had used the supplement, while 2 out of 3 (66 percent) of women in the richest quintile had done so.

There are stark differences in the use of iron supplements by State and by region. Southern women were less likely (29 percent) to have received iron supplements than average (41 percent). Within the South, women in Central Equatoria (46 percent) and Unity (39 percent) were more likely to have received iron than other Southern women. Women in Jonglei (15 percent) were the least likely to have received their supplement.

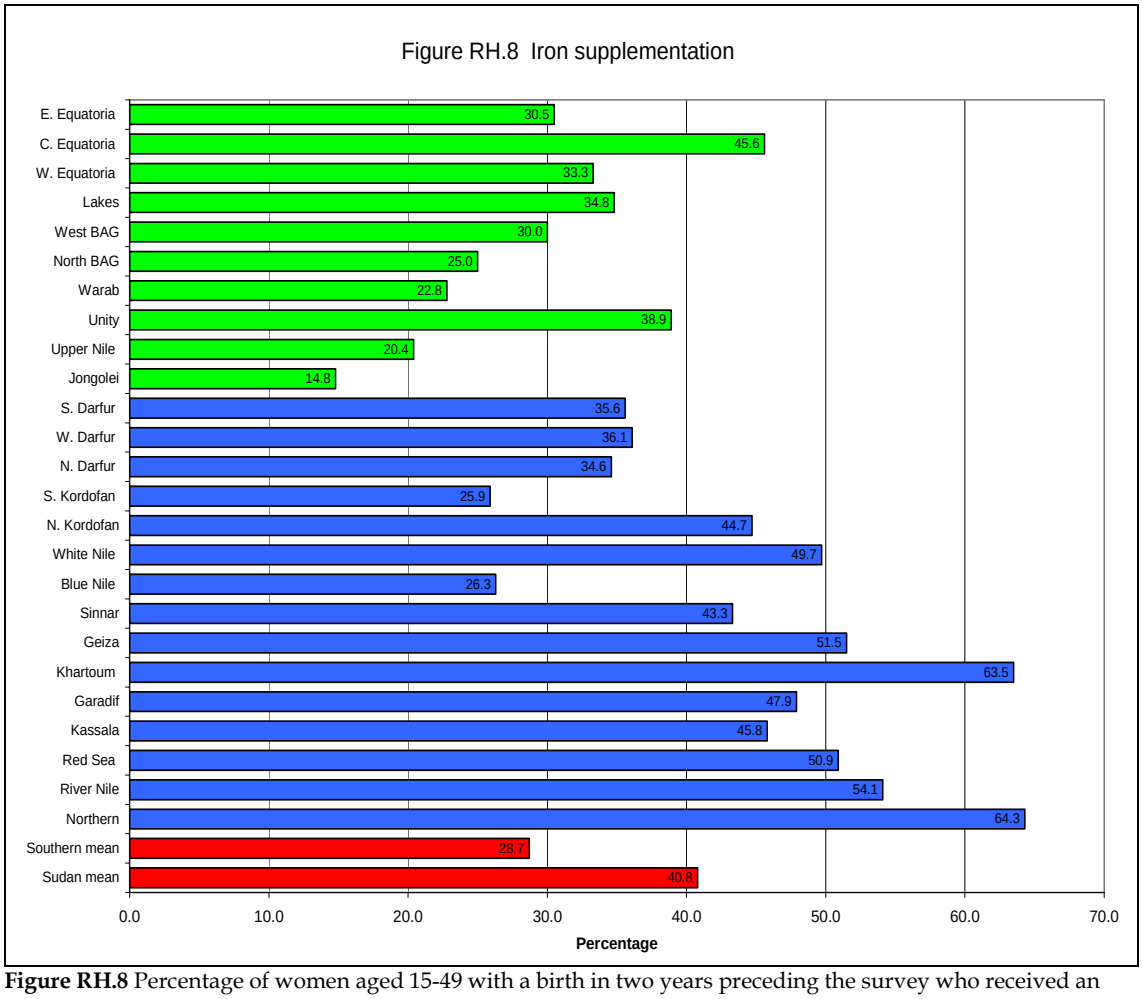

Figure RH.8 Percentage of women aged 15-49 with a birth in two years preceding the survey who received an iron supplement

Table RH.8: Iron supplement use
Percent distribution of women aged 15-49 with a birth in two years preceding the survey, by iron supplement use Sudan, 2006

		Iron supplement?				Total	Number of women who gave birth in two years preceding survey
		Yes	No	Don't know	Missing		
State	Northern	64.3	28.1	0.3	7.3	100.0	36,320
	River Nile	54.1	41.8	0.0	4.1	100.0	52,123
	Red Sea	50.9	42.3	0.9	5.9	100.0	42,590
	Kassala	45.8	48.8	1.9	3.6	100.0	105,562
	Gadarif	47.9	47.0	0.4	4.7	100.0	130,314
	Khartoum	63.5	25.9	0.3	10.4	100.0	364,733
	Gezira	51.5	41.3	1.2	6.0	100.0	212,346
	Sinnar	43.3	46.3	0.8	9.7	100.0	93,892
	Blue Nile	26.3	67.4	0.9	5.4	100.0	68,166
	White Nile	49.7	44.0	0.0	6.2	100.0	110,693
	North Kordofan	44.7	48.6	1.0	5.7	100.0	181,311
	South Kordofan	25.9	66.5	0.8	6.8	100.0	128,748
	North Darfur	34.6	56.7	1.0	7.7	100.0	131,960
	West Darfur	36.1	55.5	1.1	7.3	100.0	153,542
	South Darfur	35.6	56.3	1.0	7.2	100.0	244,234
	Jonglei	14.8	70.7	11.2	3.3	100.0	113,949
	Upper Nile	20.4	69.3	6.7	3.7	100.0	101,984
	Unity	38.9	53.3	5.1	2.6	100.0	65,656
	Warrap	22.8	52.6	1.3	23.3	100.0	83,379
	North Bahr El Ghazal	25.0	59.9	6.5	8.6	100.0	120,235
	West Bahr El Ghazal	30.0	66.1	1.5	2.4	100.0	47,933
	Lakes	34.8	62.9	1.9	0.4	100.0	103,432
	West Equatoria	33.3	63.9	2.0	0.8	100.0	48,139
	Central Equatoria	45.6	53.8	0.0	0.7	100.0	97,937
	East Equatoria	30.5	61.0	3.4	5.1	100.0	59,640
Education	None	30.9	60.4	2.6	6.0	100.0	1,731,869
	Primary	55.0	37.0	0.8	7.3	100.0	1,021,800
	Secondary +	59.6	33.2	0.0	7.1	100.0	141,452
	Missing/DK	33.8	33.3	23.6	9.2	100.0	3,696
Wealth index quintiles	Poorest	24.3	66.3	3.8	5.6	100.0	603,866
	Second	30.5	61.1	2.5	5.9	100.0	670,156
	Middle	39.9	53.3	1.4	5.5	100.0	651,924
	Fourth	53.3	39.0	0.7	7.0	100.0	551,156
	Richest	66.0	23.9	0.4	9.7	100.0	421,717
	Total	**40.8**	**50.8**	**1.9**	**6.5**	**100.0**	**2,898,818**

4.5.5 Complications during pregnancy

Table RH.9 shows complications experienced during pregnancy by Sudanese women. There is a clear pattern with regard to background characteristics, whereby women in the poorest wealth quintile are more than twice as likely (16-53 percent, depending on complication) to suffer complications during pregnancy than those in the richest quintile (3-26 percent). In general, less educated women also suffer more than better-educated women.

Women in Southern Sudan are considerably more likely to suffer from such complications than women in the remaining States. Thus, for example, 27 percent of women in Southern Sudan experienced bleeding during pregnancy, a higher figure compared to the remaining States. Among the Southern States there appears to be no clear pattern as to where women are most likely to suffer complications during pregnancy. Rather, women in one State may suffer more from one type of complication but less from other types of complication.

Table RH.9: Complications during pregnancy
Percentage of women aged 15-49 years who gave birth in the two years preceding the survey, by type of pregnancy complications, Sudan, 2006

		Bleeding	Hyper-tension	Edema	Headache	Fever	Abdominal pain	Convulsions	Urinary pain	Jaundice	Severe breathless-ness	Number of women who gave birth in two years preceding survey
State	Northern	4.3	7.6	14.6	18.3	16.3	19.3	2.7	6.7	3.0	11.0	36,320
	River Nile	5.2	6.2	11.7	14.0	13.2	12.2	1.4	9.1	2.1	6.9	52,123
	Red Sea	6.5	8.0	11.8	20.9	14.6	19.3	1.6	8.9	4.1	10.6	42,590
	Kassala	7.0	7.5	13.5	25.4	28.5	16.2	3.8	15.0	5.4	8.3	105,562
	Gadarif	6.9	11.7	14.1	31.4	37.2	27.6	9.0	22.6	10.3	18.6	130,314
	Khartoum	7.5	13.5	15.3	24.9	22.3	17.8	3.3	11.3	3.1	11.5	364,733
	Gezira	4.9	7.7	9.9	23.2	21.1	14.9	2.7	10.9	3.4	7.4	212,346
	Sinnar	6.3	9.9	14.3	35.0	39.7	28.2	3.9	16.1	7.0	21.8	93,892
	Blue Nile	8.5	13.0	18.8	50.8	55.9	34.3	5.6	26.3	11.3	21.9	68,166
	White Nile	4.1	8.6	10.6	30.2	31.2	23.4	3.1	16.7	7.8	14.7	110,693
	N. Kordofan	8.0	14.0	17.0	48.0	48.1	29.3	10.0	24.5	16.8	16.8	181,311
	S. Kordofan	8.9	13.3	13.8	30.7	35.7	17.7	4.6	16.9	8.4	8.4	128,748
	N. Darfur	8.2	19.7	20.4	43.0	40.5	20.9	8.7	16.7	10.4	12.2	131,960
	W. Darfur	7.6	11.8	14.6	35.9	36.4	19.9	5.9	14.8	7.6	9.2	153,542
	S. Darfur	14.8	29.8	33.4	59.2	63.5	39.9	23.4	36.0	31.3	27.9	244,234
	Jonglei	19.1	18.4	29.3	58.9	57.2	44.7	13.5	26.0	7.9	18.4	113,949
	Upper Nile	16.3	17.8	26.7	45.9	38.9	37.0	14.4	23.3	9.3	20.7	101,984
	Unity	54.0	39.1	53.3	71.4	66.7	60.6	30.0	50.3	27.4	42.6	65,656
	Warrap	24.1	18.1	26.3	40.5	51.3	42.7	26.3	30.2	13.4	27.6	83,379
	NBG	36.3	33.6	39.4	67.1	70.5	57.9	26.7	42.5	18.8	32.9	120,235
	WBG	29.4	26.4	35.2	57.3	53.9	50.3	23.0	25.2	17.3	25.5	47,933
	Lakes	26.0	32.8	49.6	78.1	77.3	63.9	44.4	42.5	27.0	49.1	103,432
	W. Equatoria	30.9	34.9	23.3	79.5	67.9	54.6	8.4	29.3	10.8	33.3	48,139
	C. Equatoria	16.7	17.8	23.6	48.4	39.1	33.6	15.6	23.6	9.1	20.4	97,937
	E. Equatoria	18.8	18.5	22.9	69.2	55.8	39.4	13.7	19.9	7.2	12.3	59,640
SUDAN		**13.2**	**17.2**	**21.6**	**42.3**	**42.0**	**30.5**	**11.6**	**22.0**	**11.5**	**18.4**	**2,898,818**
Education	None	16.1	18.8	24.3	48.2	47.6	34.3	15.3	25.3	14.2	21.7	1,731,869
	Primary	8.5	14.7	16.9	34.7	34.5	25.4	6.4	17.6	7.7	13.5	1,021,800
	Secondary+	11.6	13.8	21.3	24.2	26.0	20.2	3.8	13.6	5.1	12.5	141,452
Wealth index quintiles	Poorest	20.1	21.9	29.2	53.9	52.0	40.2	20.1	27.3	16.2	24.8	603,866
	Second	16.3	19.4	24.8	49.7	50.0	35.3	15.0	26.9	14.6	21.0	670,156
	Middle	12.5	16.3	20.8	42.4	43.8	31.0	10.8	23.8	12.2	19.4	651,924
	Fourth	7.2	14.0	14.6	33.4	33.5	21.8	5.7	15.5	7.5	13.6	551,156
	Richest	7.4	12.2	15.8	25.5	23.4	19.8	3.2	12.8	3.9	9.7	421,717

4.5.6 Complications during labour and delivery

The survey gathered data on the percentage of women who had suffered from prolonged labour, high fever, convulsions, and excessive bleeding during labour and delivery. Table RH.10 shows that country-wide, more than 1 in 3 women suffered from prolonged labour and high fever, one in ten women suffered from convulsions, and 1 in 4 women suffered from excessive bleeding. There are clear trends in terms of the women's background statistics: those women in the lowest wealth quintile, and those without any formal education, are appreciably more likely to suffer from all four types of complications than richer or better-educated women. For example, 39 percent of women with no formal education suffered a high fever during labour and delivery, while the figure was 16 percent for women with at least secondary education.

There are also considerable variations in these figures between the different Sudanese States, and in general, figures in the 10 Southern States are marked as the worse (Figures RH.10a-d).

Table RH.10: Complications during labour and delivery
Percentage of women aged 15-49 who gave birth in the two years preceding the survey by type of complications during labour and delivery, Sudan, 2006

		Type of complications (%)			
		Prolonged labour	High fever	Convulsions	Excessive bleeding
State	Northern	15.9	9.7	1.3	3.4
	River Nile	17.1	11.2	1.4	3.4
	Red Sea	20.1	10.6	3.1	5.0
	Kassala	22.1	16.4	3.1	7.5
	Gadarif	26.6	17.9	5.8	9.9
	Khartoum	26.7	11.1	2.4	6.1
	Gezira	13.1	11.4	1.2	3.1
	Sinnar	28.4	23.0	3.1	8.1
	Blue Nile	19.4	29.2	5.2	12.0
	White Nile	22.2	22.0	1.7	8.1
	N. Kordofan	23.0	31.6	6.5	10.8
	S. Kordofan	22.6	25.1	4.1	11.4
	N. Darfur	25.9	31.1	8.5	12.4
	W. Darfur	28.0	27.7	6.4	16.2
	S. Darfur	46.1	51.1	21.7	30.5
	Jonglei	34.2	39.8	11.5	24.0
	Upper Nile	28.1	38.5	8.5	27.8
	Unity	52.3	60.6	32.0	56.8
	Warrap	39.7	43.5	25.0	32.3
	NBG	42.5	63.4	27.1	54.5
	WBG	57.9	50.6	21.2	42.7
	Lakes	70.8	69.1	39.1	63.5
	W. Equatoria	51.4	52.2	12.4	58.6
	C. Equatoria	38.7	32.0	11.8	36.2
	E. Equatoria	34.6	37.7	13.0	25.3
SUDAN		**31.1**	**30.9**	**10.2**	**20.0**
Education	None	34.7	38.5	13.8	25.8
	Primary	26.1	20.0	5.0	11.5
	Secondary+	22.6	15.5	2.9	10.4
Wealth index quintiles	Poorest	38.2	44.8	17.5	34.6
	Second	36.9	39.8	14.5	25.8
	Middle	31.4	31.9	9.6	19.9
	Fourth	24.4	18.0	3.9	8.0
	Richest	20.0	12.1	2.1	5.9

The majority of women in Southern Sudan were more likely to experience prolonged labour (48 percent - (Figure RH.10a). Within the South, over 50 percent of women in the States of Lakes (71 percent), Western Bahr El Ghazal (58 percent), Unity (52 percent), and Western Equatoria (51 percent) said they had experienced prolonged labour. Upper Nile women were least likely to complain of this complication (29 percent).

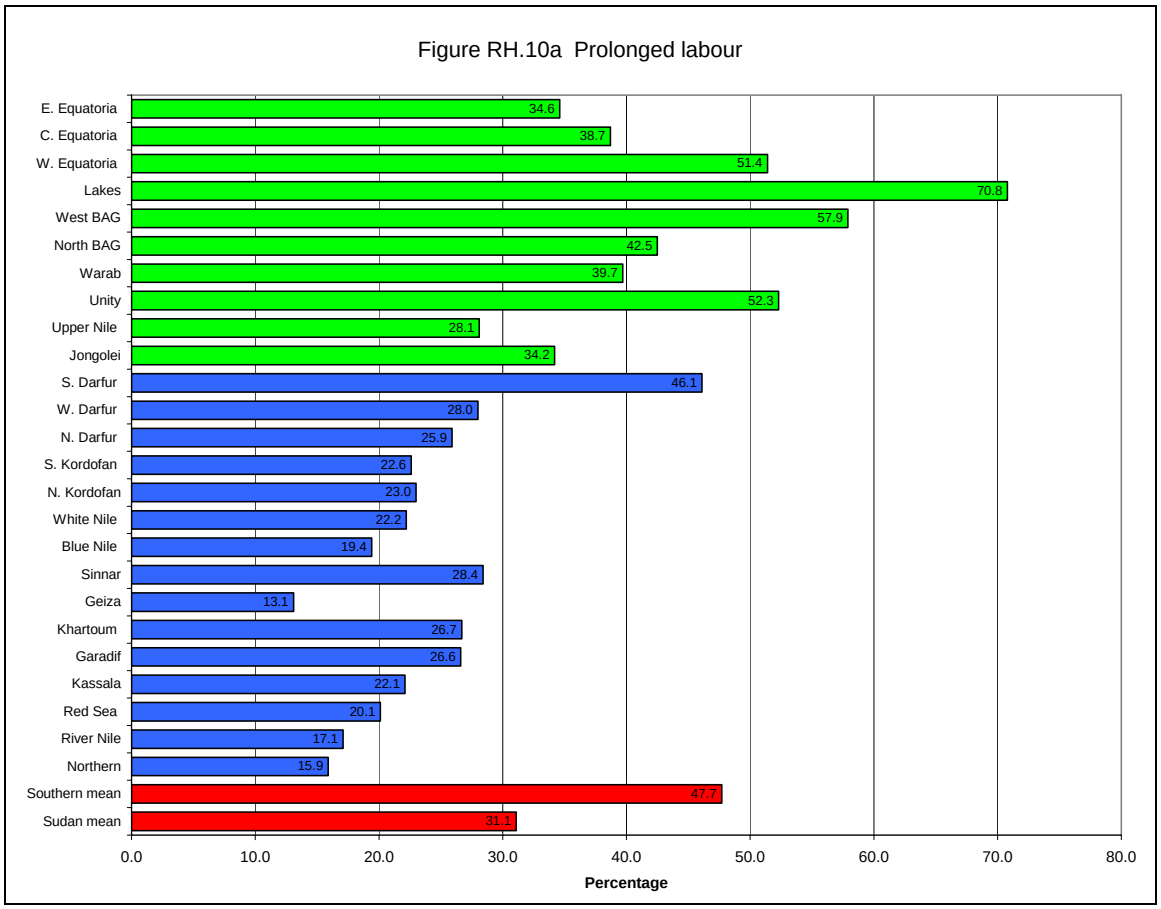

Figure RH.10a Percentage of women aged 15-49 who gave birth in the two years preceding the survey and who experienced prolonged labour

During labour and delivery a higher proportion of women in Southern Sudan suffered a high fever (49 percent - Figure RH.10b). Over 60 percent of women in the Southern States of Lakes (69 percent), Northern Bahr El Ghazal (63 percent), and Unity (60 percent) had such a fever. Women in Central Equatoria were least likely to suffer from a high fever during labour and delivery (32 percent).

Roughly 21 percent of women in Southern Sudan suffered from convulsions during labour and delivery, a figure twice as high as that for the country as a whole (10 percent; Figure RH.10c). Within the South it was again women from Lakes State who were most likely to suffer (40 percent). Figures were also relatively high for Unity (32 percent) and Northern Bahr El Ghazal (27 percent).

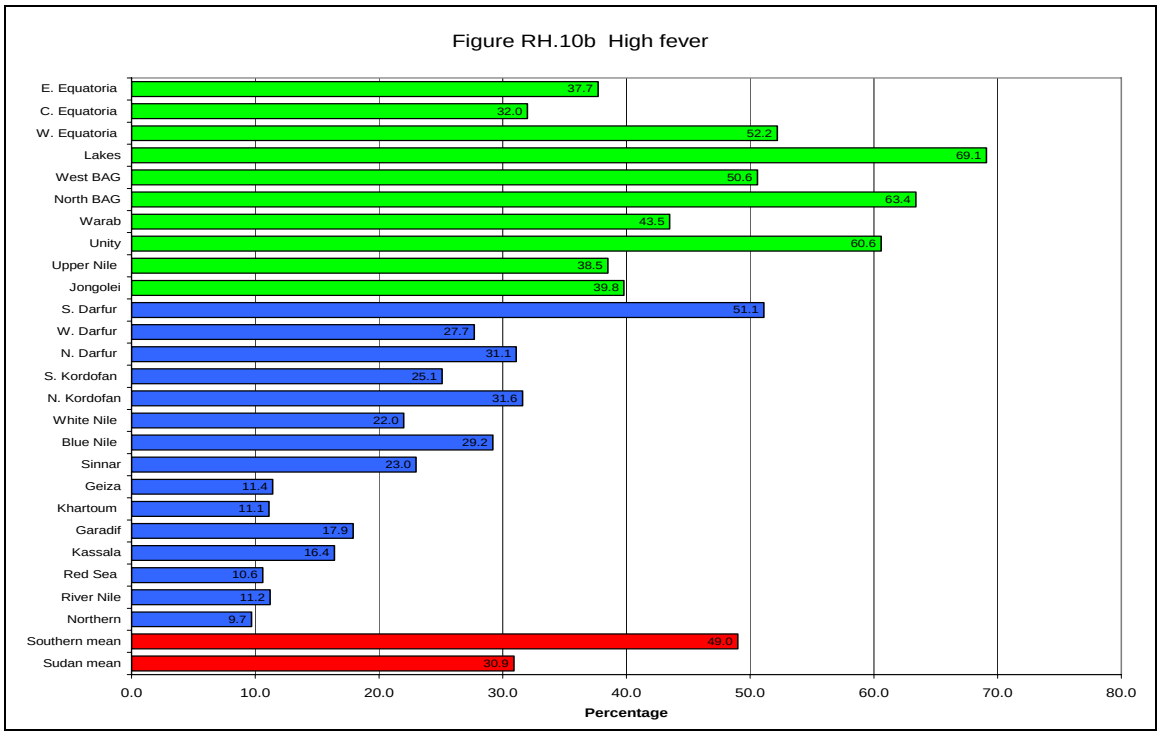

Figure RH.10b Percentage of women aged 15-49 who gave birth in the two years preceding the survey and who experienced high fever

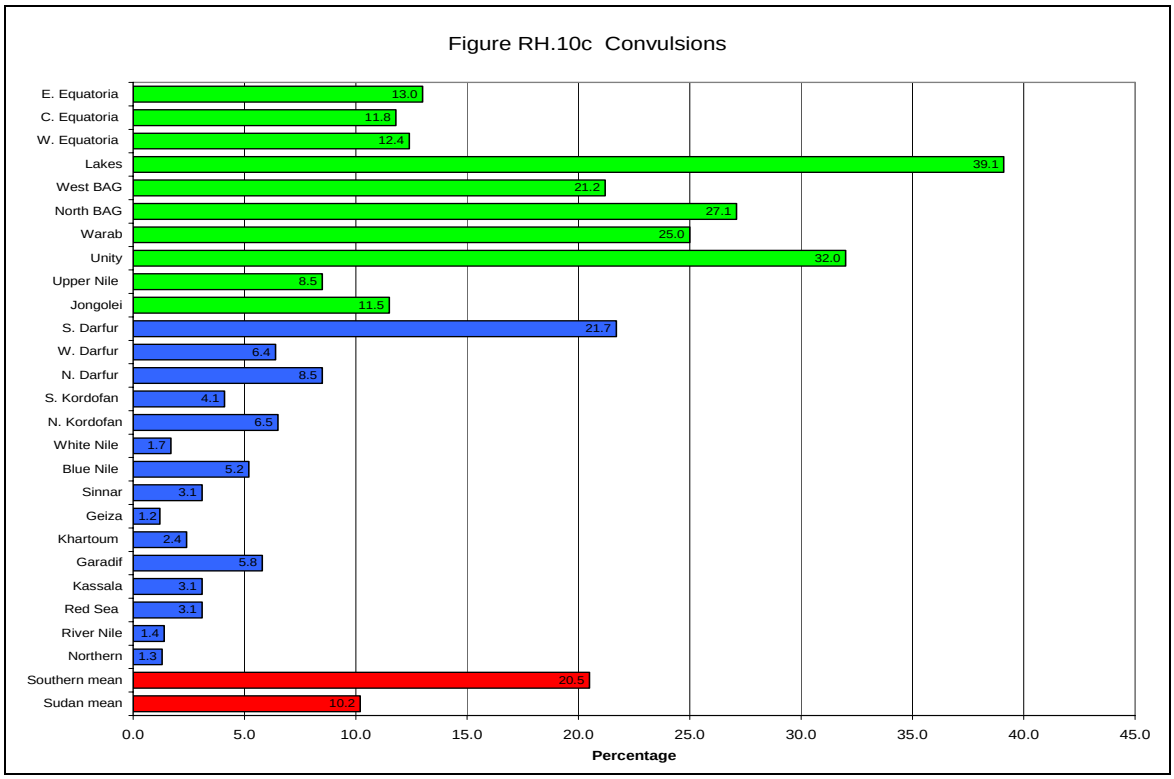

Figure RH.10c Percentage of women aged 15-49 who gave birth in the two years preceding the survey and who experienced convulsions

Excessive bleeding was a complication experienced by twice as many Southern women (42 percent - Figure RH.10d). The findings suggest that women in Lakes State (64 percent) were most likely to bleed excessively during labour, with this complication also widespread in Western Equatoria (59 percent), Unity (57 percent) and Northern Bahr El Ghazal (55 percent). The women of Jonglei (24 percent) and Eastern Equatoria (25 percent) were least likely to experience this complication.

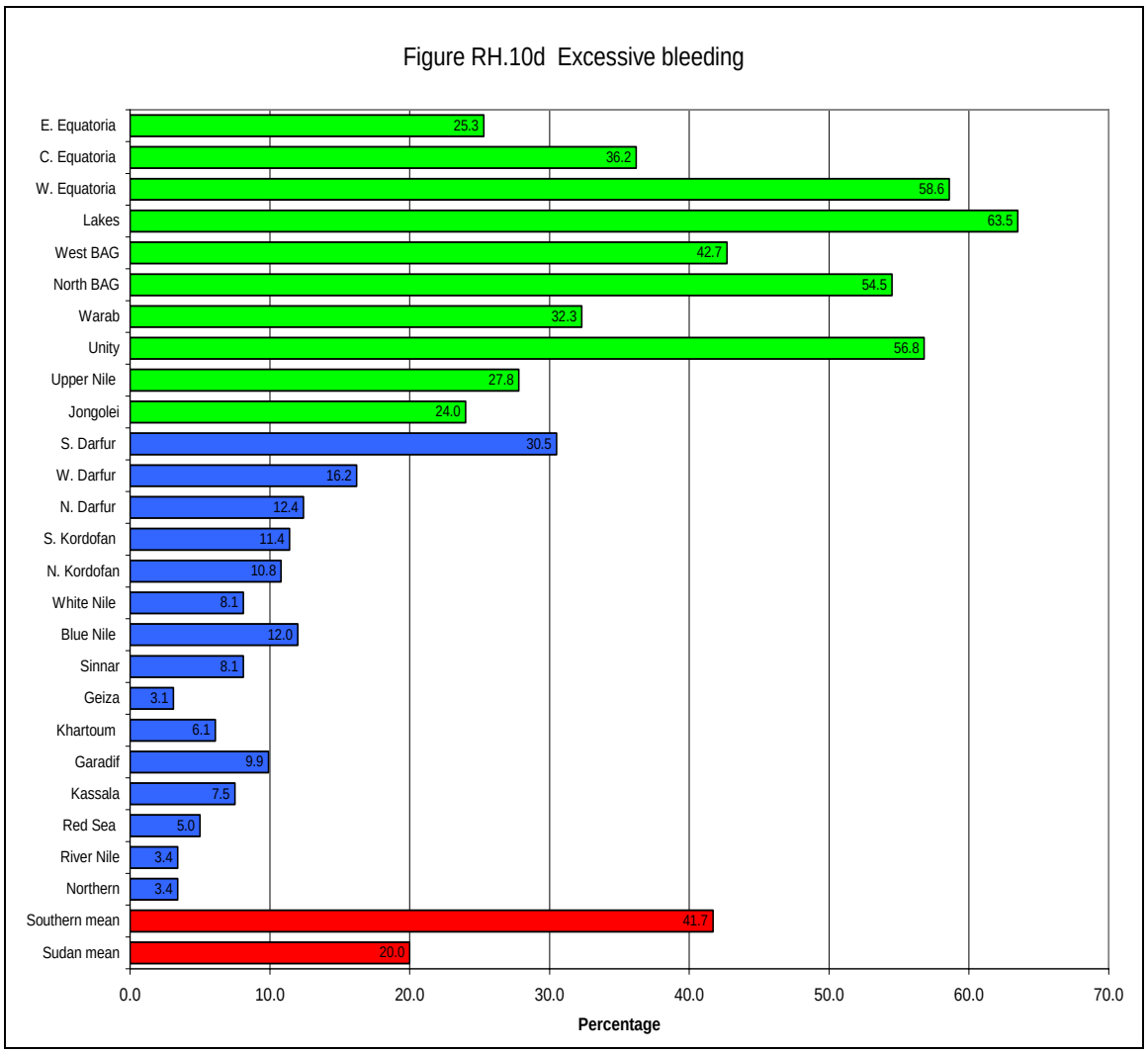

Figure RH.10d Percentage of women aged 15-49 who gave birth in the two years preceding the survey and who experienced excessive bleeding

4.5.7 Outcomes of pregnancies

Table RH.11 shows the pregnancy outcomes of Sudanese women in terms of the percentages of live births, stillbirths and miscarriages. Across the country as a whole, 80 percent of pregnancies culminate in a live birth. Of those pregnancies that are unsuccessful, half are miscarriages and half are stillbirths. Poorer and less educated women are more likely to suffer stillbirths than richer and better-educated women. For example, 18 percent of the pregnancies of women in the bottom wealth quintile had terminated in a stillbirth, while the figure for women in the top wealth quintile was only 4 percent. Interestingly, wealth and education appear to have little bearing on a woman's likelihood of having a miscarriage. Thus a similar proportion (12 percent) of women from the top and bottom wealth quintiles had miscarried.

These average figures conceal considerable variation between States, and between the 10 Southern States and the Majority of the 15 States (Figures RH.11a – c).

Table RH.11: Pregnancy outcomes
Pregnancy outcome for women aged 15-49 years who gave birth in the two years preceding the survey , Sudan, 2006

		Live births	Still births	Miscarriages	Total pregnancies
State	Northern	88.3	2.6	9.1	37,984
	River Nile	91.6	3.4	5.0	57,508
	Red Sea	93.6	1.9	4.5	44,419
	Kassala	93.3	2.8	3.9	113,939
	Gadarif	92.7	1.9	5.4	139,909
	Khartoum	88.4	2.8	8.9	393,247
	Gezira	90.0	1.9	8.1	230,196
	Sinnar	86.7	3.8	9.5	100,169
	Blue Nile	93.3	2.2	4.5	73,348
	White Nile	90.4	5.1	4.5	118,302
	N. Kordofan	89.0	3.9	7.1	195,712
	S. Kordofan	94.0	2.9	3.1	134,734
	N. Darfur	92.3	2.2	5.5	136,556
	W. Darfur	89.8	6.6	3.7	164,324
	S. Darfur	89.0	4.1	6.9	269,298
	Jonglei	66.4	26.3	7.2	154,166
	Upper Nile	64.4	20.8	14.9	153,737
	Unity	72.6	15.8	11.6	91,143
	Warrap	56.3	21.7	22.0	106,522
	NBG	62.4	25.9	11.7	163,418
	WBG	48.0	36.5	15.5	74,546
	Lakes	54.5	24.6	20.9	186,887
	W. Equatoria	72.5	9.5	17.9	61,462
	C. Equatoria	50.4	25.2	24.4	193,698
	E. Equatoria	71.5	20.5	7.9	80,762
SUDAN		**79.5**	**10.6**	**9.9**	**3,475,986**
Education	None	76.1	13.6	10.3	2,158,728
	Primary	84.9	5.6	9.5	1,156,617
	Secondary+	86.8	5.7	7.5	155,682
Wealth index quintiles	Poorest	69.9	17.7	12.3	802,967
	Second	76.7	13.8	9.5	828,572
	Middle	83.7	8.5	7.7	754,559
	Fourth	86.7	4.6	8.7	612,964
	Richest	84.1	4.3	11.6	476,925

Only 3 out 5 (62 percent) of Southern pregnancies culminated in a live birth, as opposed to 4 out of 5 (80 percent) for the country as a whole (Figure RH.11a). Within the South, women in the States of Unity (73 percent), Western Equatoria (73 percent), and Eastern Equatoria (72 percent) were most likely to have a successful pregnancy. Women were least likely to have a successful pregnancy in Western Bahr El Ghazal (48 percent) and Central Equatoria (50 percent), where a disturbing 1 out of every 2 pregnancies did not lead to a live birth.

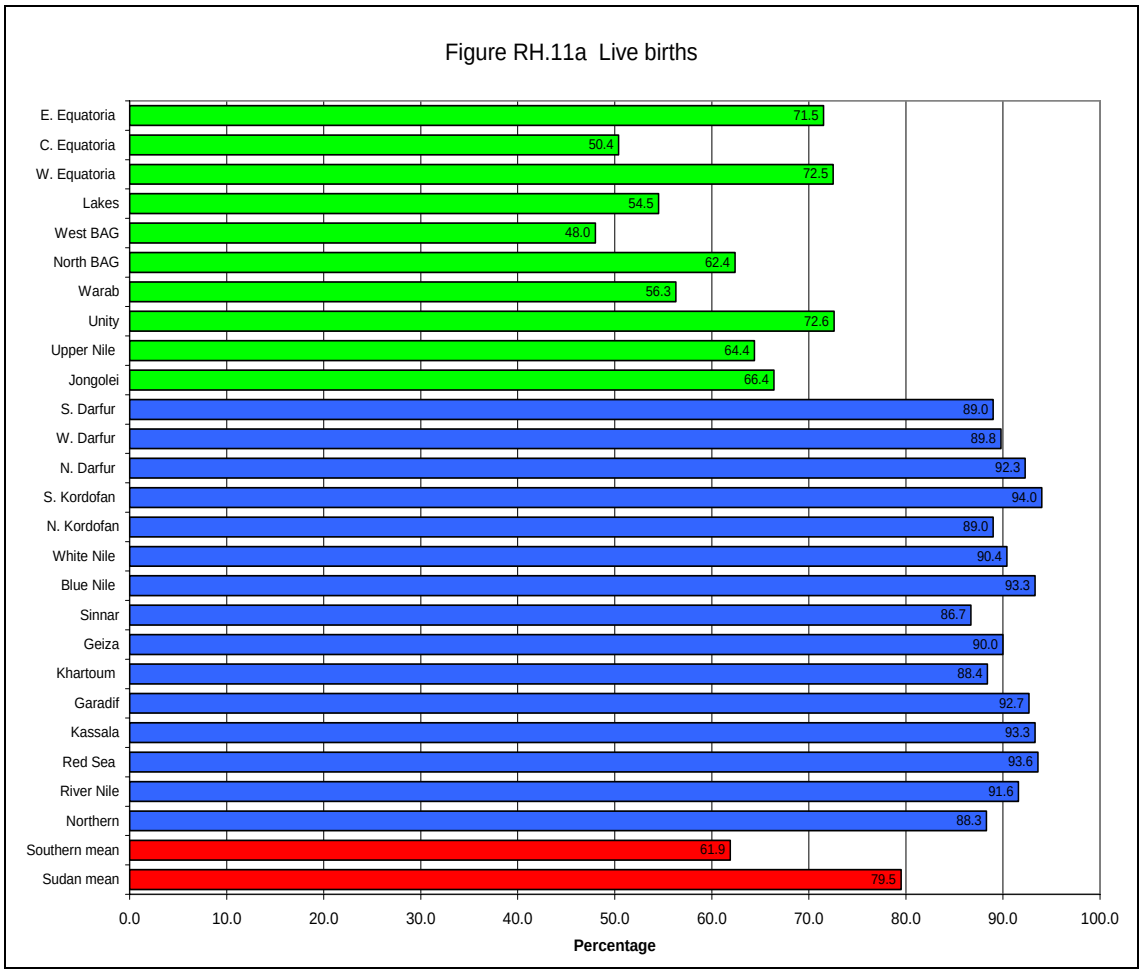

Figure RH.11a Percentage of women aged 15-49 who had been pregnant in the 2 years prior to the study and who gave birth to a live baby

Women in Southern were twice as likely (23 percent) to give birth to a stillborn baby (Figure RH.11b). Within the South, figures are worst for Western Bahr El Ghazal, where over 1 in 3 (37 percent) of pregnancies apparently culminate in a stillbirth. Women in Southern Sudan living in Western Equatoria are least likely (10 percent) to suffer a stillbirth. However, even this figure is considerably higher than the stillbirth figures for any of the remaining States.

The percentage of women whose pregnancy ended in a miscarriage was slightly high in the South (Figure RH.11c).

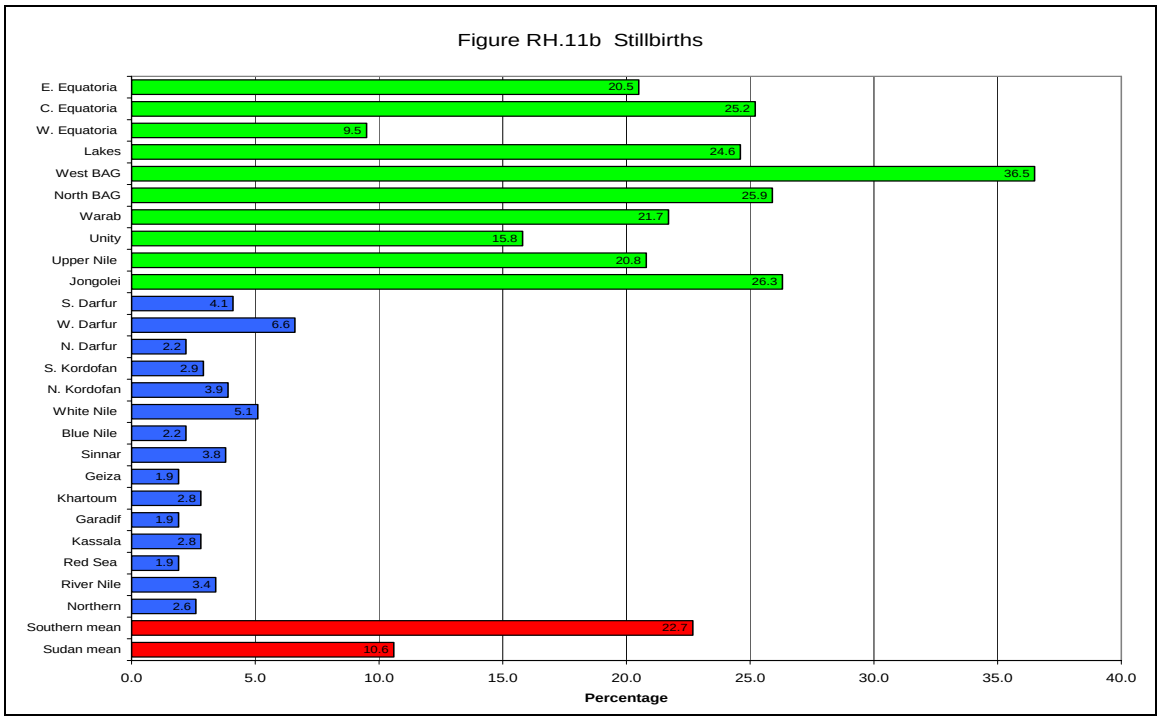

Figure RH.11b Percentage of women aged 15-49 who had been pregnant in the 2 years prior to the study and whose pregnancy culminated in a stillbirth

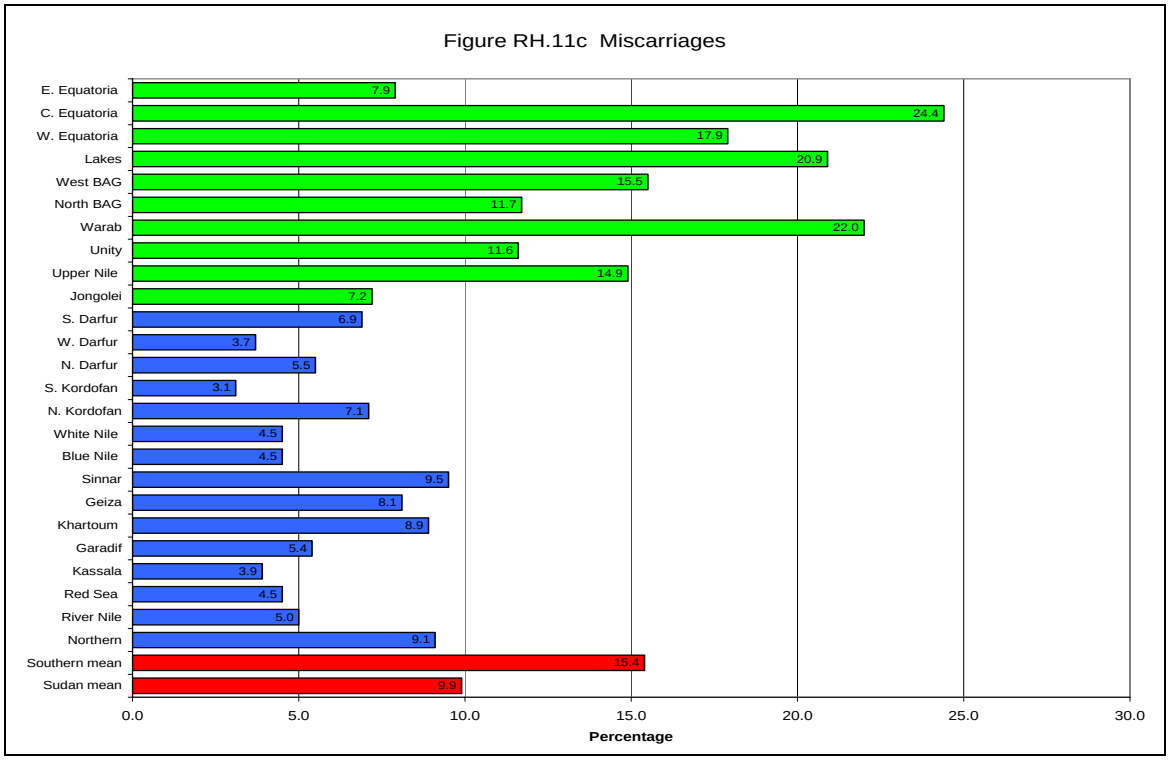

Figure RH.11c Percentage of women aged 15-49 who had been pregnant in the 2 years prior to the study and whose pregnancy terminated in a miscarriage

4.5.8 Postpartum complications

An appreciable percentage of women in the Sudan as a whole experienced one or more postpartum complications (Table RH.12). The most commonly experienced complications were lower back pain (28 percent), abdominal pain (26 percent), and upper back pain (22 percent).

Those women with less education and who belonged to the lower wealth index quintiles were much more likely to suffer postpartum complications than better educated and wealthier women. For example, 18 percent of women with no formal education suffered an edema, while the figure was 9 percent for those women with at least secondary education. Similarly, women in the bottom wealth quintile were 6 times as likely to suffer an edema as the wealthiest women.

The findings suggest stark differentials in this indicator among the 25 Sudanese States, whereby women in the South were far more likely to experience postpartum complications. Indeed, women in the South are generally twice as likely to suffer postpartum complication. For example, 29 percent of women in the North suffered from postpartum bleeding, a figure twice the national average (15 percent).

Table RH.12 :Complications during postpartum
Percentage of women pregnant in past two years by complication during postpartum period, Sudan, 2006

		Bleeding	Edema	Discharge	Abdominal pain	Lower back pain	Upper back pain	Painful urination	Painful breasts	Dripping	Total	Number of women pregnant in past two years
State	Northern	1.3	5.0	3.4	9.4	10.9	8.0	6.3	6.9	1.7	100.0	36,320
	River Nile	3.7	5.1	5.5	8.2	8.5	5.5	7.5	6.1	2.7	100.0	52,123
	Red Sea	4.4	7.4	3.5	9.3	12.5	12.2	6.8	6.1	2.6	100.0	42,590
	Kassala	5.4	5.3	4.9	12.6	15.7	8.5	12.6	5.4	3.0	100.0	105,562
	Gadarif	7.2	9.0	10.1	21.5	23.1	14.6	11.9	16.6	3.1	100.0	130,314
	Khartoum	5.1	5.1	5.5	11.8	14.9	12.6	6.7	6.6	1.1	100.0	364,733
	Gezira	2.1	2.0	6.7	8.9	11.6	5.4	3.3	4.5	2.7	100.0	212,346
	Sinnar	5.8	4.8	7.5	17.0	22.0	14.0	13.6	9.5	0.7	100.0	93,892
	Blue Nile	9.2	8.0	7.3	25.8	31.4	23.1	14.6	18.2	2.7	100.0	68,166
	White Nile	5.4	6.0	8.5	13.8	16.1	8.2	13.2	13.5	3.2	100.0	110,693
	N. Kordofan	9.0	9.3	9.8	21.3	26.3	17.3	20.1	16.8	3.5	100.0	181,311
	S. Kordofan	10.9	4.9	4.4	16.4	15.6	10.9	13.1	10.6	3.8	100.0	128,748
	N. Darfur	10.7	8.7	8.7	21.1	20.4	18.7	11.4	12.9	2.2	100.0	131,960
	W. Darfur	9.0	6.5	3.1	18.0	14.6	9.8	9.8	10.7	0.6	100.0	153,542
	S. Darfur	29.8	27.0	19.3	39.6	42.5	32.0	24.3	29.6	9.3	100.0	244,234
	Jonglei	15.6	17.9	12.9	29.8	32.5	28.1	21.5	24.5	12.9	100.0	113,949
	Upper Nile	15.3	23.5	17.9	34.7	39.2	32.5	26.5	23.1	11.6	100.0	101,984
	Unity	51.6	56.4	43.6	57.7	57.5	56.4	52.6	49.9	41.4	100.0	65,656
	Warrap	22.9	18.6	19.9	35.5	38.1	36.4	26.0	27.3	13.9	100.0	83,379
	North BEG	37.3	33.0	35.8	50.9	53.0	55.2	41.2	37.3	37.6	100.0	120,235
	West BEG	33.0	30.9	17.9	44.2	52.4	39.4	25.8	26.1	18.2	100.0	47,933
	Lakes	38.6	41.6	33.2	62.7	67.0	58.0	47.4	36.4	34.5	100.0	103,432
	W. Equatoria	35.5	26.6	26.2	56.0	54.4	45.2	29.0	30.6	6.5	100.0	48,139
	C. Equatoria	17.6	15.2	12.7	28.8	26.8	25.4	19.6	14.3	10.0	100.0	97,937
	E. Equatoria	18.5	16.4	11.1	43.9	43.2	38.7	18.8	26.1	10.5	100.0	59,640
Education	None	18.8	18.2	15.6	31.2	32.9	27.6	22.1	21.2	11.3	100.0	1,731,869
	Primary	8.7	7.5	7.8	17.4	19.9	14.3	11.5	11.6	3.6	100.0	1,021,800
	Secondary +	5.0	9.0	7.4	13.3	18.6	12.0	7.9	9.2	2.3	100.0	141,452
	Missing/DK	28.2	32.9	13.1	52.5	43.1	47.0	23.6	30.8	33.0	100.0	3,696
Wealth index quintile	Poorest	24.8	24.1	19.5	38.7	40.7	33.7	27.1	26.0	16.1	100.0	603,866
	Second	19.3	20.2	16.8	32.3	33.2	28.8	23.5	22.0	12.2	100.0	670,156
	Middle	13.4	12.0	10.7	25.0	26.8	20.8	16.7	16.5	5.8	100.0	651,924
	Fourth	6.9	5.6	7.3	13.5	16.8	11.9	8.8	10.6	2.4	100.0	551,156
	Richest	4.1	3.9	5.0	12.4	15.6	10.7	7.9	7.1	1.8	100.0	421,717
Total		**14.5**	**14.0**	**12.4**	**25.5**	**27.6**	**22.1**	**17.6**	**17.2**	**8.2**	**100.0**	**2,898,818**

4.5.9 Maternal Mortality

The complications of pregnancy and childbirth are a leading cause of death and disability among women of reproductive age in developing countries. It is estimated worldwide that around 529,000 women die each year from maternal causes. And for every woman who dies, approximately 20 more suffer injuries, infection and disabilities in pregnancy or childbirth. This means that at least 10 million women a year incur this type of damage.

The most common fatal complication is post-partum haemorrhage. Sepsis, complications of unsafe abortion, prolonged or obstructed labour and the hypertensive disorders of pregnancy, especially eclampsia, claim further lives. These complications, which can occur at any time during pregnancy and childbirth without forewarning, require prompt access to quality obstetric services equipped to provide lifesaving drugs, antibiotics and transfusions and to perform the caesarean sections and other surgical interventions that prevent deaths from obstructed labour, eclampsia and intractable haemorrhage. One MDG target is to reduce by three quarters, between 1990 and 2015, the maternal mortality ratio.

Maternal mortality is defined as the death of a woman from pregnancy-related causes, when pregnant or within 42 days of termination of pregnancy. The maternal mortality ratio is the number of maternal deaths per 100,000 live births. In MICS, the maternal mortality ratio is estimated by using the indirect sisterhood method. To collect the information needed for the use of this estimation method, adult household members are asked a small number of questions regarding the survival of their sisters and the timing of death relative to pregnancy, childbirth and the postpartum period for deceased sisters. The information collected is then converted to lifetime risks of maternal death and maternal mortality ratios[4].

The Sudan's MICS results on maternal mortality are shown in Figure RH.13. Note that the estimates refer to approximately [Month and 2006]. The results are also presented only for the State wide totals, since maternal mortality ratios generally have very large sampling errors. The maternal mortality ratio for the country as a whole is 1,107 deaths per 100,000 live births.

[4] For more information on the indirect sisterhood method, see WHO and UNICEF, 1997.

Table RH.13. Maternal mortality ratio
Percentage of deaths of women from pregnancy-related causes, when pregnant or within 42 days of termination of pregnancy, per 1000,000 live births, Sudan, 2006

State	Maternal Mortality ratio
Northern	94
River Nile	161
Red Sea	166
Kassala	1,414
Gadarif	609
Khartoum	311
Gezira	355
Sinnar	320
Blue Nile	515
White Nile	366
North Kordofan	213
South Kordofan	503
North Darfur	346
West Darfur	1,056
South Darfur	1,581
Jonglei	1,861
Upper Nile	2,094
Unity	1,732
Warrap	2,173
Northern Bahr El Ghazal	2,182
Western Bahr El Ghazal	2,216
Lakes	2,243
Western Equatoria	2,327
Central Equatoria	1,867
Eastern Equatoria	1,844
SUDAN (national total)	**1,107**

*SHHS indicator 68: *Maternal mortality ratio*: Number of deaths of women from pregnancy related causes, when pregnant or within 42 days of termination of pregnancy, per 100,000 live births

All Southern States have appreciably greater mortality ratios than the national average. Indeed, the average maternal mortality ratio for the Southern States is more than twice as high as the ratio for the Sudan as a whole. Figures were worst for Western Equatoria (2,327), Lakes (2,243), and Western Bahr El Ghazal (2,216). Among the Southern States the maternal mortality ratio was lowest in Unity (1,732). Figure RH 13 below indicates Maternal Mortality Ratio across the 25 States of Sudan with the ratio being very high in the 10 Southern States.

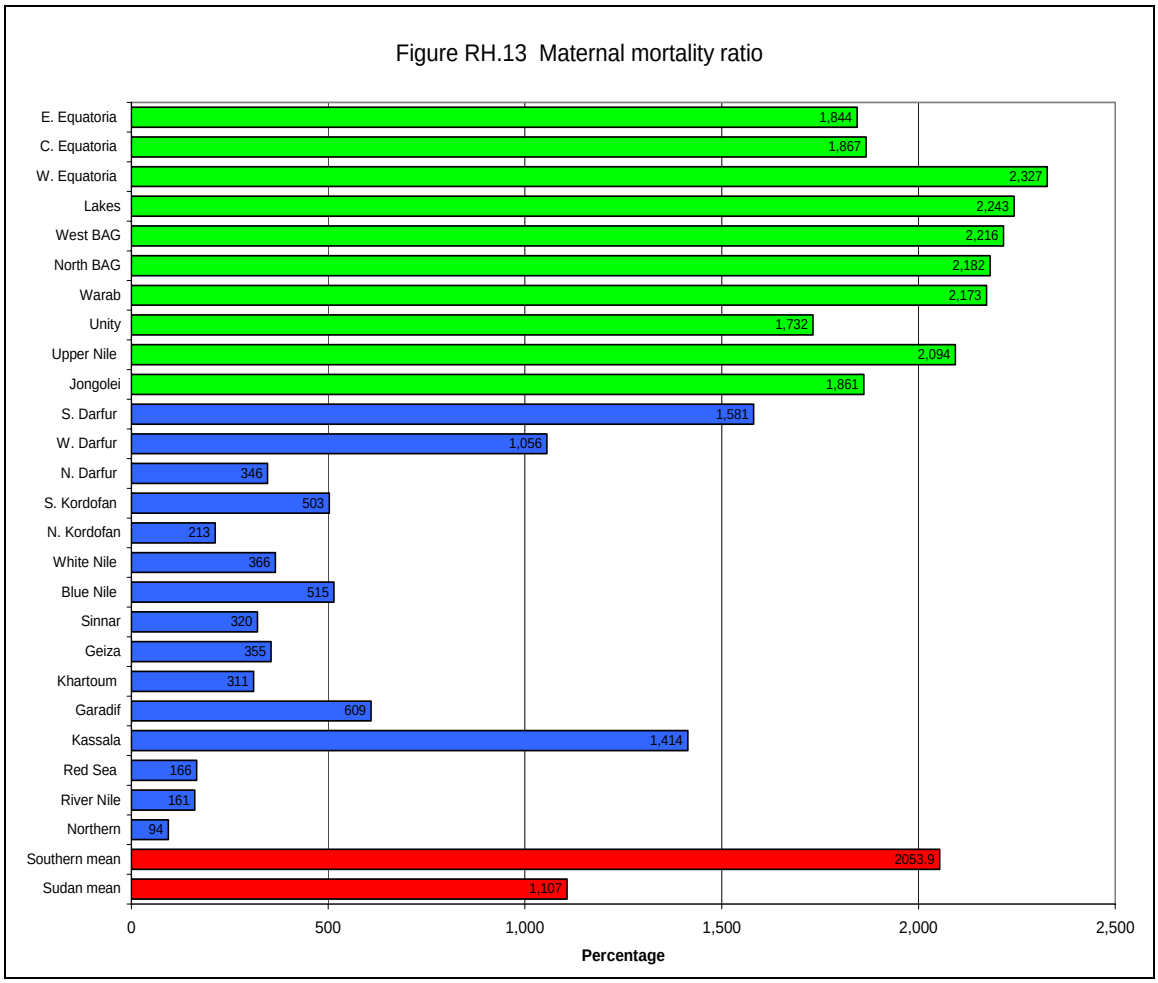

Figure RH.13 Number of deaths of women from pregnancy-related causes, when pregnant or within 42 days of termination of pregnancy, per 100,000 live birth

4.6 Education

4.6.1 Primary and Secondary School Participation

Universal access to basic education and the achievement of primary education by the world's children is one of the most important goals of the Millennium Development Goals and A World Fit for Children. Education is a vital prerequisite for combating poverty, empowering women, protecting children from hazardous and exploitative labour and sexual exploitation, promoting human rights and democracy, protecting the environment, and influencing population growth.

The indicators for primary and secondary school attendance include:

- Net intake rate in primary education
- Net primary school attendance rate
- Net secondary school attendance rate
- Net primary school attendance rate of children of secondary school age
- Female to male education ratio (GPI)

The indicators of school progression include:

- Survival rate to grade five
- Transition rate to secondary school
- Net primary completion rate

Table ED.1 shows the percentage of children of primary school entry age who are currently attending grade 1.

Table ED.1: Primary school entry
Percentage of children of primary school entry age attending grade 1, Sudan, 2006

		Percentage of children of primary school entry age currently attending grade 1 *	Number of children of primary school entry age
Sex	Male	31.6	617,966
	Female	27.5	661,837
State	Northern	51.4	14,336
	River Nile	69.8	18,578
	Red Sea	48.0	17,866
	Kassala	23.9	59,477
	Gadarif	28.3	58,643
	Khartoum	66.9	147,478
	Gezira	53.9	95,306
	Sinnar	33.3	37,789
	Blue Nile	26.1	24,837
	White Nile	35.0	45,859
	North Kordofan	35.3	85,200
	South Kordofan	25.9	68,166
	North Darfur	26.4	61,335
	West Darfur	20.8	78,358
	South Darfur	22.5	134,748
	Jonglei	6.6	54,672
	Upper Nile	8.1	30,271
	Unity	1.9	14,815
	Warrap	2.0	49,607
	Northern Bahr El Ghazal	1.0	45,181
	Western Bahr El Ghazal	4.8	11,645
	Lakes	3.9	38,161
	Western Equatoria	15.4	22,320
	Central Equatoria	20.0	34,439
	Eastern Equatoria	5.6	30,713
Mother's education	None	30.3	411,792
	Primary	30.5	112,564
	Secondary +	28.3	43,370
	Non-standard curriculum	16.8	8,754
	Mother not in household	28.4	94,660
	Missing/DK	22.1	753
Wealth index quintiles	Poorest	9.0	292,459
	Second	15.1	309,042
	Middle	23.8	276,884
	Fourth	51.2	235,258
	Richest	71.0	166,159
Total		**29.5**	**1,279,803**

*SHHS indicator 39: *Net intake rate in primary education* (Proportion of children of primary school-entry age who are currently attending first grade in primary school)

As a percentage of children of primary school entry age (7 years old), in the Sudan as a whole 30 percent are attending the first grade of primary school. There is some difference in this figure according to the sex of the child, with boys (32 percent) more likely to attend grade 1 of primary school than girls (28 percent). The education level of the mother appears to have little bearing on the likelihood of her primary-school-age children attending grade 1. However, children from the richest wealth quintile are 8 times more likely to attend grade 1 of primary school (71 percent) as those from the poorest quintile (9 percent).

Nonetheless, the most important factor determining the likelihood of a primary-age child attending school is the State in which s/he lives, and whether s/he lives in the North or the South of the country (Figure ED.1). On average, only 7 percent of potential grade 1 pupils in the South attend grade 1. Figures are highest in Central Equatoria (20 percent) and Western Equatoria (15 percent). Children of grade 1 age are least likely to attend grade 1 in Northern Bahr El Ghazal (1 percent), Unity (2 percent), and Warrap (2 percent).

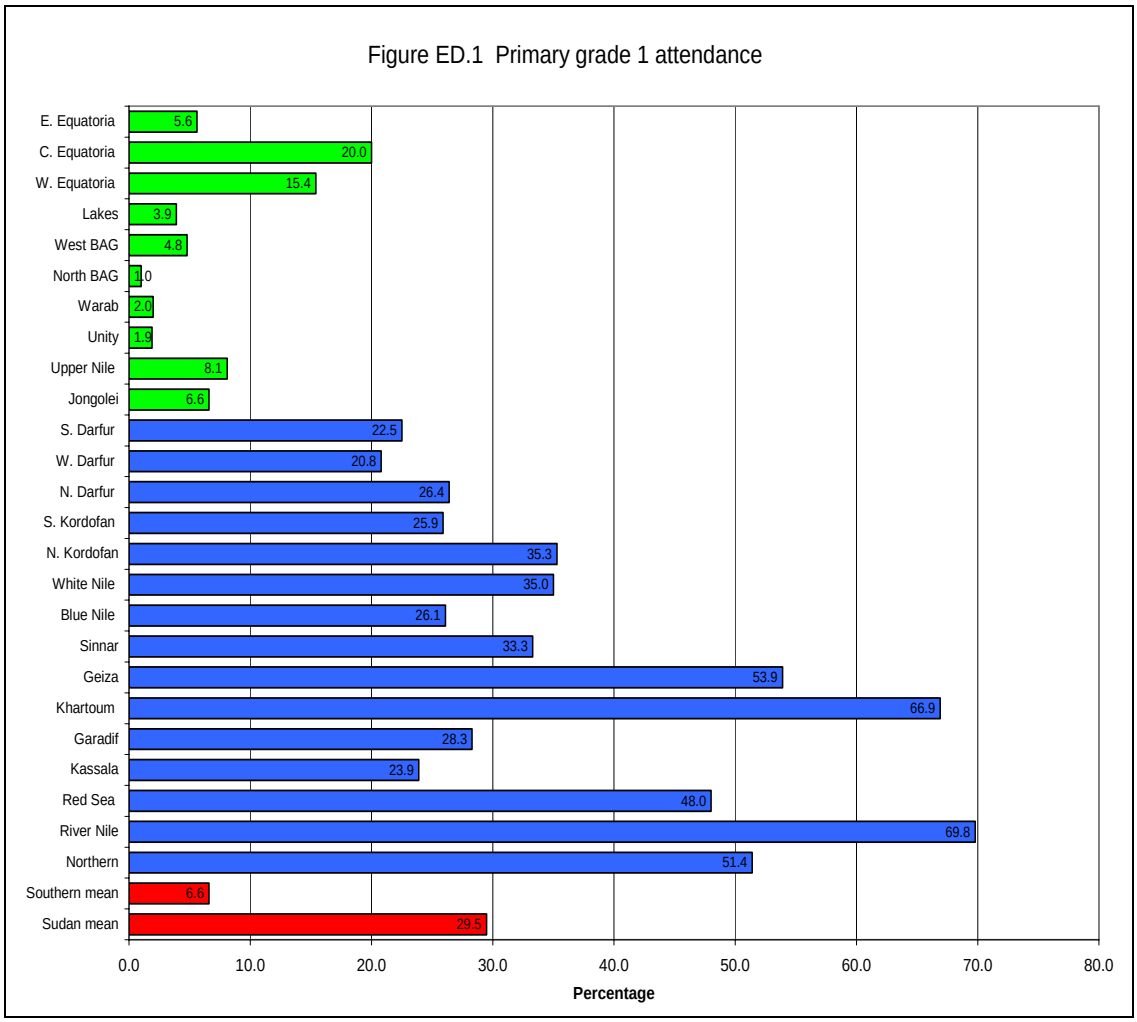

Figure ED.1 Proportion of children of primary school-entry age who are currently attending first grade in primary school

Table ED.2 provides the percentage of children of primary school age attending primary or secondary school, often termed the Net Attendance Ration (NAR).

Table ED.2: Primary school net attendance ratio (NAR)
Percentage of children of primary school age attending primary school or secondary school, Sudan, 2006

		Male net attendance ratio	Female net attendance ratio	Total net attendance ratio	Number of children
Age	Northern	87.8	86.3	87.0	130,942
	River Nile	91.9	90.4	91.1	179,578
	Red Sea	67.4	71.4	69.5	141,593
	Kassala	53.1	48.3	50.7	406,365
	Gadarif	61.0	55.5	58.1	432,296
	Khartoum	88.1	84.6	86.3	1,132,015
	Gezira	85.9	82.0	83.9	821,410
	Sinnar	71.9	61.1	66.6	301,138
	Blue Nile	57.5	47.9	52.9	173,629
	White Nile	76.4	71.2	73.8	342,388
	North Kordofan	70.7	64.7	67.6	562,170
	South Kordofan	59.6	47.2	53.3	387,566
	North Darfur	68.3	66.0	67.1	411,121
	West Darfur	53.7	39.5	46.4	445,386
	South Darfur	60.3	52.5	56.3	842,728
	Jonglei	10.8	8.6	9.7	406,753
	Upper Nile	24.2	20.9	22.8	236,063
	Unity	4.5	4.0	4.3	146,426
	Warrap	9.2	6.1	7.7	407,123
	North Bahr El Ghazal	7.8	3.4	5.7	367,838
	West Bahr El Ghazal	10.5	6.4	8.7	100,848
	Lakes	14.2	8.6	11.3	262,827
	West Equatoria	47.2	42.9	44.9	158,936
	Central Equatoria	44.2	41.7	43.0	269,775
	East Equatoria	14.6	13.2	13.9	245,360
Age	7	34.4	32.1	33.2	1,279,803
	8	42.4	40.0	41.2	1,366,842
	9	57.1	54.7	56.0	1,063,224
	10	58.4	53.2	55.8	1,412,298
	11	69.5	65.9	67.7	895,343
	12	62.7	59.5	61.2	1,295,850
	13	67.3	62.5	64.9	908,073
	14	62.7	55.6	58.6	1,090,839
Mother's education	None	56.0	52.0	54.0	3,009,482
	Primary	57.0	49.9	53.5	771,434
	Secondary +	52.2	50.0	51.1	272,803
	Non-standard curriculum	45.9	29.7	38.4	62,134
	Mother not in household	55.1	54.8	54.9	697,782
	Missing/DK	68.0	54.9	61.6	13,994
Wealth index Quintile	Poorest	22.4	16.4	19.4	2,131,929
	Second	36.1	30.4	33.3	2,001,515
	Middle	58.7	52.8	55.7	1,911,405
	Fourth	83.6	82.0	82.8	1,770,482
	Richest	93.6	92.1	92.9	1,496,941
	Total	**55.7**	**51.7**	**53.7**	**9,312,272**

* SHHS indicator 40: Primary school net attendance rate (NAR) (Proportion of primary school-age children currently attending primary school); MDG indicator 6

Nationwide, a slight majority (54 percent) of primary school age children are attending school, leaving almost half of children not even receiving primary education. The child's age is positively correlated with the likelihood that s/he will be going to school, with only 33 percent of 7-year-olds but 59 percent of 14-year–olds attending primary school. Differential figures for girls and boys are discussed in the following section.

Considering background characteristics, the mother's educational background has little influence on the likelihood of her child attending primary school. However, the wealth quintile to which a child belongs appears to be an excellent predictor of school attendance. Thus while only 1 in 5 children (19 percent) from the lowest wealth quintile go to school, over 9 out of 10 of the wealthiest children have this opportunity.

Nonetheless, the most important predictor of primary school attendance is the State in which the child lives. On average, only 16 percent of Southern children ever go to primary school, less than a third the figure for the Sudan as a whole. Within the South, primary school attendance is highest in Western and Central Equatoria, where the figures are 45 percent and 43 percent, respectively. The States of Unity (4 percent), Northern Bahr El Ghazal (6 percent), and Warrap (8 percent) have the worst figures.

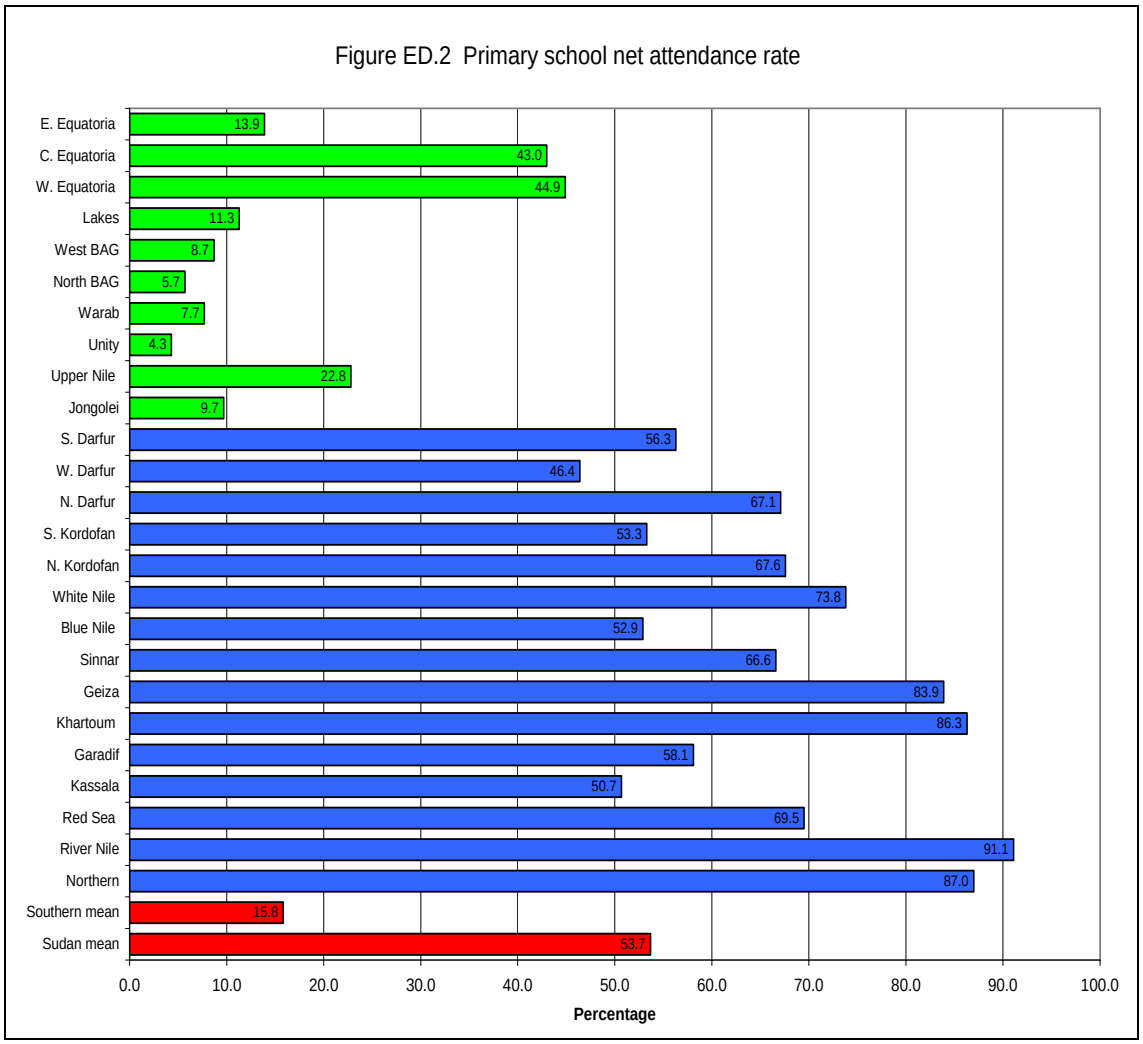

Figure ED.2 Proportion of primary school-age children currently attending primary school

4.6.2 Gender Parity

The ratio of girls to boys attending primary school (known also as the Gender Parity Index) is shown in Table ED.3. Across the Sudan as a whole, 93 girls attend primary school for every 100 boys that do so. The educational background of the child's mother appears to have little bearing on this index. The GPI is lower for poorer households (in the poorest quintile, only 73 girls attend school for every 100 boys), and almost reaches parity in the fourth and fifth quintiles (in which 98 girls attend primary school for every 100 boys).

Table ED.3: Gender parity in primary education
Ratio of girls to boys attending primary education, Sudan, 2006

		Primary school net attendance ratio (girls) (%)	Primary school net attendance ratio (boys) (%)	**Gender parity index** (GPI) for primary school NAR*
State	Northern	86.3	87.8	0.98
	River Nile	90.4	91.9	0.98
	Red Sea	71.4	67.4	1.06
	Kassala	48.3	53.1	0.91
	Gadarif	55.5	61.0	0.91
	Khartoum	84.6	88.1	0.96
	Gezira	82.0	85.9	0.95
	Sinnar	61.1	71.9	0.85
	Blue Nile	47.9	57.5	0.83
	White Nile	71.2	76.4	0.93
	N. Kordofan	64.7	70.7	0.91
	S. Kordofan	47.2	59.6	0.79
	N. Darfur	66.0	68.3	0.97
	W. Darfur	39.5	53.7	0.74
	S. Darfur	52.5	60.3	0.87
	Jonglei	8.6	10.8	0.80
	Upper Nile	20.9	24.2	0.86
	Unity	4.0	4.5	0.87
	Warrap	6.1	9.2	0.66
	NBG	3.4	7.8	0.43
	WBG	6.4	10.5	0.61
	Lakes	8.6	14.2	0.60
	W. Equatoria	42.9	47.2	0.91
	C. Equatoria	41.7	44.2	0.94
	E. Equatoria	13.2	14.6	0.91
	SUDAN	**51.7**	**55.7**	**0.93**
Mother's education	None	52.0	56.0	0.93
	Primary	49.9	57.0	0.88
	Secondary+	50.0	52.2	0.96
Wealth index quintiles	Poorest	16.4	22.4	0.73
	Second	30.4	36.1	0.84
	Middle	52.8	58.7	0.90
	Fourth	82.0	83.6	0.98
	Richest	92.1	93.6	0.98

*SHHS indicator 45: Gender parity index for primary school NAR (Ratio of primary school-age girls to boys currently attending primary school); MDG indicator 9

In the South the average GPI is 0.8. (Figure ED.3). In greater Equatoria the GPI is similar to that for the 15 States States, i.e. with roughly nine girls attending primary school for every 10 boys. However, girls are particularly disadvantaged in the other states, compared to boys, especially in Northern Bahr El Ghazal, Lakes, and Western Bahr El Ghazal, which all have gender parity indices of around 0.6 or less.

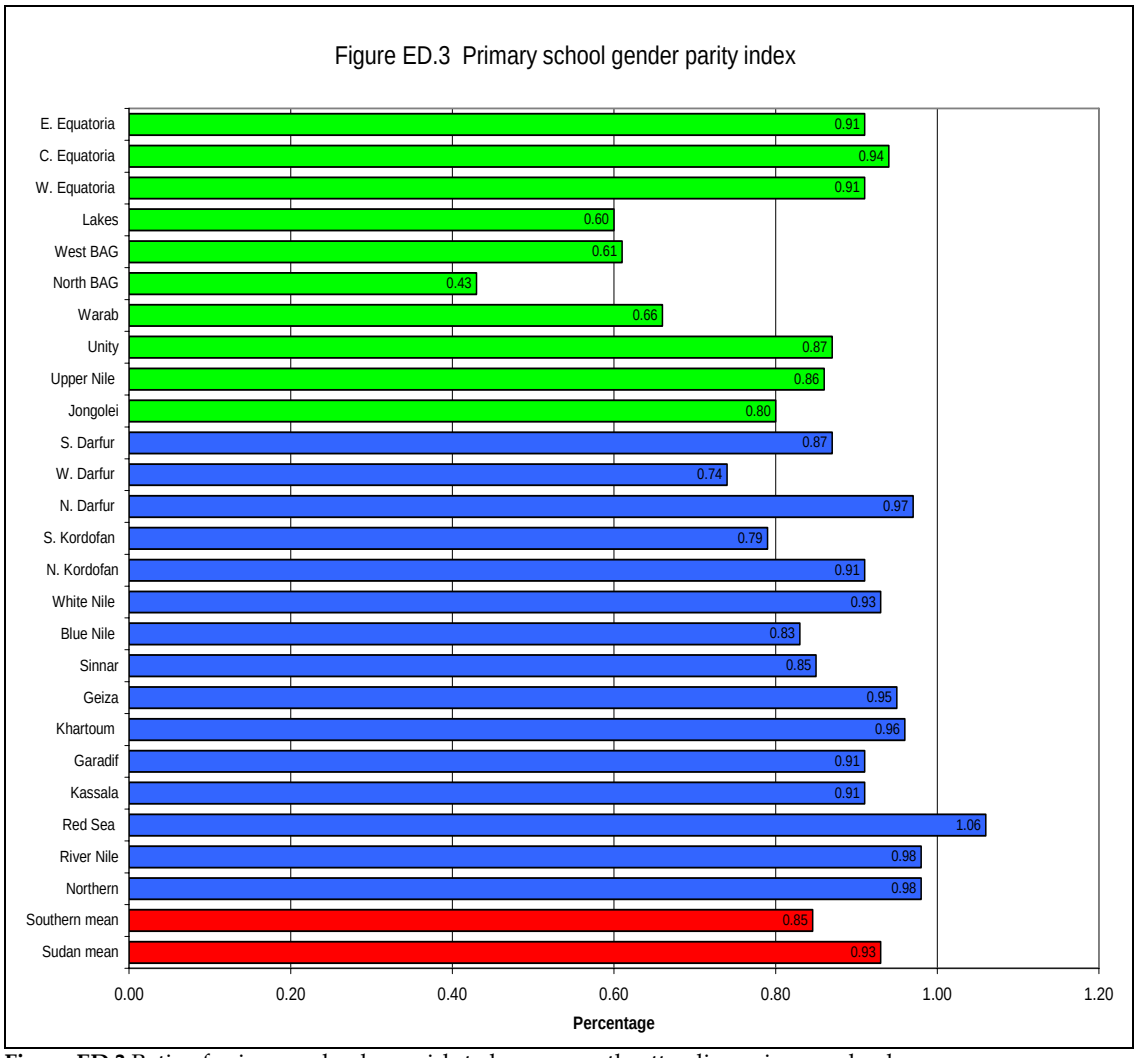

Figure ED.3 Ratio of primary school-age girls to boys currently attending primary school

4.6.3 Secondary School Attendance

Table ED.4 shows the percentage of Sudanese children of secondary school age who currently attend secondary school.

Table ED.4: Secondary school net attendance ratio (NAR)
Percentage of children of secondary school age attending secondary or higher school, Sudan, 2006

		Male		Female		Total	
		Net attendance ratio	Number of children	Net attendance ratio	Number of children	Net attendance ratio	Number of children
State	Northern	33.2	21,861	45.8	17,005	38.7	38,867
	River Nile	32.4	32,147	52.6	26,464	41.6	58,611
	Red Sea	26.8	23,683	32.3	18,110	29.2	41,793
	Kassala	14.5	55,666	20.4	45,526	17.2	101,193
	Gadarif	10.3	58,046	14.8	47,742	12.3	105,788
	Khartoum	34.3	209,961	42.8	152,596	37.9	362,557
	Gezira	29.7	135,997	41.6	123,686	35.4	259,683
	Sinnar	14.7	43,256	20.8	41,246	17.7	84,502
	Blue Nile	6.8	25,682	6.5	19,455	6.7	45,137
	White Nile	17.2	58,157	21.0	53,754	19.1	111,911
	North Kordofan	14.2	65,396	22.1	72,774	18.3	138,170
	South Kordofan	8.5	42,533	7.4	40,742	8.0	83,275
	North Darfur	13.6	61,914	24.5	44,844	18.2	106,758
	West Darfur	11.3	52,485	8.9	41,397	10.2	93,882
	South Darfur	12.5	106,031	13.7	72,344	13.0	178,376
	Jonglei	0.5	50,135	1.7	27,223	0.9	77,358
	Upper Nile	4.8	25,388	0.0	14,647	3.0	40,035
	Unity	0.0	17,395	0.0	11,278	0.0	28,674
	Warrap	0.9	54,495	0.0	36,900	0.5	91,395
	Northern BEG	0.4	52,751	0.6	42,343	0.5	95,094
	Western BEG	0.5	15,131	0.0	10,457	0.3	25,588
	Lakes	0.6	24,187	0.0	16,796	0.3	40,983
	West Equatoria	2.4	25,876	2.9	16,924	2.6	42,800
	C. Equatoria	16.1	39,687	6.6	27,223	12.3	66,911
	East Equatoria	1.4	24,814	2.9	23,772	2.1	48,586
Age	15	9.7	515,603	14.6	314,122	11.6	829,725
	16	19.4	447,399	24.2	386,432	21.6	833,831
	17	22.7	359,673	26.1	344,697	24.3	704,370
Mother's education	None	15.5	432,406	22.0	334,792	18.3	767,198
	Primary	19.7	104,175	22.1	81,610	20.8	185,785
	Secondary +	18.2	43,441	25.6	32,642	21.4	76,083
	Non-standard curriculum	9.5	9,603	8.4	6,581	9.1	16,184
	Mother not in household	18.7	93,602	21.8	80,026	20.1	173,629
	Missing/DK	67.5	4,238	34.3	1,321	59.6	5,559
Wealth index quintiles	Poorest	1.9	238,719	0.4	164,396	1.3	403,115
	Second	2.7	244,269	3.4	181,823	3.0	426,092
	Middle	8.0	265,061	10.1	210,908	8.9	475,969
	Fourth	19.0	289,958	27.9	232,885	23.0	522,844
	Richest	46.1	284,668	53.3	255,239	49.5	539,907
Total		**16.5**	**1,322,676**	**21.9**	**1,045,251**	**18.9**	**2,367,926**

* MICS indicator 56, defined as the number of pupils in the official age group for a given level of education who attend school in that level, expressed as a percentage of the population in that age group.

Fewer than 1 in 5 Sudanese children (19 percent) of secondary school age currently attend secondary school (Table ED.4). Some of those not attending secondary school may be at primary school, but most of them will not be at school at all. Nationwide, girls (22 percent) are slightly more likely to attend secondary school than boys (17 percent). Also, 16 – and 17-year-olds are more likely to attend secondary school than 15-year-olds; presumably the latter are more likely to still be attending primary school. The mother's educational background plays very little role in determining the likelihood that her children will go to secondary school. The wealth of the child's household, however, is good predictor of secondary school attendance: children from the wealthiest quintile are more than 20 times as likely to attend secondary school as those from the poorest quintile. The poorest girls are even less likely to attend secondary school than the poorest boys.

Secondary school attendance varies sharply between Sudanese States, and particularly between the 10 and 15 States (Figure ED.4). The mean secondary net attendance ratio for the South is a shocking 3 percent. The figure is highest for Central Equatoria (12 percent). In 6 out of the 10 Southern States less than 1 percent of appropriately-aged children attend secondary schools.

The findings suggest that there is no clear trend with regard girls' secondary school attendance in the South. In some States (e.g., Jonglei, Northern Bahr El Ghazal, and Western Equatoria), it appears more girls than boys attend secondary school, while in other States (e.g. Central Equatoria), the opposite is the case.

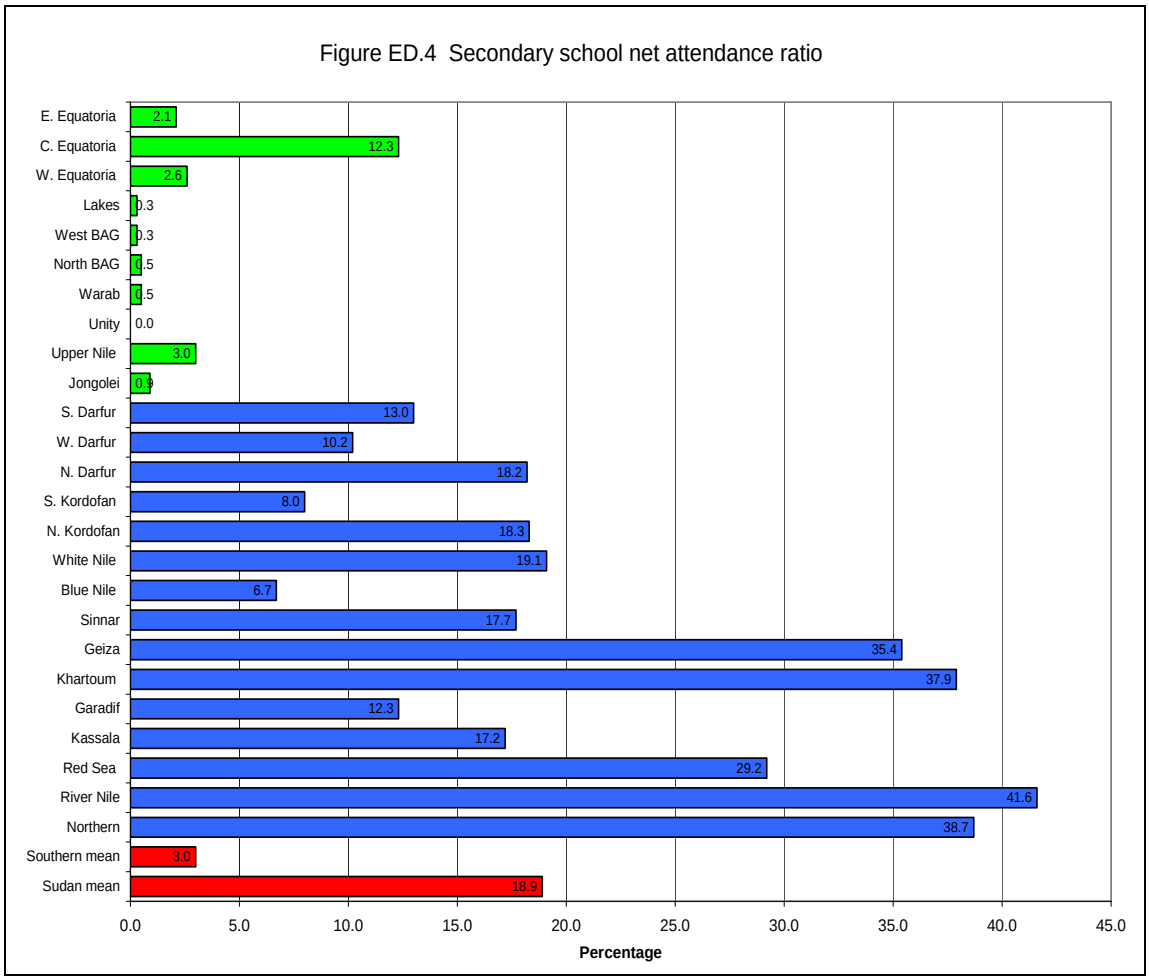

Figure ED.4 Percentage of children of secondary school age attending secondary school or higher

4.6.4 Children of secondary school age attending primary school

Table ED.5 shows the numbers and percentages of children of secondary school age who are attending primary school.

Table ED.5: Secondary school age children attending primary school
Percentage of children of secondary school age attending primary school, Sudan, 2006

		Male		Female		Total	
		Percent attending primary school	Number of children	Percent attending primary school	Number of children	Percent attending primary school	Number of children
State	Northern	38.9	21,861	28.6	17,005	34.4	38,867
	River Nile	39.6	32,147	20.5	26,464	31.0	58,611
	Red Sea	25.6	23,683	27.2	18,110	26.3	41,793
	Kassala	33.1	55,666	27.3	45,526	30.5	101,193
	Gadarif	47.5	58,046	29.1	47,742	39.2	105,788
	Khartoum	43.0	209,961	33.4	152,596	38.9	362,557
	Gezira	44.2	135,997	34.9	123,686	39.8	259,683
	Sinnar	40.6	43,256	29.7	41,246	35.3	84,502
	Blue Nile	53.0	25,682	23.1	19,455	40.1	45,137
	White Nile	53.0	58,157	43.1	53,754	48.2	111,911
	N. Kordofan	49.3	65,396	28.4	72,774	38.3	138,170
	S. Kordofan	55.6	42,533	37.6	40,742	46.8	83,275
	N. Darfur	63.6	61,914	40.0	44,844	53.7	106,758
	W. Darfur	54.9	52,485	29.5	41,397	43.7	93,882
	S. Darfur	54.7	106,031	30.5	72,344	44.9	178,376
	Jonglei	17.2	50,135	1.7	27,223	11.7	77,358
	Upper Nile	24.0	25,388	15.0	14,647	20.7	40,035
	Unity	4.9	17,395	4.2	11,278	4.7	28,674
	Warrap	14.3	54,495	9.9	36,900	12.6	91,395
	North BEG	10.3	52,751	2.8	42,343	7.0	95,094
	West BEG	13.6	15,131	7.6	10,457	11.1	25,588
	Lakes	16.1	24,187	12.0	16,796	14.4	40,983
	W. Equatoria	64.5	25,876	47.8	16,924	57.9	42,800
	C. Equatoria	47.9	39,687	38.6	27,223	44.1	66,911
	E. Equatoria	21.7	24,814	17.5	23,772	19.6	48,586
Age	15	51.1	515,603	36.4	314,122	45.5	829,725
	16	38.9	447,399	27.8	386,432	33.8	833,831
	17	29.5	359,673	21.9	344,697	25.8	704,370
Mother's education	None	44.1	432,406	29.6	334,792	37.8	767,198
	Primary	37.1	104,175	23.7	81,610	31.2	185,785
	Secondary +	43.0	43,441	24.1	32,642	34.9	76,083
	Non-standard curriculum	39.6	9,603	47.6	6,581	42.8	16,184
	Mother not in household	39.4	93,602	31.2	80,026	35.6	173,629
	Missing/DK	9.7	4,238	0.0	1,321	7.4	5,559
Wealth index quintiles	Poorest	22.0	238,719	11.2	164,396	17.6	403,115
	Second	39.7	244,269	19.6	181,823	31.2	426,092
	Middle	50.5	265,061	32.0	210,908	42.3	475,969
	Fourth	52.6	289,958	40.1	232,885	47.0	522,844
	Richest	37.9	284,668	32.2	255,239	35.2	539,907
Total		41.1	1,322,676	28.4	1,045,251	35.5	2,367,926

* SHHS indicator 41: S*econdary school net attendance rate (NAR*) (Proportion of children of secondary-school age currently attending secondary school

The data suggest that in the Sudan as a whole, 36 percent of 15-, 16-, and 17-year olds were still at primary school. No clear patterns are discernable relating the child's background characteristics to his/her likelihood of still being at primary school after having reached age 15. Girls appear to be less likely (28 percent) to remain on in primary school after reaching secondary school age than boys (41 percent).

In general, the small number of Southern children who go to primary school appear more likely to progress on to secondary school, with the exception of children from Western and Central Equatoria, where the figures, 58 percent and 44 percent respectively, are some of the worst in the Sudan (Figure ED.5).

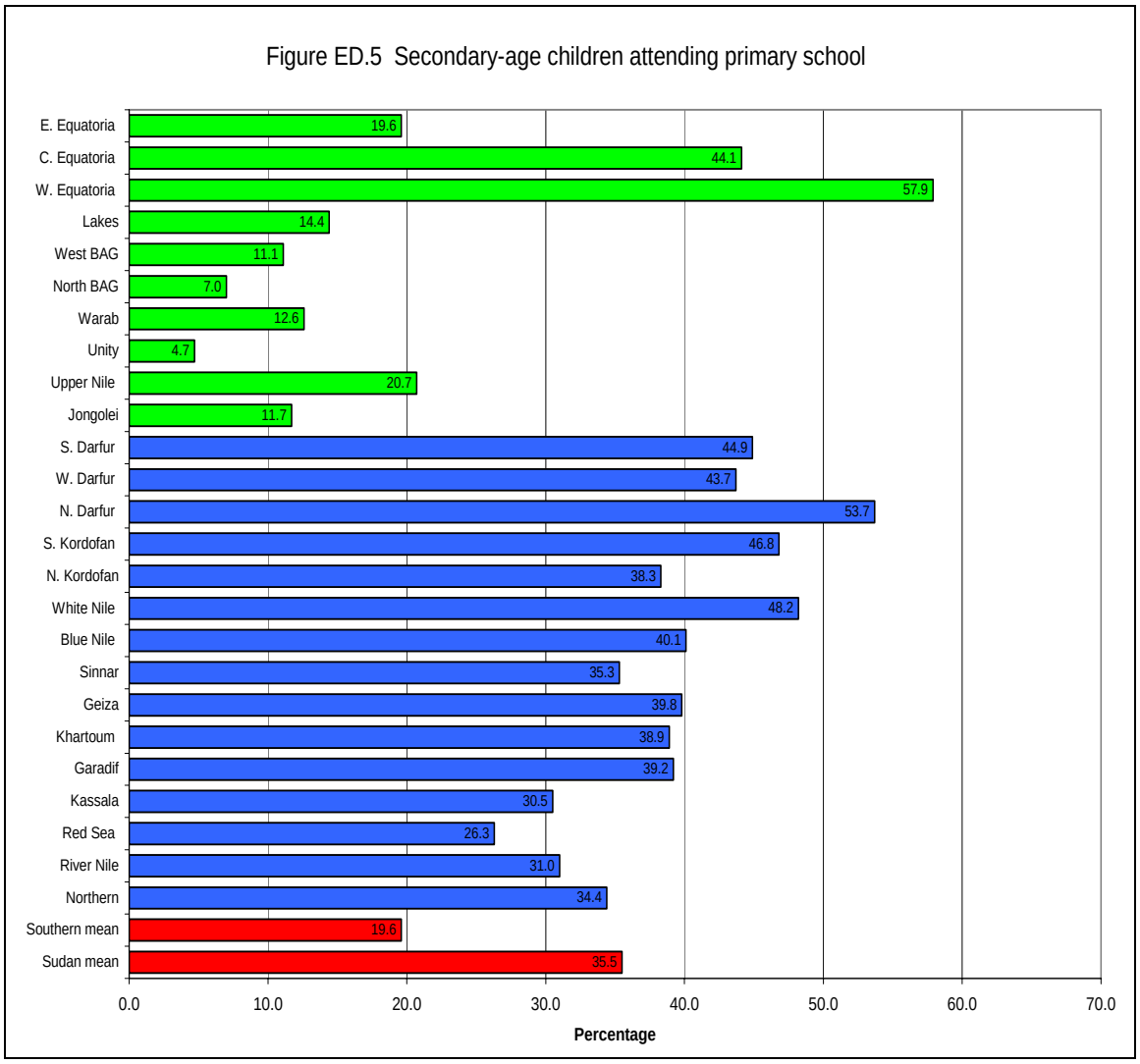

Figure ED.5 Percentage of children of secondary school age attending primary school

4.6.5 Percentage of children reaching grade 5

Table ED.6 presents the findings on the proportion of children who finish one school grade and move up to the next.

Table ED.6: Children reaching grade 5
Percentage of children entering first grade of primary school who eventually reach grade 5, Sudan, 2006

		Percent attending 2nd grade who were in 1st grade last year	Percent attending 3rd grade who were in 2nd grade last year	Percent attending 4th grade who were in 3rd grade last year	Percent attending 5th grade who were in 4th grade last year	Percent who reach grade 5 of those who enter 1st grade *
Sex	Male	97.2	97.8	98.3	97.7	91.3
	Female	96.9	98.3	96.3	97.2	89.1
State	Northern	98.9	96.9	95.5	96.7	88.5
	River Nile	99.4	99.3	97.3	99.3	95.3
	Red Sea	100.0	99.1	97.8	100.0	96.9
	Kassala	100.0	98.2	100.0	100.0	98.2
	Gadarif	97.7	100.0	100.0	97.7	95.4
	Khartoum	98.8	98.8	97.8	99.3	94.8
	Gezira	99.5	98.5	98.1	97.4	93.6
	Sinnar	98.4	99.2	96.7	100.0	94.4
	Blue Nile	99.0	99.4	99.3	99.1	96.8
	White Nile	99.0	100.0	98.2	99.2	96.5
	N. Kordofan	98.8	98.8	97.8	97.6	93.1
	S. Kordofan	97.9	100.0	97.8	100.0	95.8
	N. Darfur	98.4	99.3	99.4	99.4	96.5
	W. Darfur	98.5	98.1	100.0	97.2	93.9
	S. Darfur	95.6	97.6	99.3	96.5	89.4
	Jonglei	67.4	85.3	81.5	72.7	34.1
	Upper Nile	77.3	91.3	85.7	72.7	44.0
	Unity	36.4	54.5	100.0	66.7	13.2
	Warrap	92.9	77.8	100.0	100.0	72.2
	North BEG	81.8	60.0	40.0	71.4	14.0
	West BEG	89.5	91.7	92.3	100.0	75.7
	Lakes	89.6	97.3	100.0	96.2	83.8
	W. Equatoria	87.0	88.2	79.4	75.0	45.7
	C. Equatoria	68.5	90.2	85.1	87.2	45.9
	E. Equatoria	75.9	91.3	93.8	92.3	59.9
Mother's education	None	97.3	97.4	96.5	97.5	89.2
	Primary	97.6	96.7	96.5	96.1	87.5
	Secondary +	100.0	98.8	99.2	95.5	93.6
	Non-standard curriculum	100.0	100.0	95.5	82.5	78.8
	Mother not in household	98.2	99.1	98.6	99.8	95.7
	Missing/DK	100.0	100.0	100.0	74.8	74.8
Wealth index quintiles	Poorest	92.6	95.8	95.7	94.3	80.0
	Second	94.6	95.5	96.3	93.3	81.2
	Middle	96.6	98.2	97.3	95.9	88.5
	Fourth	98.3	98.7	97.8	99.0	94.0
	Richest	99.7	99.1	98.2	99.4	96.3
Total		**97.1**	**98.0**	**97.4**	**97.5**	**90.3**

* SHHS indicator 42: *Children reaching grade 5* (Proportion of children entering first grade of primary school who eventually reach grade five); MDG indicator 7

Nationwide, 9 out of 10 (90 percent) of those starting grade 1 of school eventually reached grade 5. Notice that this number includes children that repeat grades but that eventually move up to reach grade five. There is virtually no differential in the figures for boys and for girls, and the educational background of the child's mother also offers little predictive power for this statistic. However, there again appears to be a clear correlation with the wealth of the child's household, with only 80 percent of the poorest children staying on to grade 5 while for the richest children this figure is 96 percent.

There are clearly apparent differences in the figures for the 10 States and most of the remaining States of the country (Figure ED.6). Indeed, for most of the pupils in the 15 States who started at grade 1, they were roughly twice as likely (90 percent, as against 47 percent for the South) to stay on until grade 5. Within the South, the figures were best in Lakes (84 percent), Western Bahr El Ghazal, (76 percent) and Warrap (72 percent). The staying-on rates were lowest in Unity (13 percent) and Northern Bahr El Ghazal (14 percent).

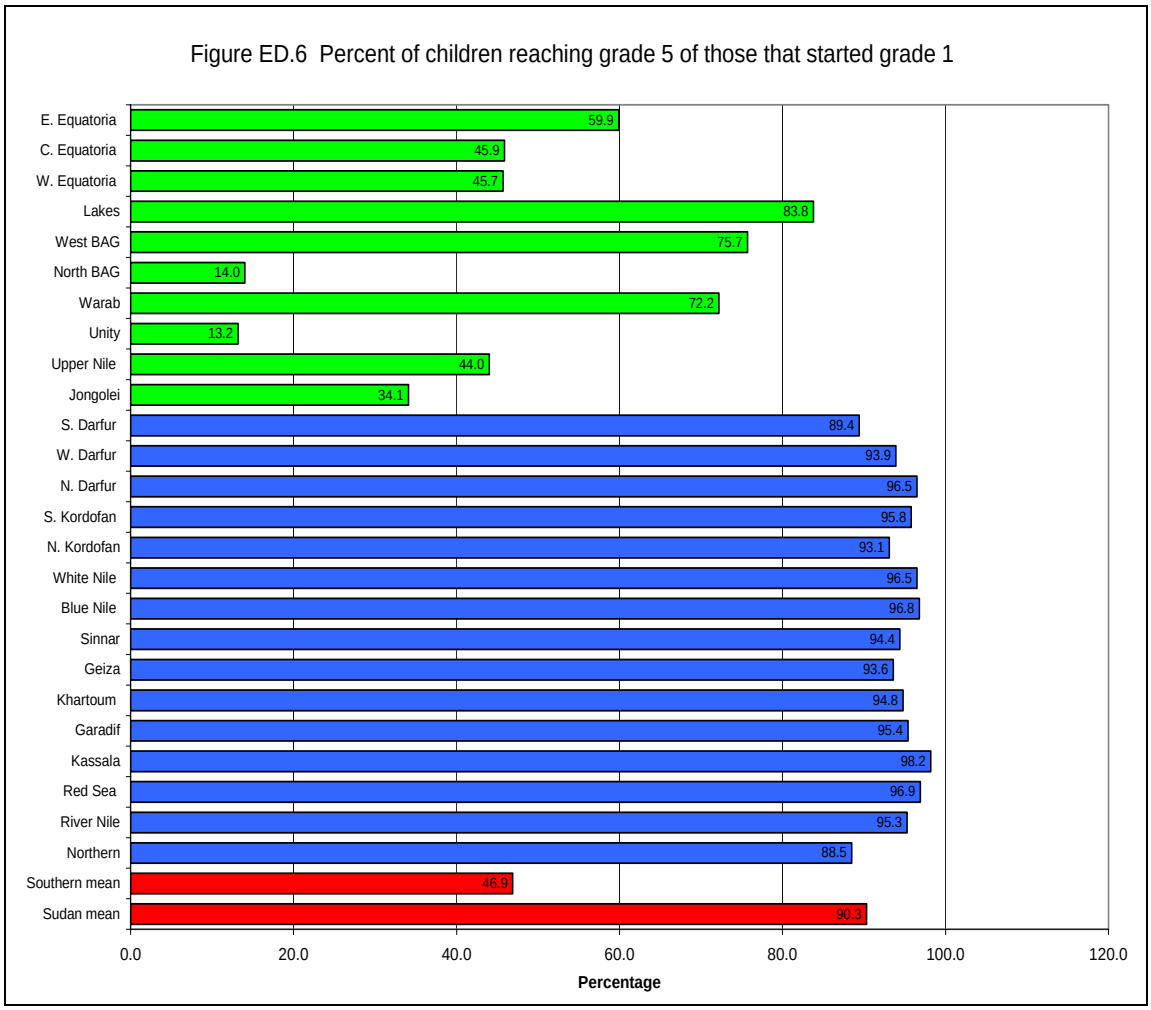

Figure ED.6 Percentage of children who reach grade 5 of those who entered grade 1.

4.6.6 Adult Literacy

One of the World Fit for Children goals is to assure adult literacy. Adult literacy is also an MDG indicator, relating to both men and women. In the survey, since only a women's questionnaire was administered, the results are based only on females aged 15-24. Literacy was assessed on the ability of women to read a short simple Statement or on school attendance. The percent literate is presented in Table ED.7.

Table ED.7: Adult literacy
Percentage of women aged 15-24 years who are literate, Sudan, 2006

		Percentage literate *	Percentage not known	Number of women aged 15-24 years
State	Northern	81.5	0.8	57,229
	River Nile	83.8	0.6	88,252
	Red Sea	63.3	1.2	63,492
	Kassala	41.2	0.2	140,100
	Gadarif	41.3	0.6	152,152
	Khartoum	78.7	1.1	532,361
	Gezira	72.5	0.7	376,611
	Sinnar	53.7	1.2	134,600
	Blue Nile	25.8	1.4	63,175
	White Nile	50.4	1.5	162,590
	North Kordofan	46.9	1.0	227,586
	South Kordofan	32.1	0.5	128,934
	North Darfur	54.1	1.8	125,067
	West Darfur	25.6	0.0	117,744
	South Darfur	35.3	0.9	252,394
	Jonglei	2.1	0.0	88,627
	Upper Nile	1.9	0.0	59,744
	Unity	0.9	0.0	30,058
	Warrap	0.0	0.0	111,911
	Northern Bahr El Ghazal	0.0	0.0	69,008
	Western Bahr El Ghazal	0.4	0.0	31,907
	Lakes	0.0	0.0	48,387
	Western Equatoria	4.5	0.0	58,975
	Central Equatoria	6.8	0.0	82,920
	Eastern Equatoria	6.7	0.0	61,504
Education	None	0.0	0.0	1,196,868
	Primary	69.9	1.2	1,776,341
	Secondary +	87.9	0.6	288,339
	Missing/DK	0.0	0.0	3,780
Age	15-19	50.2	1.0	1,591,533
	20-24	41.6	0.5	1,673,796
Wealth index quintiles	Poorest	3.8	0.1	445,474
	Second	10.6	0.7	573,200
	Middle	30.6	1.0	686,494
	Fourth	65.2	0.7	772,834
	Richest	89.4	0.9	787,326
Total		**45.8**	**0.7**	**3,265,329**

* MICS Indicator 60; MDG Indicator 8

The percentage of women aged 15-24 who are literate is 46 percent for the Sudan as a whole. There is a clear positive correlation between women's literacy rate and both their level of education and the wealth quintile to which they belong. For example, only 4 percent of women aged 15-24 from households in the poorest wealth quintile could read, whereas 89 percent of women from the richest households were literate.

The findings suggest a staggering literacy differential between the 10 Southern States and most of the remaining States of the country (Figure ED.7). In fact, the percentage of women aged 15-24 in most of the 15 States who are literate (52 percent) is over 20 times as high as the figure for the Southern States (2 percent).

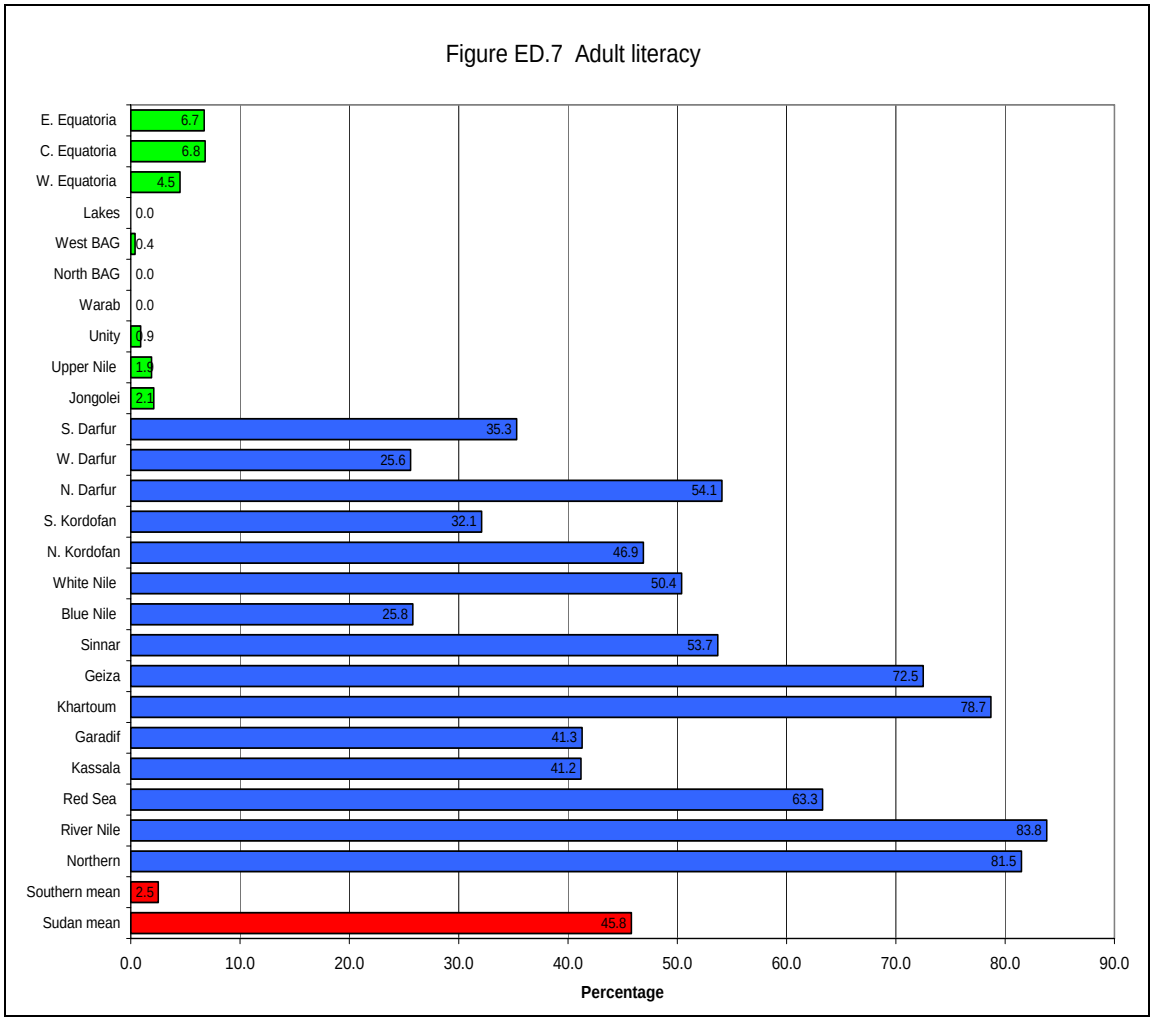

Figure ED.7 Percentage of women aged 15-24 years who are literate

4.7 Child Protection

4.7.1 Birth Registration

The Convention on the Rights of the Child States that every child has the right to a name and a nationality and the right to protection from being deprived of his or her identity. Birth registration is a fundamental means of securing these rights for children. The World Fit for Children States the goal to develop systems to ensure the registration of every child at or shortly after birth, and fulfil his or her right to acquire a name and a nationality, in accordance with national laws and relevant international instruments. The indicator is the percentage of children under 5 years of age whose birth is registered.

Table CP.1 shows the proportion of under-five children whose births were registered as well as the main reasons given by respondents as to why their unregistered children had not been registered.

Table CP.1: Birth registration
Percent distribution of children aged 0-59 months by whether birth is registered and reasons for non-registration, Sudan, 2006

		Birth is registered *	Don't know if birth is registered	Number of children aged 0-59 months	Birth is not registered because:								Total	Number of children aged 0-59 months without birth registration
					Cost s too much	Must travel too far	Didn't know child should be registered	Late, didn't want to pay fine	Doesn't know where to register	Other	Don't know	Missing		
State	Northern	67.8	0.5	71,281	45.9	15.0	2.6	0.0	2.1	27.9	6.7	0.0	100.0	22,574
	River Nile	67.4	0.2	108,078	30.3	24.9	0.5	0.0	4.0	31.6	7.8	1.0	100.0	35,032
	Red Sea	64.6	1.5	92,640	13.5	24.9	23.9	0.4	7.0	15.0	13.2	2.0	100.0	31,412
	Kassala	34.7	0.3	228,581	18.5	15.7	28.5	0.0	6.8	13.7	16.7	0.2	100.0	148,560
	Gadarif	45.8	0.1	277,710	21.3	11.6	9.3	0.2	6.6	44.2	6.6	0.2	100.0	150,317
	Khartoum	70.2	0.3	728,062	54.1	9.0	4.0	0.9	3.1	21.5	6.1	1.2	100.0	215,252
	Gezira	61.4	0.4	498,259	33.0	14.2	18.5	0.3	4.0	23.3	6.4	0.3	100.0	190,412
	Sinnar	45.0	0.3	184,375	25.5	17.2	9.9	1.9	6.2	36.3	2.8	0.2	100.0	100,775
	Blue Nile	27.8	0.5	135,715	35.8	18.5	12.9	0.0	8.9	16.0	7.5	0.4	100.0	97,232
	White Nile	43.3	0.1	243,446	48.3	20.0	8.1	0.0	2.1	19.3	1.3	0.8	100.0	137,666
	N. Kordofan	32.9	0.7	380,655	27.8	20.6	23.7	0.7	7.4	8.8	9.8	1.2	100.0	252,977
	S. Kordofan	28.4	0.8	277,708	22.5	25.1	6.6	0.5	8.2	13.1	23.2	0.8	100.0	196,615
	N. Darfur	29.1	1.7	268,487	22.8	11.9	8.7	0.0	5.9	19.7	29.7	1.3	100.0	185,853
	W. Darfur	16.4	2.5	300,867	14.8	23.9	27.0	5.0	10.9	10.0	7.5	0.9	100.0	243,812
	S. Darfur	18.9	0.1	502,544	30.3	22.3	10.8	0.1	5.8	24.1	6.1	0.4	100.0	407,224
	Jonglei	3.3	8.7	243,417	5.9	13.5	24.0	1.8	35.1	1.6	11.7	6.4	100.0	180,475
	Upper Nile	11.3	3.5	171,127	1.4	13.8	29.0	0.7	40.6	0.7	11.3	2.5	100.0	80,715
	Unity	6.3	3.8	120,333	0.8	4.7	61.0	1.0	24.7	0.5	2.9	4.5	100.0	91,095
	Warrap	1.3	4.5	238,751	3.0	13.5	44.4	0.2	13.4	0.3	2.2	23.1	100.0	182,175
	North BEG	4.2	6.4	215,262	7.6	7.6	48.0	2.4	19.1	2.1	5.8	7.3	100.0	129,709
	West BEG	10.1	1.8	75,022	5.1	35.1	26.3	2.0	12.5	1.7	1.4	15.9	100.0	43,845
	Lakes	1.1	2.0	155,869	1.9	13.4	45.6	2.6	30.9	0.8	2.5	2.2	100.0	127,161
	W. Equatoria	6.6	1.0	85,109	3.9	8.8	30.7	1.3	51.3	1.8	2.3	0.0	100.0	55,500
	C. Equatoria	4.3	3.0	189,908	5.9	27.8	17.9	1.4	40.0	4.1	2.6	0.4	100.0	138,373
	E. Equatoria	7.7	3.4	162,590	2.2	13.0	39.1	0.2	17.2	1.7	24.1	2.4	100.0	87,169
Total		32.6	1.7	5,955,796	21.3	17.1	21.3	1.0	13.1	14.2	9.2	2.8	100.0	3,531,929

Table CP.1 (cont.): Birth registration
Percent distribution of children aged 0-59 months by whether birth is registered and reasons for non-registration, Sudan, 2006

		Birth is registered *	Don't know if birth is registered	Number of children aged 0-59 months	Birth is not registered because:								Total	Number of children aged 0-59 months without birth registration
					Costs too much	Must travel too far	Didn't know child should be registered	Late, didn't want to pay fine	Doesn't know where to register	Other	Don't know	Missing		
Age	0-11 months	29.0	1.2	1,288,626	22.3	18.2	17.4	0.7	11.7	18.9	8.6	2.1	100.0	833,860
	12-23 months	36.3	1.4	1,142,094	22.0	17.2	20.8	0.9	13.9	13.7	9.1	2.4	100.0	637,428
	24-35 months	32.4	1.7	1,262,671	21.3	16.6	22.4	1.1	12.5	13.3	8.8	4.0	100.0	748,203
	36-47 months	33.5	1.8	1,291,161	21.0	17.1	21.9	1.1	14.0	12.0	10.6	2.3	100.0	746,920
	48-59 months	31.8	2.4	971,246	19.3	16.0	25.3	1.4	14.0	12.1	8.5	3.4	100.0	565,518
Mother's education	None	16.6	2.3	3,709,763	18.5	16.5	25.4	1.0	15.2	10.3	9.7	3.4	100.0	2,659,873
	Primary	48.9	0.6	1,430,060	30.4	19.7	8.8	1.0	7.2	24.3	7.6	0.9	100.0	692,053
	Secondary	80.3	0.5	722,652	24.3	19.1	3.5	0.7	4.6	37.7	7.7	2.4	100.0	132,437
	Non-standard curriculum	50.5	0.5	81,410	28.7	7.9	21.6	0.0	7.6	25.5	8.4	0.3	100.0	39,772
	Missing/DK	31.6	0.0	11,911	67.5	4.4	14.5	0.0	6.3	2.4	4.9	0.0	100.0	7,794
Wealth index quintiles	Poorest	6.1	3.9	1,264,533	3.0	3.8	9.3	0.3	5.0	1.5	3.0	1.1	27.1	956,283
	Second	11.2	2.4	1,367,061	6.0	5.6	6.8	0.3	4.5	2.7	2.7	1.1	29.7	1,049,133
	Middle	25.3	0.6	1,319,404	6.7	4.9	4.1	0.2	2.7	4.8	2.0	0.4	26.0	916,671
	Fourth	56.4	0.4	1,161,613	4.8	2.4	1.0	0.1	0.6	3.8	1.1	0.2	13.9	492,205
	Richest	85.5	0.5	843,186	0.7	0.4	0.1	0.0	0.3	1.4	0.3	0.0	3.3	117,637
Total		**32.6**	**1.7**	**5,955,796**	**21.3**	**17.1**	**21.3**	**1.0**	**13.1**	**14.2**	**9.2**	**2.8**	**100.0**	**3,531,929**

*SHHS indicator 46: Birth registration rate (Proportion of children aged 0-59 months whose births are reported registered)

Across the Sudan as a whole, the births of 33 percent of children under five years old have been registered (Table CP.1). There are no significant variations in birth registration across age categories. However, the mother's educational background and the wealth index to which the child's household belongs are both excellent predictors of the likelihood that the child's birth is registered. Thus the children of less educated and poorer mothers were unlikely to be registered (17 percent and 6 percent, respectively), while those whose mothers had secondary education (80 percent), or belonged to the wealthiest quintile (86 percent), were very likely to have been registered.

Children in Southern Sudan are six times less likely (5 percent) to have had their birth registered than children in the country as a whole (Figure CP.1). Southern children were most likely to be registered in Upper Nile (11 percent) and Western Bahr El Ghazal (10 percent). Lakes and Warrap States had the lowest birth registration rates (both 1 percent).

The main reasons Southern births were not registered appear to be that parents or guardians a) did not know their child was supposed to be registered; b) did not know where to register their children; or c) did not wish to travel so far to have their child registered (Table CP.1).

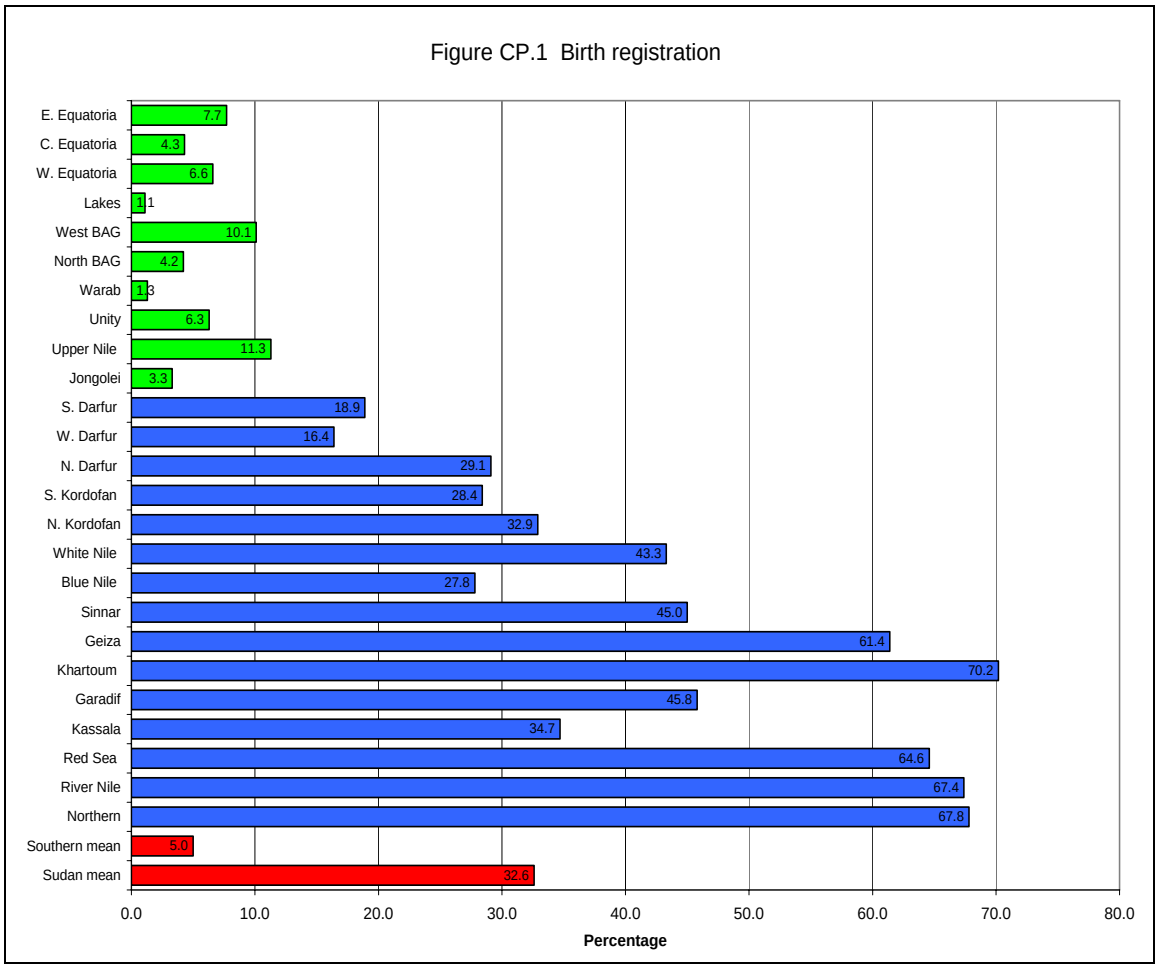

Figure CP.1 Proportion of children aged 0-59 months whose births are reported registered

4.7.2 Early Marriage and Polygamy

Marriage before the age of 18 is a reality for many young girls. According to UNICEF's worldwide estimates, over 60 million women aged 20-24 were married/in union before the age of 18. Factors that influence child marriage rates include: the State of the country's civil registration system, which provides proof of age for children; the existence of an adequate legislative framework with an accompanying enforcement mechanism to address cases of child marriage; and the existence of customary or religious laws that condone the practice.

In many parts of the world parents encourage the marriage of their daughters while they are still children in hopes that the marriage will benefit them both financially and socially, while also relieving financial burdens on the family. In actual fact, child marriage is a violation of human rights, compromising the development of girls and often resulting in early pregnancy and social isolation, with little education and poor vocational training reinforcing the gendered nature of poverty. The right to 'free and full' consent to a marriage is recognized in the Universal Declaration of Human

Rights - with the recognition that consent cannot be 'free and full' when one of the parties involved is not sufficiently mature to make an informed decision about a life partner. The Convention on the Elimination of all Forms of Discrimination against Women mentions the right to protection from child marriage in article 16, which States: "The betrothal and the marriage of a child shall have no legal effect, and all necessary action, including legislation, shall be taken to specify a minimum age for marriage..." While marriage is not considered directly in the Convention on the Rights of the Child, child marriage is linked to other rights - such as the right to express their views freely, the right to protection from all forms of abuse, and the right to be protected from harmful traditional practices - and is frequently addressed by the Committee on the Rights of the Child. Other international agreements related to child marriage are the Convention on Consent to Marriage, Minimum Age for Marriage and Registration of Marriages and the African Charter on the Rights and Welfare of the Child and the Protocol to the African Charter on Human and People's Rights on the Rights of Women in Africa. Child marriage was also identified by the Pan-African Forum against the Sexual Exploitation of Children as a type of commercial sexual exploitation of children.

Young married girls are a unique, though often invisible, group. Required to perform heavy amounts of domestic work, under pressure to demonstrate fertility, and responsible for raising children while still children themselves, married girls and child mothers face constrained decision-making and reduced life choices. Boys are also affected by child marriage but the issue impacts girls in far larger numbers and with more intensity. Cohabitation - when a couple lives together as if married - raises the same human rights concerns as marriage. Where a girl lives with a man and takes on the role of caregiver for him, the assumption is often that she has become an adult woman, even if she has not yet reached the age of 18. Additional concerns due to the informality of the relationship - for example, inheritance, citizenship and social recognition - might make girls in informal unions vulnerable in different ways than those who are in formally recognized marriages.

Research suggests that many factors interact to place a child at risk of marriage. Poverty, protection of girls, family honour and the provision of stability during unstable social periods are considered as significant factors in determining a girl's risk of becoming married while still a child. Women who married at younger ages were more likely to believe that it is sometimes acceptable for a husband to beat his wife and were more likely to experience domestic violence themselves. The age gap between partners is thought to contribute to these abusive power dynamics and to increase the risk of untimely widowhood.

Closely related to the issue of child marriage is the age at which girls become sexually active. Women who are married before the age of 18 tend to have more children than those who marry later in life. Pregnancy related deaths are known to be a leading cause of mortality for both married and unmarried girls between the ages of 15 and 19, particularly among the youngest of this cohort. There is evidence to suggest that girls who marry at young ages are more likely to marry older men

which puts them at increased risk of HIV infection. Parents seek to marry off their girls to protect their honour, and men often seek younger women as wives as a means to avoid choosing a wife who might already be infected. The demand for this young wife to reproduce and the power imbalance resulting from the age differential lead to very low condom use among such couples.

4.7.3 Early Marriage

The percentage of women married at various ages is provided in Table CP.2.

Table CP.2. Early Marriage and Polygamy: Percentage of women married at various ages as indicated.

State	Percentage married before age 15 *	Number of women aged 15-49 years	Percentage married before age 18*	Number of women aged 20-49 years	Percentage of women aged 15-19 years married/ in union **	Number of women aged 15-19 years	Percent/f women aged 15-49 years in polygamous marriage/ Union***	Percentage of women aged 15-49 years currently married/inuni on
Northern	7.0	155,314	20.4	127,065	14.0	28,249	9.0	80,375
River Nile	6.1	251,107	19.3	203,541	11.8	47,566	8.3	126,124
Red Sea	10.5	172,855	32.6	143,909	20.1	28,946	10.0	108,322
Kassala	14.8	388,682	42.7	311,041	33.9	77,641	13.4	264,208
Gaderif	16.5	351,812	48.5	264,981	32.6	86,831	18.8	239,075
Khartoum	7.4	1,396,068	27.4	1,140,087	12.0	255,980	15.1	784,957
Gezira	7.4	978,435	24.7	778,470	11.6	199,965	11.0	506,228
Sinnar	10.4	311,366	35.6	239,474	18.6	71,892	16.5	174,542
Blue Nile	20.8	151,292	56.4	115,219	38.0	36,073	29.3	111,008
White Nile	10.9	397,300	35.1	312,195	20.9	85,105	12.1	232,863
N. Kordofan	12.7	568,863	33.3	446,751	20.8	122,112	15.3	336,469
S. Kordofan	13.2	317,165	41.1	250,990	30.2	66,175	30.8	222,417
N. Darfur	9.4	346,313	31.1	277,707	15.3	68,606	32.5	229,453
W. Darfur	18.1	333,393	49.2	270,855	42.8	62,538	42.1	253,171
S. Darfur	14.5	598,635	47.5	480,307	24.6	118,328	39.7	421,434
Jonglei	16.8	330,303	38.4	299,395	62.7	30,908	23.0	294,554
Upper Nile	15.5	232,889	49.2	214,243	67.3	18,646	47.3	205,110
Unity	24.1	125,494	56.8	119,677	88.1	5,818	58.7	116,075
Warrap	17.7	331,612	47.9	282,790	27.9	48,822	47.3	252,672
NBG	11.0	354,355	33.6	337,844	79.5	16,511	49.1	316,675
WBG	21.8	102,590	47.4	96,009	73.9	6,582	38.7	94,292
Lakes	14.3	199,539	33.6	187,109	53.6	12,430	56.8	185,556
W. Equatoria	20.1	146,550	34.9	115,463	57.1	31,086	28.1	115,641
C. Equatoria	16.5	232,219	32.6	200,009	31.8	32,210	26.5	179,986
E. Equatoria	19.9	194,865	42.9	162,353	30.6	32,512	52.8	154,898
SUDAN	**12.4**	**8,969,016**	**36.0**	**7,377,483**	**24.7**	**1,591,533**	**27.5**	**6,006,106**
Age								
15-19 years	6.9	1,591,533	.	0	24.7	1,591,533	14.8	393,800
20-24 years	11.5	1,673,796	34.0	1,673,796	.	0	22.1	1,004,416
25-29 years	14.6	1,891,925	37.0	1,891,925	.	0	29.3	1,433,050
30-34 years	14.7	1,334,286	36.9	1,334,286	.	0	30.2	1,076,422
35-39 years	12.8	1,261,536	35.5	1,261,536	.	0	30.6	1,072,848
40-44 years	13.1	721,767	35.8	721,767	.	0	28.2	609,326
45-49 years	17.0	494,172	39.1	494,172	.	0	30.4	416,244
Education								
None	17.9	4,462,546	46.0	3,983,943	46.0	478,602	34.9	3,687,236
Primary	7.7	3,692,201	28.5	2,659,945	15.3	1,032,256	15.8	1,999,753
Secondary+	3.8	802,288	9.0	721,757	19.0	80,531	14.2	310,183
Wealth index quintiles								
Poorest	16.1	1,591,109	41.8	1,401,304	39.6	189,805	41.9	1,288,177
Second	16.6	1,692,599	44.4	1,436,737	40.1	255,862	34.4	1,350,638
Middle	14.9	1,717,060	42.2	1,367,545	33.1	349,514	26.1	1,233,014
Fourth	10.6	1,861,070	35.2	1,469,497	17.6	391,573	18.1	1,104,915
Richest	5.8	2,107,178	19.9	1,702,399	7.8	404,778	12.3	1,029,361

*SHHS indicator 47: *Marriage before age 15* (Proportion of women aged 15-49 years who were first married or in union by the exact age of 15)

**SHHS indicator 48: *Marriage before age 18* (Proportion of women aged 20-49 years of age who were first married or in union by the exact age of 18)

***SHHS indicator 49: *Young women aged 15-19 years currently married or in union* (Proportion of women aged 15-19 years currently married or in union)

****SHHS indicator 50: *Polygamy* (Proportion of women aged 15-49 years in a polygamous union)

In the Sudan as a whole, 12 percent of women aged 15-49 were married before their 15th birthday (Table CP.2). Analysis by age group suggests there have been no significant changes in this pattern in the last 30 years. Women with no formal education were over four times more likely to be married under the age of 15 than those with at least secondary education. Belonging to a family in any of the bottom three wealth quintiles also increased the likelihood that girls will be married at a very young age, with the poorest women almost three times as likely (16 percent) to be married before age 15 as women from the richest households (6 percent).

Girls in Southern Sudan are appreciably more likely (17 percent) to be married before age 15 than girls in the remaining 15 States (12 percent). In the South, women from Unity were most likely to marry early (24 percent), followed by women from Western Bahr El Ghazal (22 percent). Figures were lowest for Northern Bahr El Ghazal, where 11 percent of girls were married before age 15. (Figure CP.2a)

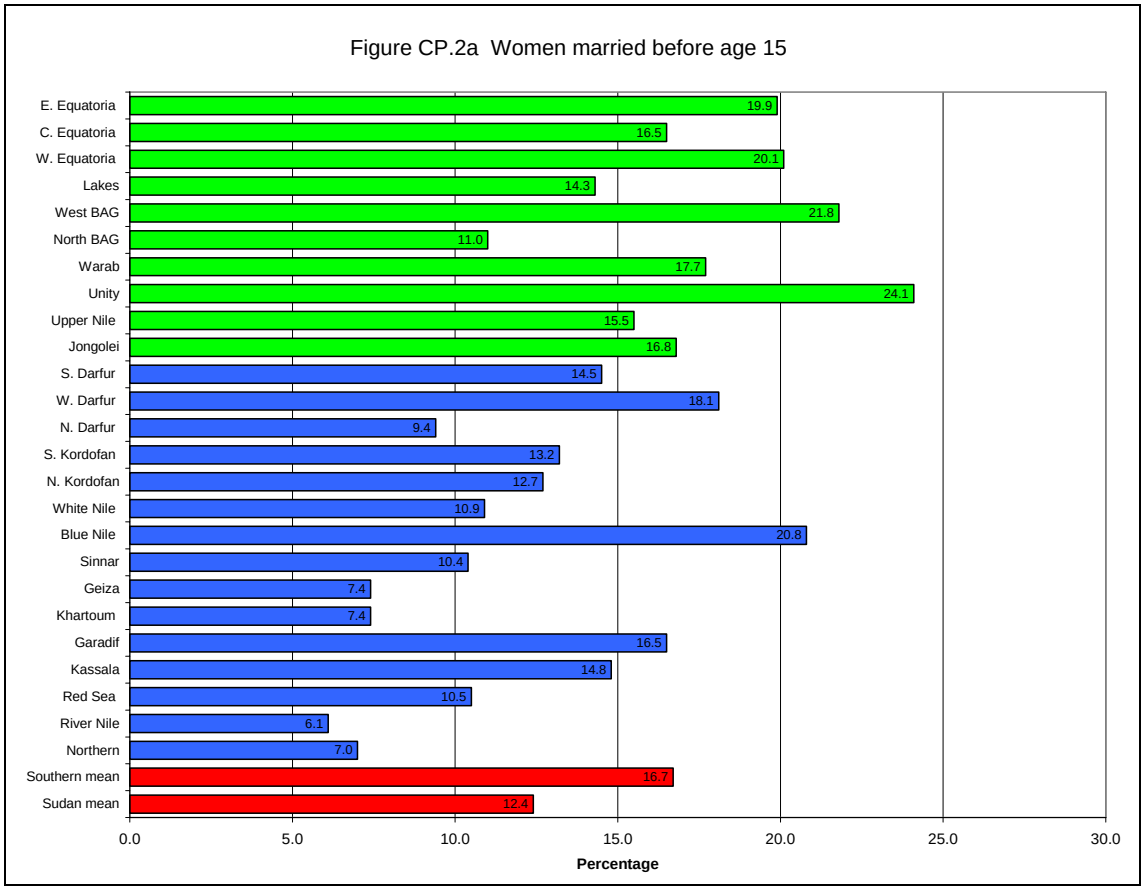

Figure CP.2a Percentage of women aged 15-49 years who were first married or in union before the age of 15

Country-wide, over 1 in 3 women (36 percent) were married at age 17 or younger, while among the Southern States the mean figure is 41 percent (Figure CP.2b). Women in Unity State were most likely to get married before age 18 (57%), and almost 1 in 2 women also married young in Upper Nile (49 percent), Warrap (48 percent) and Western Bahr El Ghazal (47 percent). Figures for under-18 marriages were lowest in Central Equatoria, Lakes, and Northern Bahr El Ghazal (all 34%)

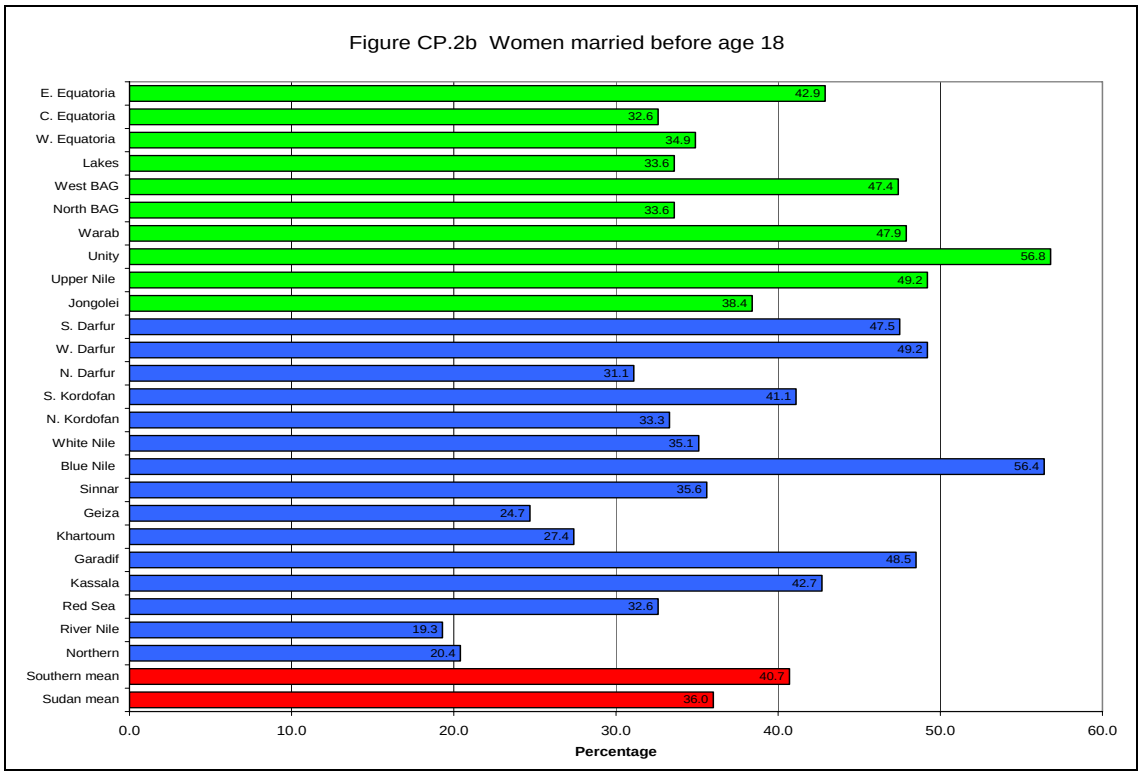

Figure CH.2b Percentage of women aged 15-49 years who were first married or in union before the age of 18

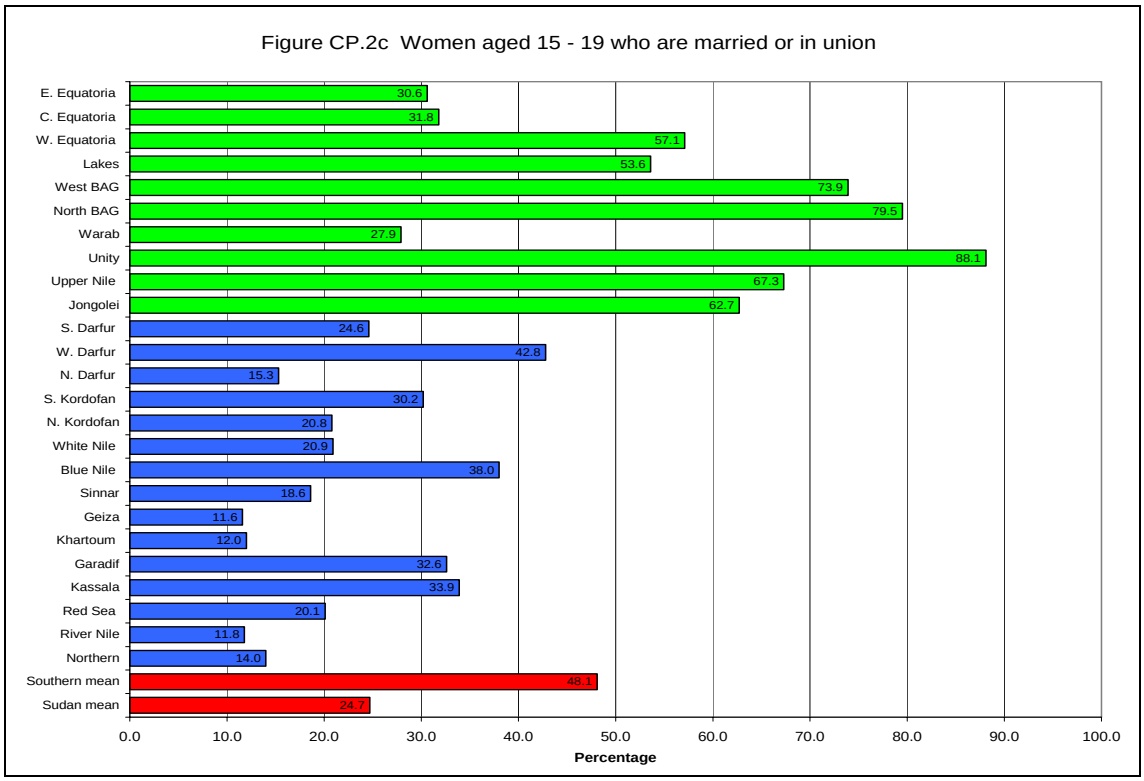

Figure CP.2c Percentage of women aged 15-49 years who were first married or in union before the age of 15

The proportion of women in the age group 15-19 who are married or in union is 25 percent for the Sudan as a whole, but the mean figure for the Southern States is twice as high (48 percent; Figure CP.2c). In fact, in Unity State almost 9 out of 10 women (88 percent) in this age group were married, and the figures for Northern and Western Bahr El Ghazal are well above 70 percent. Figures were lowest in Warrap (28 percent), Eastern Equatoria (31 percent) and Central Equatoria (32 percent).

Also shown in Table CP.2 is the percentage of women aged 15-49 who are in a polygynous marriage or union. The poorest and least educated women are most likely to have to share their husband with one or more other women. For example, 35 percent of women with no formal education are involved in a polygamous marriage, whereas this figure is 14 percent for those women with at least secondary education.

Women in the Southern States are more likely than majority of women from the 15 States to be in a polygamous marriage or union (Figure CP.2d). In several Southern States, more than half of women aged 15-49 share their husband with at least one other wife, and in Unity the figure is an astounding 59 percent. The figures are lowest in Jonglei (23 percent) and Central Equatoria (27 percent).

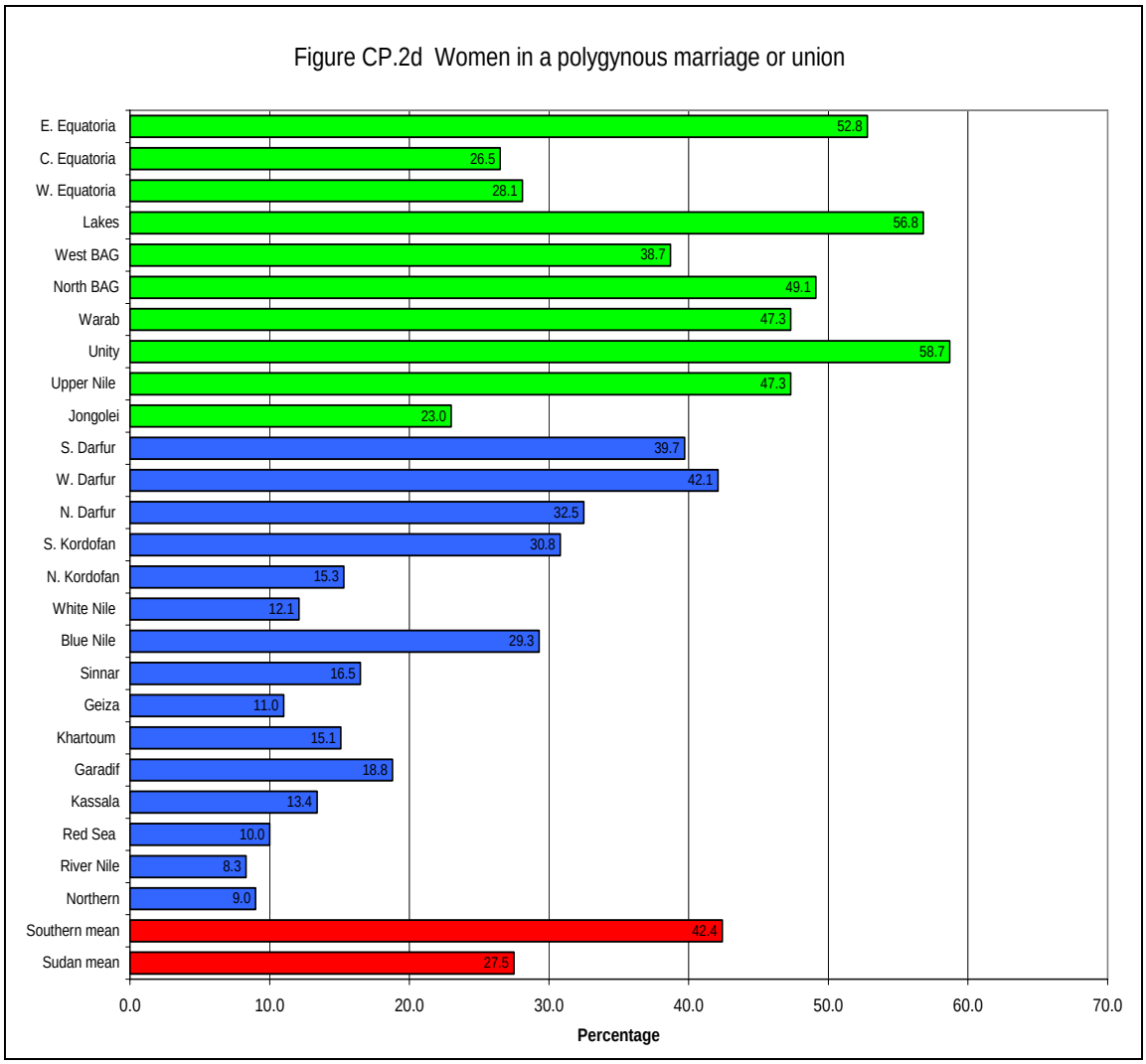

Figure CP.2d Proportion of women aged 15-49 years who are in a polygamous marriage or union

4.8 HIV/AIDS, Orphaned and Vulnerable Children

4.8.1 Knowledge of HIV Transmission and Condom Use

One of the most important prerequisites for reducing the rate of HIV infection is accurate knowledge of how HIV is transmitted and strategies for preventing transmission. Correct information is the first step toward raising awareness and giving young people the tools to protect themselves from infection. Misconceptions about HIV are common and can confuse young people and hinder prevention efforts. Different regions are likely to have variations in misconceptions although some appear to be universal (for example that sharing food can transmit HIV or that mosquito bites can transmit HIV). The UN General Assembly Special Session on HIV/AIDS (UNGASS) called on governments to improve the knowledge and skills of young people to protect themselves from HIV. The indicators to measure this goal as well as the MDG of reducing HIV infections by half include improving the level of knowledge of HIV and its prevention, and changing behaviours to prevent further spread of the disease. The HIV module was administered to women 15-49 years of age.

One indicator which is both an MDG and UNGASS indicator is the percent of young women who have comprehensive and correct knowledge of HIV prevention and transmission. Women were asked whether they had heard of AIDS, and then whether they knew of the three main ways of HIV transmission – having only one faithful uninfected partner, using a condom every time, and abstaining from sex. The results are presented in Table HA.1.

Table HA.1: Knowledge of preventing HIV transmission
Percentage of women aged 15-49 years who know the main ways of preventing HIV transmission, Sudan, 2006

		Heard of AIDS	Percentage who know transmission can be prevented by:			Knows all three ways	Knows at least one way	Doesn't know any way	Number of women
			Having only one faithful uninfected sex partner	Using a condom every time	Abstaining from sex				
State	Northern	87.4	55.7	2.4	2.3	0.1	57.9	42.1	155,314
	River Nile	90.0	42.1	4.9	5.0	0.1	47.9	52.1	251,107
	Red Sea	78.6	33.9	4.9	11.4	0.8	42.1	57.9	172,855
	Kassala	66.9	32.3	9.0	7.4	1.1	39.0	61.0	388,682
	Gadarif	76.3	42.8	2.7	7.0	0.5	47.9	52.1	351,812
	Khartoum	94.3	48.5	19.0	19.5	6.8	60.0	40.0	1,396,068
	Gezira	86.8	61.5	3.9	0.8	0.1	62.2	37.8	978,435
	Sinnar	75.4	28.6	1.3	13.9	0.0	42.6	57.4	311,366
	Blue Nile	60.2	25.0	1.6	9.2	0.6	32.9	67.1	151,292
	White Nile	88.1	49.3	8.2	8.9	1.6	55.3	44.7	397,300
	N. Kordofan	73.0	36.0	2.2	6.2	0.2	42.0	58.0	568,863
	S. Kordofan	64.5	28.5	2.4	5.8	0.3	33.6	66.4	317,165
	N. Darfur	67.2	30.4	2.3	10.4	0.9	37.7	62.3	346,313
	W. Darfur	37.4	14.2	1.2	3.5	0.1	17.1	82.9	333,393
	S. Darfur	75.0	53.7	9.3	9.3	4.5	55.8	44.2	598,635
	Jonglei	24.8	8.2	4.8	3.5	2.8	8.9	91.1	330,303
	Upper Nile	45.4	33.8	22.9	20.3	16.5	34.3	65.7	232,889
	Unity	45.3	23.5	12.0	8.8	7.2	24.1	75.9	125,494
	Warrap	27.8	6.3	2.7	5.7	1.1	9.7	90.3	331,612
	North BEG	34.6	21.3	16.2	16.7	14.1	22.9	77.1	354,355
	West BEG	50.6	23.8	12.7	12.1	3.5	32.9	67.1	102,590
	Lakes	56.5	33.1	2.4	13.2	1.4	35.6	64.4	199,539
	W. Equatoria	87.4	53.6	20.6	44.5	11.9	68.1	31.9	146,550
	C. Equatoria	72.9	59.3	38.7	35.7	24.6	64.0	36.0	232,219
	E. Equatoria	48.5	31.2	20.3	25.0	14.7	33.6	66.4	194,865
Total for Sudan		70.4	39.0	9.2	11.2	4.0	44.5	55.5	8,969,016
Age	15-19	73.3	37.0	7.2	11.1	2.4	44.1	55.9	1,591,533
	20-24	72.8	40.9	9.6	11.2	4.1	46.2	53.8	1,673,796
	25-29	66.9	39.0	10.8	12.4	5.1	44.2	55.8	1,891,925
	30-34	68.8	39.7	10.5	11.4	4.9	44.6	55.4	1,334,286
	35-39	70.2	39.7	8.6	9.5	3.6	44.3	55.7	1,261,536
	40-44	71.1	39.2	8.3	10.6	3.9	44.5	55.5	721,767
	45-49	69.2	34.6	8.1	11.5	3.9	41.1	58.9	494,172
Education	None	49.6	22.2	6.6	8.9	4.3	25.0	75.0	4,462,546
	Primary	90.5	54.1	10.1	13.0	3.3	62.0	38.0	3,692,201
	Secondary +	93.5	62.6	19.5	15.4	5.8	72.4	27.6	802,288
	Missing/DK	55.2	28.9	31.9	23.0	21.3	33.0	67.0	11,981
Wealth index quintiles	Poorest	39.3	18.0	6.6	9.9	4.6	20.6	79.4	1,591,109
	Second	49.5	23.9	8.4	10.5	5.3	27.1	72.9	1,692,599
	Middle	68.6	33.6	7.7	10.1	3.6	38.4	61.6	1,717,060
	Fourth	87.1	49.1	7.8	9.4	3.4	54.2	45.8	1,861,070
	Richest	97.2	62.4	14.4	15.2	3.6	72.9	27.1	2,107,178
	Total	**70.4**	**39.0**	**9.2**	**11.2**	**4.0**	**44.5**	**55.5**	8,969,016

*SHHS indicator 69: *Awareness of AIDS among women* (Percentage of women aged 15-49 years who have heard of AIDS)

In the Sudan as a whole, almost three-quarters of the interviewed women (70 percent) have heard of AIDS. However, the percentage of women who know of all three main ways of preventing HIV transmission is a woeful 4 percent. Four out of 10 women (39 percent) know of having one faithful uninfected sex partner, only 9 percent know of using a condom every time, and 11 percent know of abstaining from sex as the main ways of preventing HIV transmission. While 45 percent of women knew at least one way, a high proportion of women (56 percent) did not know any of the three ways of protecting themselves from HIV.

A woman's age appears to have little bearing on her knowledge of the means of preventing HIV transmission. However, less educated and poorer women were much more likely to be ignorant of such means than better-educated or richer women. For example, women with no formal education were roughly three times more likely (75 percent as opposed to 28 percent) to be ignorant of all three ways of preventing HIV transmission than women educated to secondary level or beyond.

Figure HA.1a shows the proportion of women in the different Sudanese States who have heard of AIDS. In the South, less than 1 in 2 women have heard of AIDS as against a figure of 70 percent for the Sudan as a whole, but both in the 10 and 15 States, this figure varies starkly among the different States. Women are most likely to have heard of AIDS in Western Equatoria (87 percent) and Central Equatoria (73 percent). Women in Jonglei (25 percent), Warrap (28 percent) and Northern Bahr El Ghazal (35 percent) are least likely to have heard of AIDS.

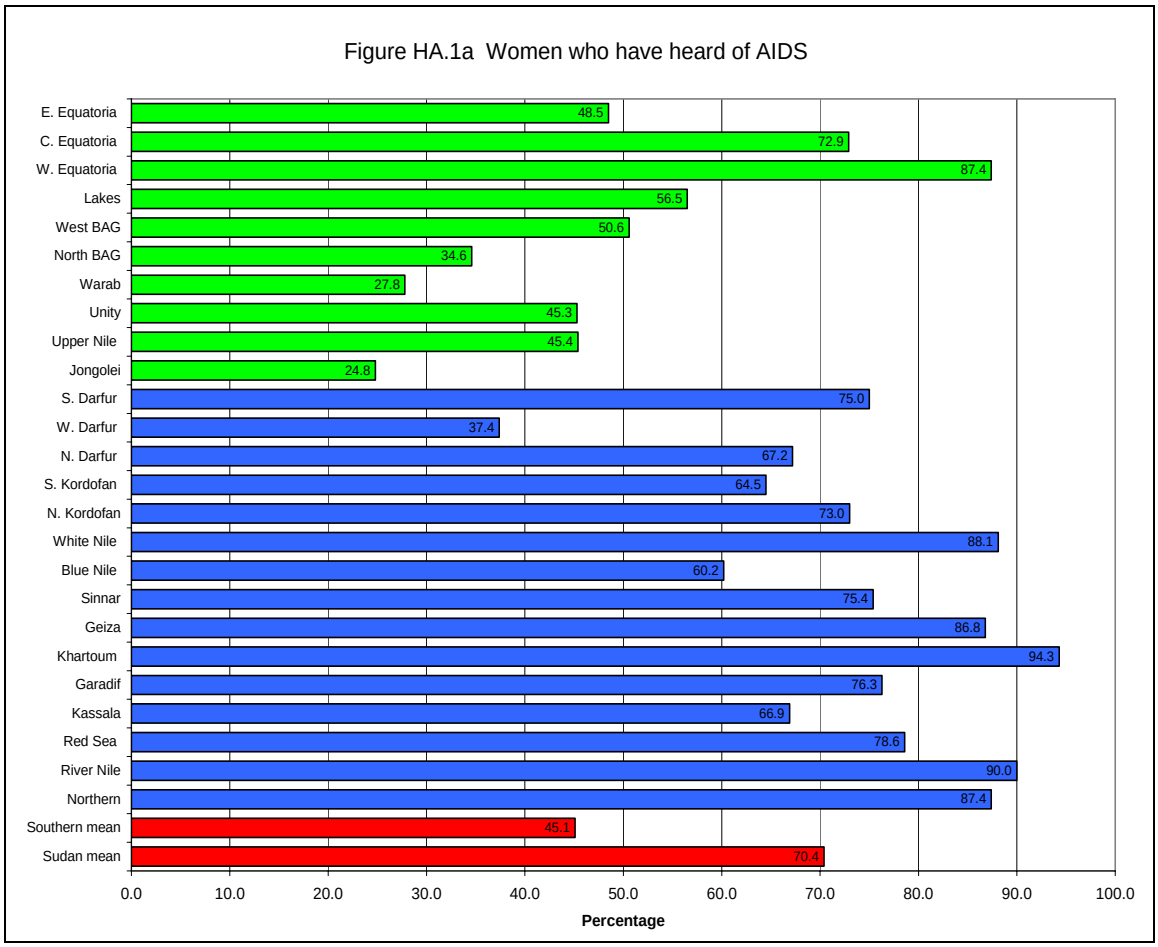

Figure HA.1a Percentage of women aged 15-49 years who have heard of AID

Figure HA.1b shows the proportion of women who are aware of the three main ways of preventing the transmission of HIV (having only one faithful uninfected sex partner; always using a condom when having sex with anyone else; and abstaining from sex before finding a long-term partner). Figures vary wildly among the different Sudanese States, but in general, twice as many Southern women (10 percent) are adequately informed about the means of protecting themselves from AIDS as women from the remaining 15 States; nonetheless, even in the South, 9 out of 10 women are ignorant of at least one of the main ways of preventing AIDS transmission. Within the Southern States, the women of Central Equatoria are best informed (25 percent), followed by the women of Upper Nile (17 percent) and Eastern Equatoria (15 percent). Least well-informed are the women of Warrap and Lakes, where a shocking 99 women out of 100 do not know all of the three main ways of protecting themselves against AIDS.

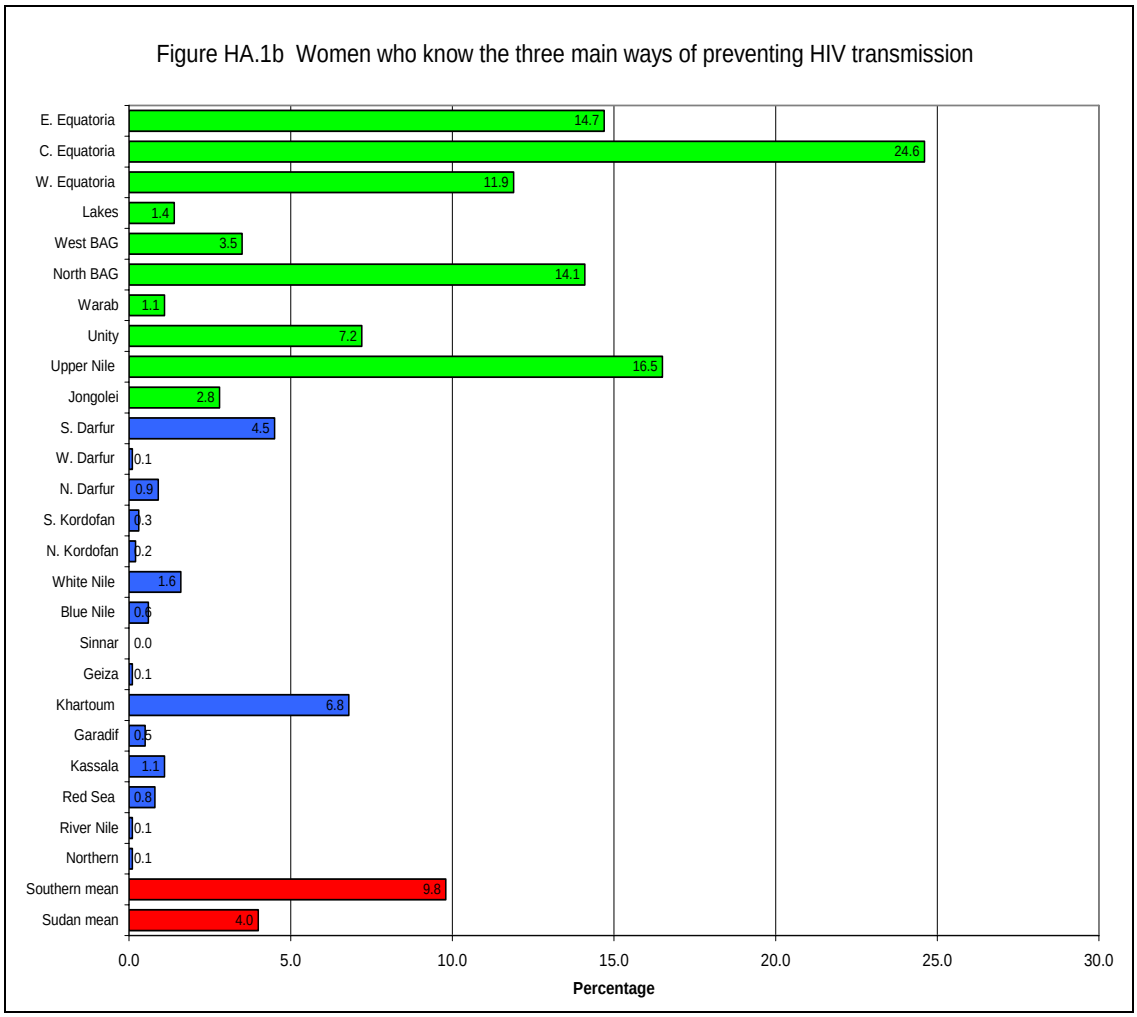

Figure HA.1b Percentage of women aged 15-49 years who know the three main ways of preventing HIV transmission (having a monogamous relationship with an uninfected partner; always using a condom when having sex with anyone else; and abstaining from sex before finding a long-term partner)

Figure HA.1c shows the proportion of women who professed themselves ignorant of all three of the main ways of preventing the transmission of the HIV (i.e., having a monogamous relationship with an uninfected partner; always using a condom when having sex with anyone else; and abstaining from sex before committing to a long-term partner). In the South, the figure is 70 percent, against a country-wide average of 56 percent. Over 9 out of 10 women in Jonglei (91 percent) and Warrap (90 percent) knew none of the three ways to protect themselves against AIDS. The women of Western Equatoria (32 percent) and Central Equatoria (36 percent) were least likely to be ignorant of the three main ways of preventing HIV transmission.

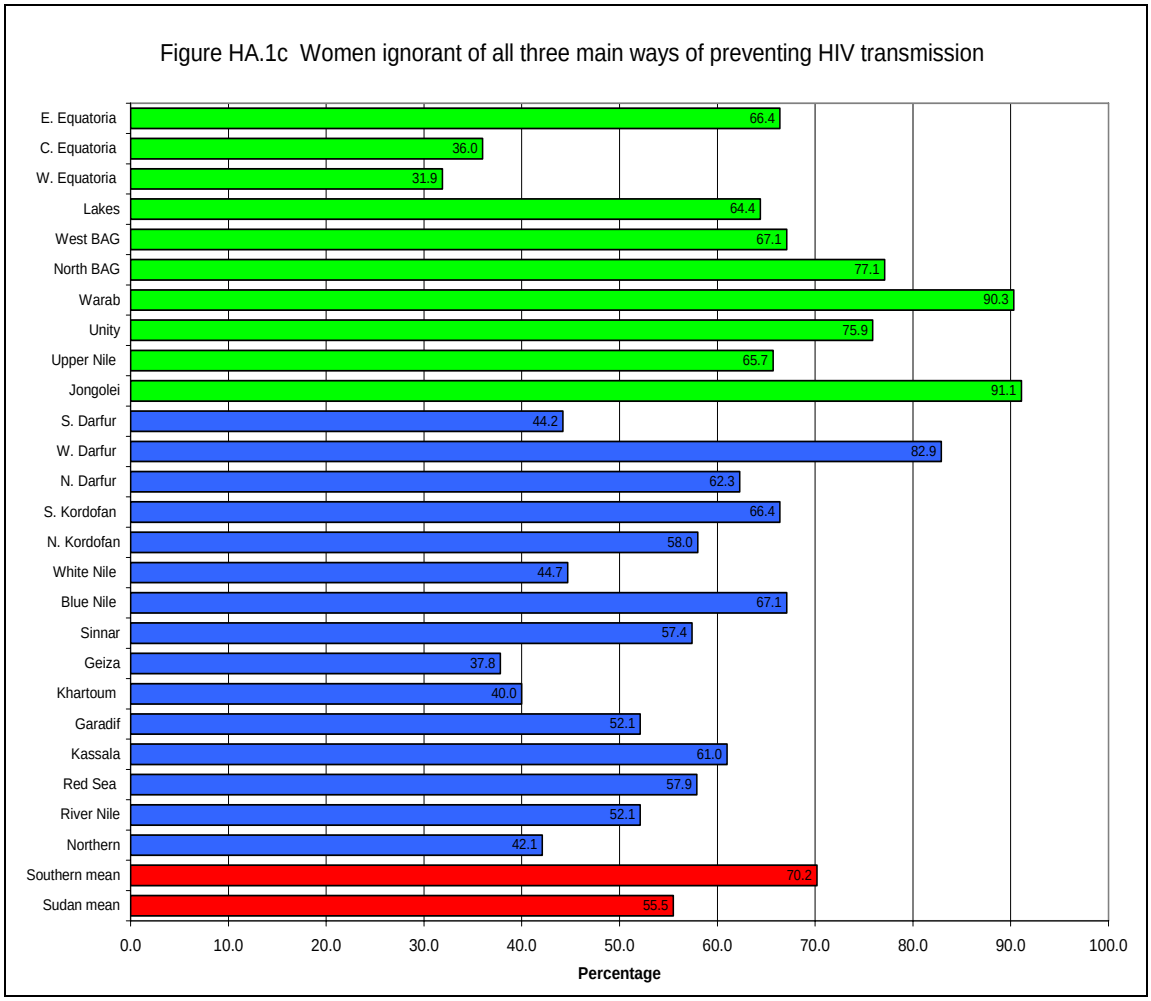

Figure HA.1c Percentage of women aged 15-49 years who are ignorant of all three of the main ways of protecting themselves against AIDS (having a monogamous relationship with an uninfected partner; always using a condom when having sex with anyone else; and abstaining from sex before committing to a long-term partner)

Table HA.2 presents information on women's knowledge of modes of HIV transmission, as well as some commonly held misconceptions on HIV transmission.

Table HA.2: Knowledge of the modes of HIV transmission
Percentage of women aged 15-49 years who correctly identify the modes of transmission of HIV as well as misconceptions about HIV transmission, Sudan, 2006

State		Percentage of women who believe that HIV can be transmitted:									Number of women
		..through intercourse	..by not using condom	..by blood transfusion	..by injection with needle already used by someone	..from mosquito bites	..through supernatural means	..by sharing food with person with AIDS virus	..by other means	Don't know how AIDS is transmitted	
	Northern	62.3	0.2	43.6	38.5	0.3	0.4	1.0	12.1	18.4	155,314
	River Nile	61.6	3.1	59.5	52.0	3.6	0.0	1.4	14.5	14.4	251,107
	Red Sea	57.1	5.0	54.5	51.9	3.4	0.8	0.8	12.3	12.9	172,855
	Kassala	43.0	5.6	41.4	41.6	2.4	0.1	0.5	12.7	11.2	388,682
	Gadarif	49.5	1.4	34.7	39.0	3.0	0.8	1.1	17.5	17.3	351,812
	Khartoum	81.2	15.2	73.9	68.5	8.7	1.1	2.6	12.1	7.8	1,396,068
	Gezira	64.4	1.4	52.4	48.1	0.8	0.2	0.4	12.9	12.5	978,435
	Sinnar	47.0	0.4	36.6	35.2	0.6	0.1	1.7	16.9	19.4	311,366
	Blue Nile	34.9	0.9	14.2	20.5	0.2	0.0	0.5	12.6	19.8	151,292
	White Nile	60.7	6.2	59.8	61.4	5.2	0.3	0.9	4.9	18.9	397,300
	N. Kordofan	45.5	1.1	32.8	32.5	2.1	0.2	1.0	11.4	21.6	568,863
	S. Kordofan	38.3	1.4	28.8	26.3	1.1	0.0	0.0	4.6	21.4	317,165
	N. Darfur	44.1	1.9	28.0	27.4	0.9	0.2	0.3	11.8	20.9	346,313
	W. Darfur	20.2	0.5	12.7	13.8	0.6	0.3	0.5	1.0	15.5	333,393
	S. Darfur	55.3	5.6	32.0	36.6	7.7	0.5	1.6	6.7	16.8	598,635
	Jonglei	14.1	5.5	6.9	5.9	2.3	0.6	1.2	1.1	8.8	330,303
	Upper Nile	42.3	23.4	32.4	25.0	5.7	2.9	2.6	1.0	2.9	232,889
	Unity	37.2	16.6	21.4	19.3	3.6	1.3	3.1	0.2	7.4	125,494
	Warrap	14.4	1.5	7.1	6.9	1.1	0.0	2.1	0.1	10.6	331,612
	NBG	23.8	19.2	17.3	17.7	7.3	3.2	4.1	3.3	6.5	354,355
	WBG	37.7	6.8	14.6	14.9	0.8	0.0	0.6	0.1	7.7	102,590
	Lakes	39.2	2.4	7.2	11.8	4.1	0.4	5.5	2.0	10.9	199,539
	W. Equatoria	79.4	17.6	22.8	44.6	13.8	6.3	4.1	11.6	5.3	146,550
	C. Equatoria	64.3	35.8	47.9	51.5	3.7	0.9	3.8	1.7	3.1	232,219
	E. Equatoria	46.8	18.2	27.8	23.3	0.7	1.5	1.9	10.3	1.2	194,865
SUDAN		**51.5**	**7.5**	**39.7**	**38.8**	**3.9**	**0.7**	**1.6**	**8.9**	**12.9**	**8,969,016**

Table HA.2a: Knowledge of the modes of HIV transmission
Percentage of women aged 15-49 years who correctly identify the modes of transmission of HIV as well as misconceptions about HIV transmission, Sudan, 2006

		Percentage of women who believe that HIV can be transmitted:									
		..through intercourse	..by not using condom	..by blood transfusion	..by injection with needle already used by someone	..from mosquito bites	..through supernatural means	..by sharing food with person with AIDS virus	..by other means	Don't know how AIDS is transmitted	Number of women
Age	15-19 years	51.7	5.1	42.6	41.9	3.3	0.8	1.8	10.6	12.6	1,591,533
	20-24 years	54.2	8.0	41.4	39.9	4.0	0.7	1.5	10.5	12.5	1,673,796
	25-29 years	51.1	8.9	38.3	36.8	4.4	0.7	1.7	7.6	11.2	1,891,925
	30-34 years	51.8	8.9	39.8	39.2	3.6	0.9	2.0	7.7	12.5	1,334,286
	35-39 years	50.0	6.7	37.2	37.1	4.2	0.7	1.4	8.8	14.7	1,261,536
	40-44 years	51.9	6.7	39.3	38.8	3.7	0.6	1.5	8.3	13.5	721,767
	45-49 years	46.5	7.3	36.1	35.1	3.5	1.0	1.2	8.2	16.6	494,172
Education	None	28.7	6.4	17.8	18.2	2.9	0.8	1.7	3.7	16.5	4,462,546
	Primary	71.8	6.8	58.1	56.7	5.0	0.7	1.6	14.3	10.4	3,692,201
	Secondary	85.7	16.3	76.9	70.8	4.1	0.6	1.1	13.2	4.0	802,288
Wealth index quintile	Poorest	24.8	6.6	12.6	12.3	2.5	0.6	1.9	2.0	10.8	1,591,109
	Second	30.3	7.7	17.5	19.9	3.5	1.1	1.8	4.3	15.6	1,692,599
	Middle	42.6	6.0	30.3	31.2	3.2	0.6	1.1	7.5	19.8	1,717,060
	Fourth	62.8	5.3	51.0	49.9	4.8	0.5	1.5	14.5	14.8	1,861,070
	Richest	86.2	11.1	75.6	70.2	5.0	0.8	1.7	14.1	4.9	2,107,178

In the Sudan as a whole, just over half of the women interviewed (52 percent) know that HIV can be transmitted through sexual intercourse. Less than 1 in 10 women (8 percent) are apparently aware that they are protected from contracting HIV transmission if their partner uses a condom. Forty (40) percent of women know that HIV can be transmitted with a blood transfusion, and just slightly fewer (39 percent) know they can contract HIV by injecting themselves with a needle previously used by an infected person.

The data suggests small proportions of women hold the misconceptions that HIV can be transmitted by an HIV-infected mosquito (4 percent), by sharing food with an HIV-infected person (1.6 percent), or through supernatural means (0.7 percent). Just over 1 in 10 women (13 percent) conceded they had no idea how HIV is transmitted.

The likelihood of a woman being correctly or incorrectly informed about modes of HIV transmission appears not to be related to her age. However, these beliefs vary strongly according to a woman's background characteristics, with richer and better educated women generally more likely to be correctly informed about modes of HIV transmission than poorer and less educated women. For example, over three times as many women from the top wealth quintile (86 percent) as in the lowest wealth quintile (25 percent) know that HIV can be transmitted through sexual intercourse.

Both within the Sudan as a whole and within the Southern States there are stark variations among the States in the proportion of women who know that HIV can be transmitted through sexual intercourse (Figure HA.2a). On average, women in the South (35 percent) are less well informed in this regard than women in the country as a whole (52 percent). Within the South, women in Western Equatoria are most likely (79 percent) to be aware that intercourse with an infected partner can lead to AIDS. Women are most ignorant in this regard in Jonglei and Warrap States (both 14 percent).

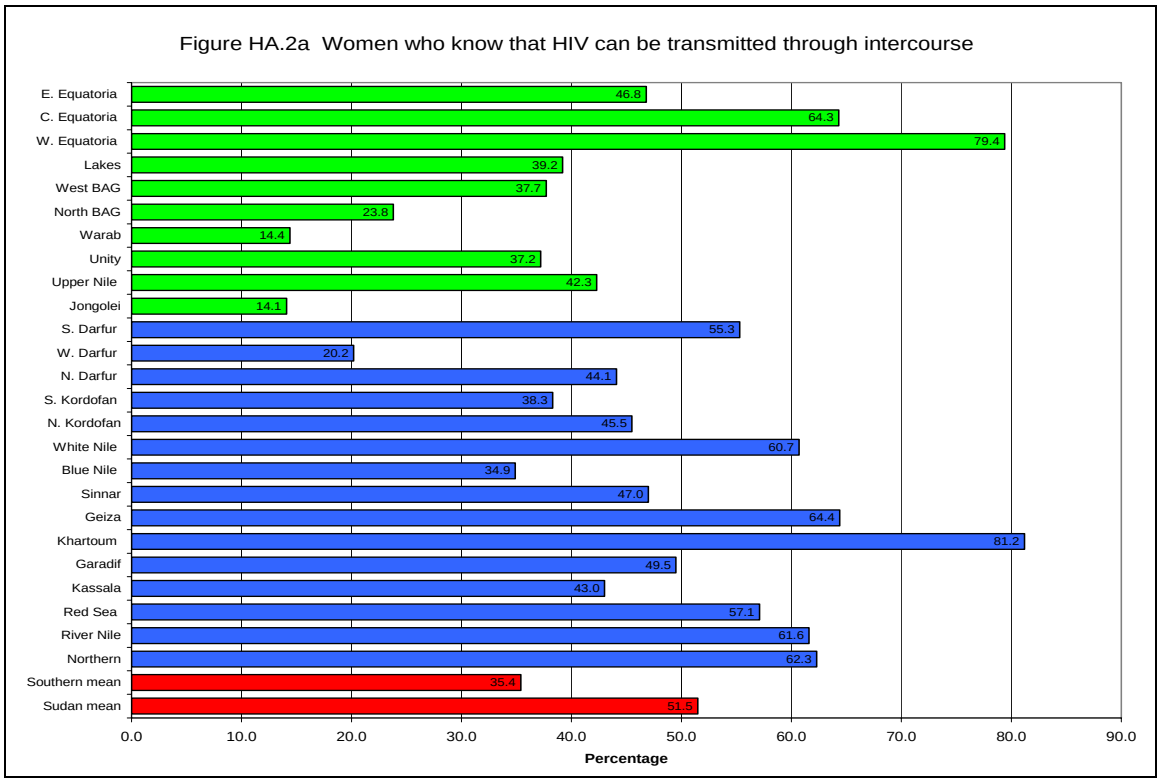

Figure HA.2a Percentage of women aged 15-49 years who correctly identified sexual intercourse as a mode of transmitting HIV

Women in the South are slightly more likely (14 percent) than women in the country as a whole (8 percent) to know that use of condoms during intercourse can prevent transmission of HIV (Figure HA.2b). Figures vary widely within the South, and are best for Central Equatoria (36 percent) and worst for Warrap and Lakes (2 percent).

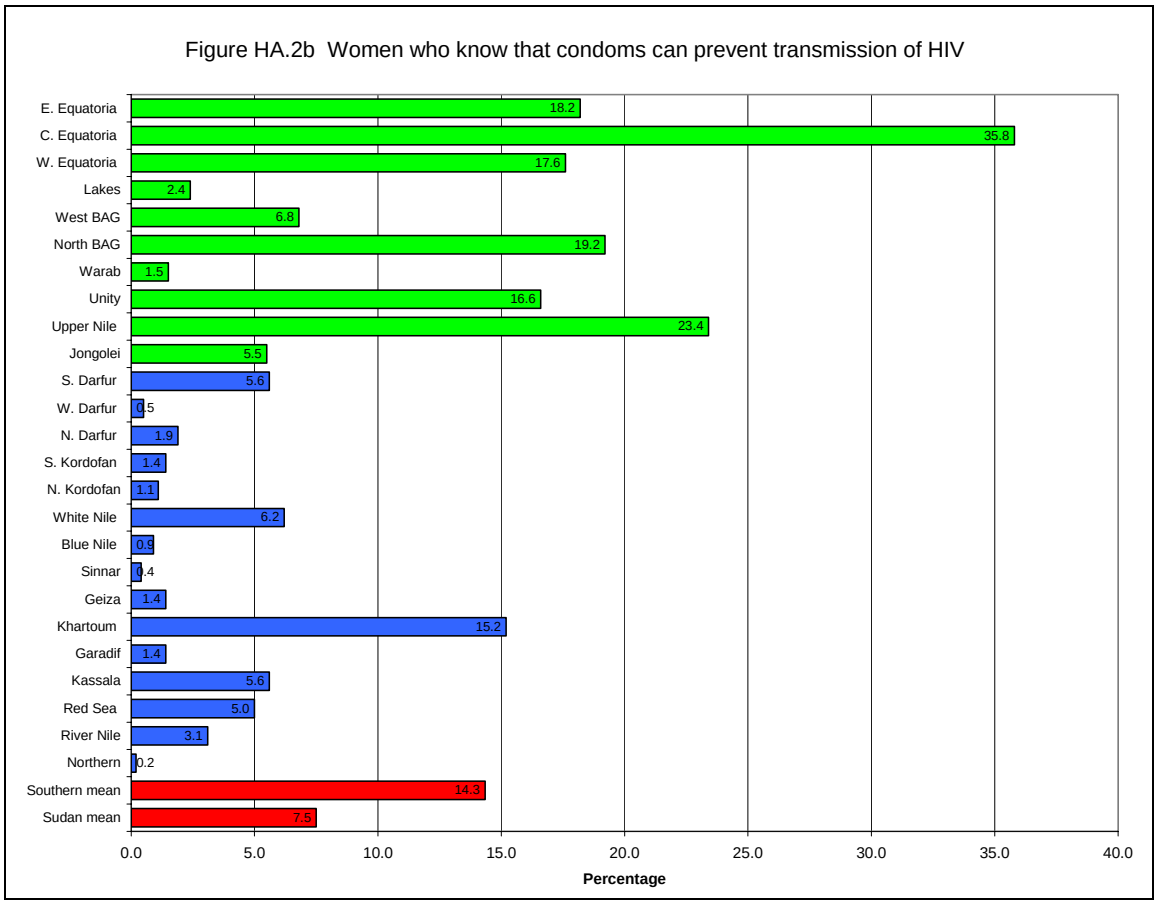

Figure HA.2b Percentage of women aged 15-49 who identified not using a condom during sex as a mode of transmitting HIV

With regards to transmission, women in the South are only half as likely (20 percent) as the national mean (40 percent) to know that HIV can be transmitted via blood transfusions (Figure HA.2c). Women in Central Equatoria (48 percent) are most likely to be aware of this mode of HIV transmission, while the figures are lowest in the States of Jonglei, Warrap and Lakes (all 7 percent).

The findings suggest the proportion of women who know that HIV can be transmitted by sharing needles is very similar to that for those who are aware of the potential for transmitting HIV via blood transfusions, with the mean for Southern Sudan at 20 percent and that for the country as a whole at 39 percent (Figure HA.2d). Among the Southern States, figures were again highest in Central Equatoria (52 percent), followed by Western Equatoria. They were lowest in Jonglei (6 percent) and Warrap (7 percent).

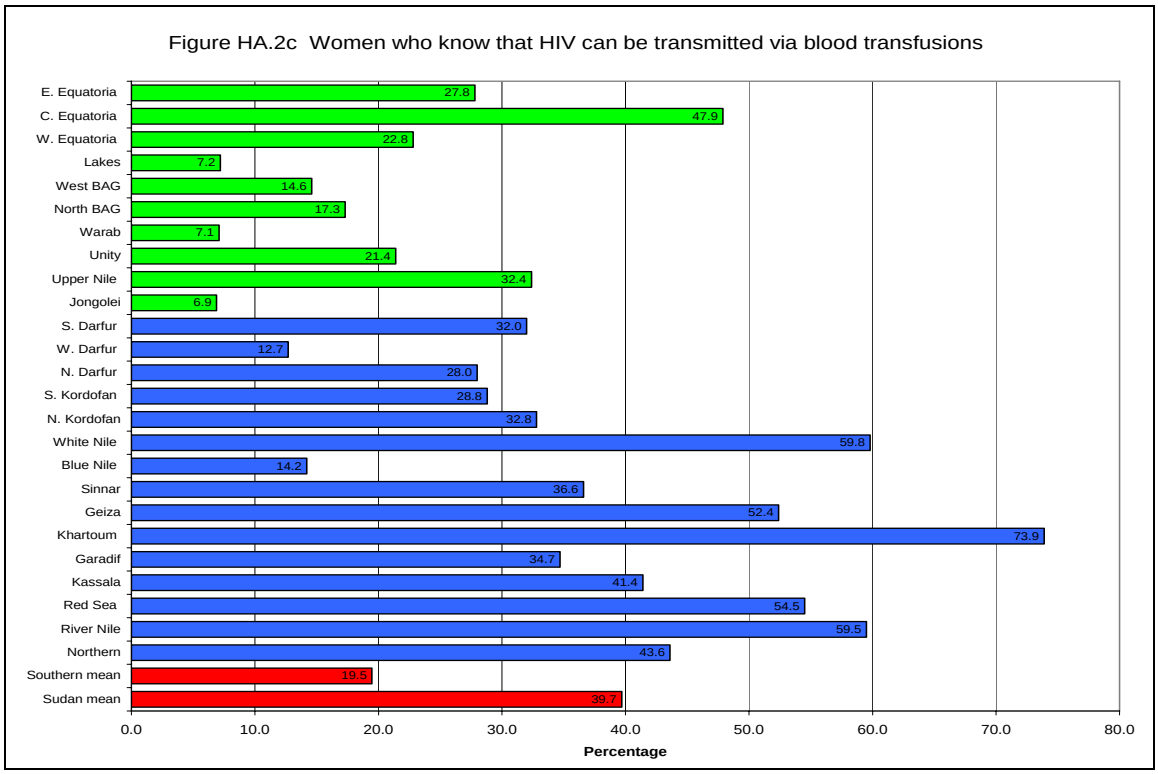

Figure HA.2c Percentage of women aged 15-49 who correctly identified blood transfusions as a mode of transmitting HIV

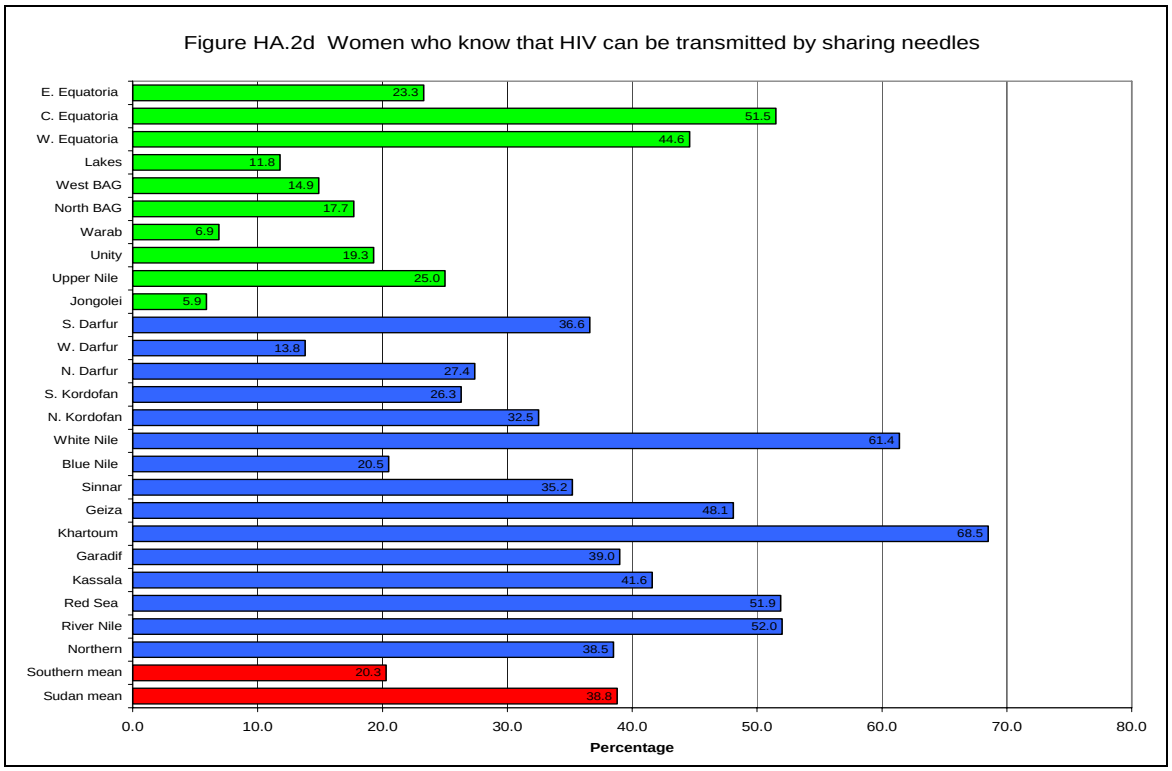

Figure HA.2d Percentage of women aged 15-49 who correctly identified sharing a needle as a mode of transmitting HIV

Knowledge of mother-to-child transmission of HIV is also an important first step if women are to seek HIV testing when they are pregnant to avoid infection in the baby. Women should know that HIV can be transmitted during pregnancy, delivery, and through breastfeeding. The level of knowledge among women age 15-49 years concerning mother-to-child transmission is presented in Table HA.3.

Table HA.3 Knowledge of mother-to-child transmission of HIV
Percentage of women aged 15-49 years who correctly identify means of HIV transmission from mother to child, Sudan, 2006

		Percentage of women who know AIDS can be transmitted (%):						Number of women
		..from mother to child*	..during pregnancy	..at delivery	..through breastmilk	All three ways**	Did not know any specific way	
State	Northern	65.5	57.3	49.2	54.7	40.4	22.0	155,314
	River Nile	75.7	69.3	59.1	51.5	40.8	14.8	251,107
	Red Sea	59.5	54.8	48.5	34.5	27.9	19.5	172,855
	Kassala	48.9	43.3	39.5	32.1	25.7	18.0	388,682
	Gadarif	59.6	53.3	49.0	47.2	37.5	16.7	351,812
	Khartoum	82.1	77.7	57.7	47.0	35.7	12.8	1,396,068
	Gezira	70.1	58.0	52.3	43.2	31.7	16.8	978,435
	Sinnar	56.7	50.5	47.1	46.4	37.7	18.9	311,366
	Blue Nile	39.9	35.4	31.3	33.5	24.4	20.7	151,292
	White Nile	65.6	52.1	56.0	40.1	31.0	22.8	397,300
	N. Kordofan	55.9	51.5	41.8	39.1	31.3	17.3	568,863
	S. Kordofan	37.6	35.5	27.6	27.3	19.8	28.4	317,165
	N. Darfur	48.6	45.4	40.5	39.7	33.7	19.2	346,313
	W. Darfur	21.0	18.9	15.4	15.7	12.5	16.8	333,393
	S. Darfur	54.8	46.4	39.2	41.6	28.0	20.3	598,635
	Jonglei	9.7	7.2	7.1	6.9	4.3	16.1	330,303
	Upper Nile	36.4	24.5	26.3	20.4	10.8	14.7	232,889
	Unity	33.8	28.3	13.5	14.9	7.5	15.1	125,494
	Warrap	10.8	6.4	9.8	8.6	4.7	18.1	331,612
	NBG	25.1	20.8	9.7	7.8	4.7	12.9	354,355
	WBG	33.8	19.1	14.2	29.6	11.3	18.8	102,590
	Lakes	36.5	29.0	30.9	34.3	26.0	20.4	199,539
	W. Equatoria	70.4	36.1	53.5	56.5	24.2	17.2	146,550
	C. Equatoria	63.0	37.3	56.9	38.9	24.2	10.4	232,219
	E. Equatoria	36.7	23.1	27.0	32.0	15.5	14.3	194,865
SUDAN		**54.0**	**46.4**	**40.4**	**36.0**	**26.4**	**17.2**	**8,969,016**
Age	15-19 years	57.8	50.5	43.0	39.7	28.8	16.0	1,591,533
	20-24 years	56.0	47.7	41.2	37.9	27.6	17.6	1,673,796
	25-29 years	51.4	43.5	38.3	33.3	24.1	16.4	1,891,925
	30-34 years	52.7	45.8	40.3	34.3	26.1	17.1	1,334,286
	35-39 years	52.8	44.8	40.1	36.0	26.4	18.2	1,261,536
	40-44 years	54.5	47.9	40.8	35.3	25.9	17.2	721,767
	45-49 years	49.8	43.1	38.6	32.9	24.5	20.0	494,172
Education	None	29.7	23.4	21.2	21.0	14.0	20.9	4,462,546
	Primary	76.5	67.2	59.2	52.2	39.6	14.4	3,692,201
	Secondary+	85.0	78.7	61.1	44.4	34.3	8.9	802,288
Wealth index quintiles	Poorest	22.2	16.0	15.2	16.0	9.4	18.3	1,591,109
	Second	31.1	23.1	22.9	21.8	14.1	19.7	1,692,599
	Middle	48.2	40.4	36.7	35.1	25.4	21.3	1,717,060
	Fourth	69.2	60.8	54.6	49.2	38.5	18.3	1,861,070
	Richest	87.5	80.2	64.1	51.5	39.0	9.9	2,107,178

*SHHS indicator 73: Knowledge of mother-to-child transmission of HIV (Proportion of women aged 15-49 years who know that HIV can be transmitted from mother to child)
**SHHS indicator 74: Knowledge of means of mother-to-child transmission of HIV (Proportion of women aged 15-49 years who know HIV can be transmitted during pregnancy, at delivery and through breast milk)

Overall in the Sudan, 54 percent of women know that HIV can be transmitted from mother to child. Slightly fewer had more specific knowledge, with 46 percent knowing that HIV can be transmitted during pregnancy, 40 percent aware the virus can be passed from mother to baby during delivery, and 36 percent of women aware the virus can be transmitted from mother to baby through breast-milk. The percentage of women who know all three ways of mother-to-child transmission is 26 percent, while 17 percent of women did not know of any specific way.

Women of all age groups had a similar understanding of the modes of HIV transmission. However, women with more education were more likely to have a better understanding of the modes of HIV transmission between mother and baby. For example, almost three times as many women with at least secondary education (85 percent) know that HIV can be transmitted from mother to child as do women with no formal education (30 percent). A similar pattern is discernable for women from different wealth quintiles, with the richer women invariably better informed about mother-to-baby HIV transmission than women from lower wealth quintiles. Thus, for example, women in the top wealth quintile were four times as likely (39 percent) to know all three ways of mother-to-baby HIV transmission as women in the bottom wealth quintile (9 percent).

Women from the 10 Southern States are less well-informed than women from the 15 States with regard to any of the modes of mother-to-baby HIV transmission. Figure HA.3a presents the figures on the percentage of women who know that HIV can be transmitted from mother to child.

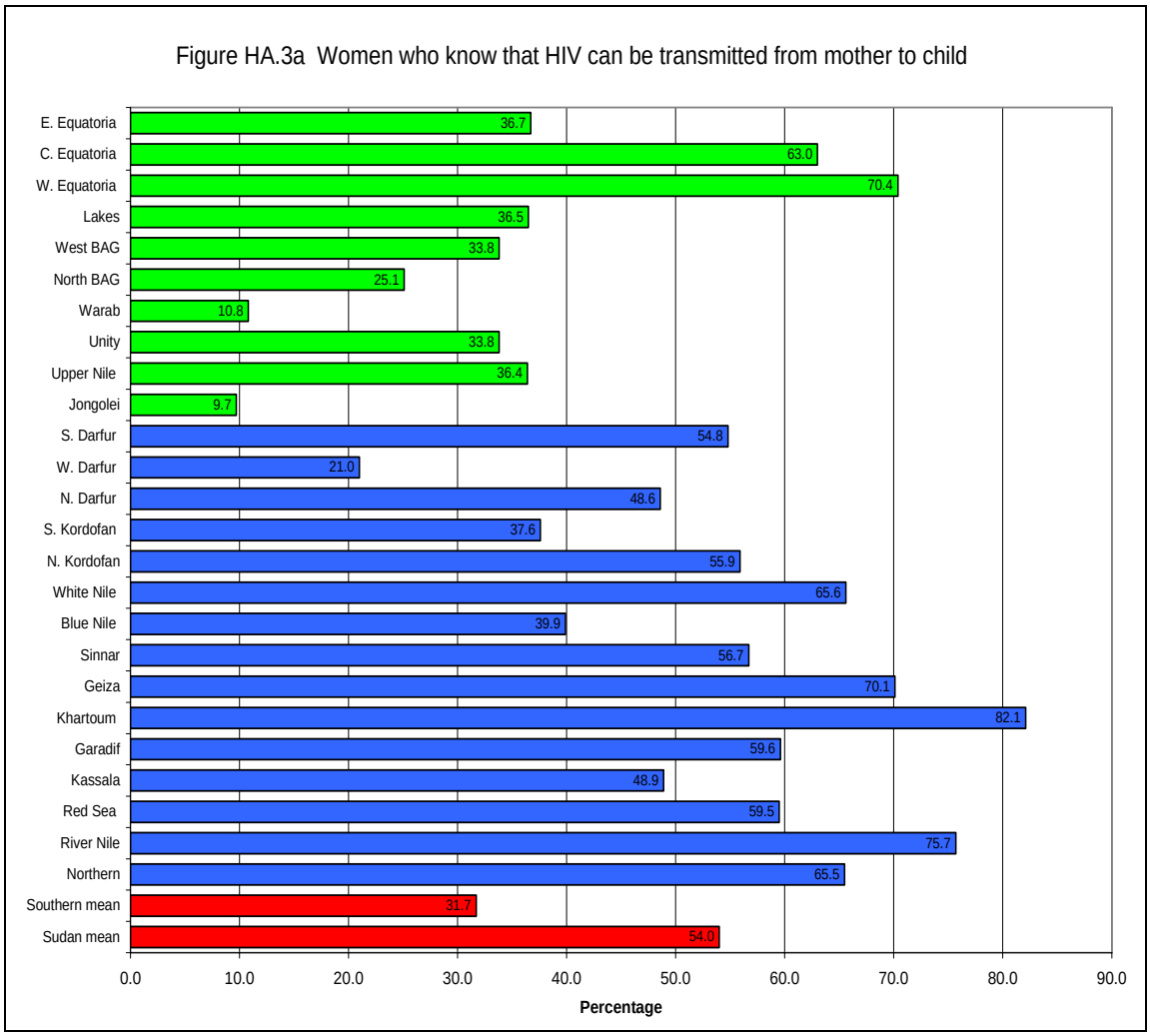

Figure HA.3a Percentage of women aged 15-49 who know that HIV can be transmitted from mother to child

The mean figure for the South (32 percent) is appreciably lower than the country-wide mean (54 percent). Nonetheless, women in some Southern States (Western and Central Equatoria) are better informed than the national average. Women are least likely to know that HIV can be transmitted from mother to child in Jonglei (10 percent) and Warrap (11 percent).

Southern women were much less likely to be aware of the three main ways a mother can transmit HIV to her baby (i.e., during pregnancy, at delivery, and through breast-milk). On average, only 12 percent of Southern women were well-informed in this regard. Figures even in the best-informed Southern States are below the country-wide mean: in Lakes State, 26 percent of women know all three ways of mother-to-baby HIV transmission, followed closely by Central and Western Equatoria (both 24 percent). In Jonglei (4 percent), Warrap and Northern Bahr El Ghazal (both 5 percent) fewer than 1 in 20 women were well-informed as to how mothers can infect their children with HIV.

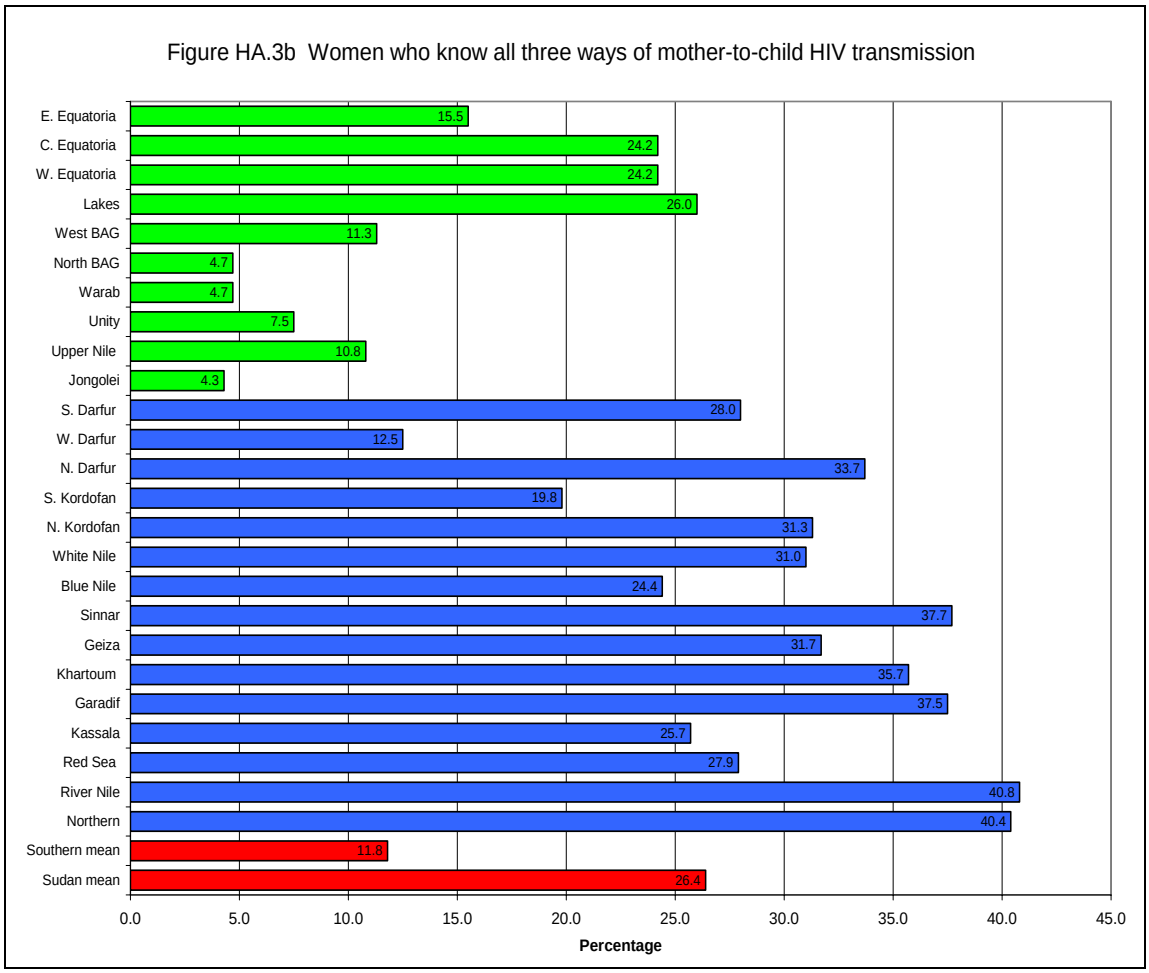

Figure HA.3b Percentage of women aged 15-49 who know that HIV can be transmitted during pregnancy, at delivery, and through breast milk.

4.8.2 Orphans and Vulnerable Children

As the HIV epidemic progresses, more and more children are becoming orphaned and vulnerable because of AIDS. Children who are orphaned or in vulnerable households may be at increased risk of neglect or exploitation if the parents are not available to assist them. Monitoring the variations in different outcomes for orphans and vulnerable children and comparing them to their peers gives us a measure of how well communities and governments are responding to their needs.

To monitor these variations, a measurable definition of orphaned and vulnerable children needed to be created. The UNAIDS Monitoring and Evaluation Reference Group developed a proxy definition of children who have been affected by adult morbidity and mortality. This should capture many of the children affected by AIDS in countries where a significant proportion of the adults are HIV infected. This definition classifies children as orphaned and vulnerable if they have experienced the death of either parent, if either parent is chronically ill, or if an adult (aged 18-59) in the household either died (after being chronically ill) or was chronically ill in the year prior to the survey.

Table HA.4 gives an overview of children aged 0-17 years who are orphaned and/or vulnerable, and who are living with neither parent, mother only, or father only.

Table HA.4: Children's living arrangements and orphan hood
Distribution of children aged 0-17 years according to living arrangements, percentage of children aged 0-17 years in households not living with a biological parent and percentage of children who are orphaned (one or both parents dead), Sudan, 2006

		Living with both parents (%)	Living with neither parent (%)				Living with mother only (%)		Living with father only (%)		Impossible to determine (%)	Total (%)	Not living with a biological parent * (%)	One or both parents dead ** (%)	Number of children
			Only father alive	Only mother alive	Both are alive	Both are dead	Father alive	Father dead	Mother alive	Mother dead					
	Male	70.7	0.5	0.8	3.6	1.3	9.9	5.4	1.3	1.4	4.9	100.0	6.3	9.6	10,498,038
Sex	Female	70.0	0.6	0.9	4.7	1.3	9.7	5.5	1.1	1.4	4.7	100.0	7.5	9.8	9,950,365
	Northern	76.1	0.5	0.2	1.9	0.1	13.7	3.6	0.6	2.0	1.3	100.0	2.6	6.4	275,588
	River Nile	73.9	0.4	0.4	2.6	0.4	13.5	4.8	1.4	1.5	1.1	100.0	3.8	7.4	396,445
	Red Sea	79.8	0.8	0.7	3.3	1.2	6.8	2.7	1.5	0.9	2.2	100.0	6.0	6.3	315,961
	Kassala	82.9	0.3	0.8	3.3	0.8	5.2	2.9	0.8	2.0	1.0	100.0	5.3	6.8	857,300
	Gadarif	79.6	0.7	0.4	3.1	0.4	8.2	3.3	1.7	2.0	0.7	100.0	4.6	6.8	942,991
	Khartoum	75.6	0.5	0.1	2.5	0.9	11.3	5.5	1.7	1.2	0.8	100.0	4.0	8.1	2,517,492
	Gezira	79.5	0.5	0.0	1.3	0.9	11.7	4.3	0.2	0.9	0.6	100.0	2.8	6.7	1,784,266
	Sinnar	82.2	0.3	0.6	2.3	0.3	6.8	3.9	1.1	1.9	0.4	100.0	3.6	7.2	641,443
	Blue Nile	81.5	0.4	1.1	3.8	0.3	5.7	3.0	1.9	1.2	1.1	100.0	5.6	6.0	401,024
	White Nile	81.9	0.5	0.5	2.4	0.6	8.4	2.7	0.7	1.2	1.0	100.0	4.0	5.5	796,499
	N. Kordofan	78.0	0.5	0.4	3.8	0.7	9.3	3.8	0.5	1.7	1.4	100.0	5.5	7.2	1,250,597
	S. Kordofan	69.3	1.1	1.2	4.6	0.9	12.9	5.0	1.6	1.4	2.1	100.0	7.7	9.5	874,385
	N. Darfur	73.2	0.3	0.8	3.9	0.5	13.1	5.2	0.5	0.7	1.7	100.0	5.5	7.6	933,918
	W. Darfur	66.3	0.9	1.2	7.0	1.1	14.6	4.7	1.1	1.0	2.0	100.0	10.3	9.0	983,915
	S. Darfur	75.0	1.0	0.8	6.9	0.6	7.6	2.9	2.2	2.3	0.7	100.0	9.2	7.6	1,810,264
	Jonglei	49.0	0.2	0.9	3.9	1.9	4.9	6.7	1.7	1.7	29.0	100.0	6.9	11.8	861,600
	Upper Nile	49.2	0.4	2.2	6.8	4.3	14.0	11.7	1.3	1.7	8.5	100.0	13.7	20.5	541,699
	Unity	57.8	0.9	2.7	7.6	2.3	7.7	7.0	1.0	1.1	11.8	100.0	13.5	14.3	351,155
	Warrap	48.9	0.5	2.3	6.8	1.9	12.3	13.7	0.6	0.7	12.4	100.0	11.4	19.4	853,346
	NBG	48.4	0.3	1.6	3.9	3.1	8.5	8.2	0.6	1.3	24.1	100.0	8.9	15.3	801,674
	WBG	57.5	0.4	1.9	4.4	2.1	3.4	8.3	0.8	1.0	20.3	100.0	8.8	14.3	230,769
	Lakes	68.1	0.4	0.7	7.0	2.3	6.6	5.6	1.9	1.2	6.1	100.0	10.4	10.4	540,166
	W. Equatoria	44.0	1.5	3.0	11.5	4.9	14.9	5.6	5.7	2.7	6.2	100.0	20.9	17.9	340,927
	C. Equatoria	69.0	0.7	1.5	4.9	2.4	7.3	7.5	1.2	2.1	3.3	100.0	9.6	14.4	614,004
State	E. Equatoria	55.5	0.4	0.8	2.4	4.2	11.3	12.0	0.4	0.7	12.3	100.0	7.8	18.2	530,976
	SUDAN	**70.4**	**0.6**	**0.8**	**4.2**	**1.3**	**9.8**	**5.4**	**1.2**	**1.4**	**4.8**	**100.0**	**6.9**	**9.7**	**20,448,403**

Table HA.4a : Children's living arrangements and orphanhood
Distribution of children aged 0-17 years according to living arrangements, percentage of children aged 0-17 years in households not living with a biological parent and percentage of children who are orphaned (one or both parents dead), Sudan, 2006

		Living with both parents (%)	Living with neither parent (%)				Living with mother only (%)		Living with father only (%)		Impossible to determine (%)	Total (%)	Not living with a biological parent * (%)	One or both parents dead ** (%)	Number of children
			Only father alive	Only mother alive	Both are alive	Both are dead	Father alive	Father dead	Mother alive	Mother dead					
Age	0-4 yrs	77.8	0.2	0.3	2.2	0.4	11.4	3.5	0.5	0.4	3.2	100.0	3.2	5.0	5,955,210
	5-9 yrs	71.2	0.5	0.8	4.5	1.1	9.6	4.8	1.3	1.2	5.1	100.0	6.9	8.5	6,522,864
	10-14 yrs	66.0	0.9	1.2	4.9	1.8	9.0	6.8	1.7	2.4	5.3	100.0	8.8	13.2	5,602,403
	15-17 yrs	59.5	0.9	1.6	6.5	2.9	8.8	8.7	1.7	2.4	7.0	100.0	11.9	16.7	2,367,926
Wealth index quintiles	Poorest	58.7	0.6	1.5	5.9	2.1	11.1	9.0	1.2	1.4	8.6	100.0	10.0	14.8	4,477,052
	Second	66.3	0.6	1.0	4.4	1.6	9.5	5.7	1.2	1.5	8.0	100.0	7.7	10.6	4,481,326
	Middle	73.5	0.6	0.9	4.4	1.0	9.0	4.3	1.3	1.4	3.6	100.0	7.0	8.3	4,290,729
	Fourth	78.8	0.5	0.4	3.4	0.6	8.9	3.6	1.0	1.5	1.3	100.0	4.9	6.7	3,947,781
	Richest	77.6	0.5	0.2	2.2	1.0	10.8	4.0	1.4	1.3	1.0	100.0	4.0	7.0	3,251,515

*SHHS indicator 54: Children's living arrangements (children aged 0-17 years not living with a biological parent)

**SHHS indicator 55: *Prevalence of orphans* (Proportion of children under age 18 with at least one dead parent)

In the Sudan as a whole, only 70 percent of surveyed children aged 0-17 years were living with both their parents. Usually, children not living with both parents lived with their mother, and their father either lived elsewhere (10 percent), or was deceased (5 percent). In a further 4 percent of cases, both parents were alive but lived elsewhere. In a smaller number of cases, both parents were deceased (1.3 percent), or the child lived with his/her father and the mother was either alive but living elsewhere (1.2 percent), or deceased (1.4 percent). In some 5 percent of cases it was not possible to determine whether a child was living with his/her biological parents.

Altogether in the Sudan as a whole, 7 percent of children were living without either of their biological parents. One (1) in ten (10) children had lost one or both his/her parents.

Older children were more likely than younger children not to be living with one or both parents, or to have lost one or both parents. For example, only 3 percent of children in the age group 0-4 were not living with either biological parent, but for children aged 15-17 this figure had risen to 12 percent.

Poor children were more likely than rich children not to be living with both parents, not to be living with either biological parent, and/or to have lost one or both biological parents. For example, over twice as many children in the poorest wealth quintile had lost one or both parents (15 percent) as in the top wealth quintile (7 percent).

In the Southern States the mean number of children not living with either biological parent (11 percent) was appreciably higher than in the Sudan as a whole (7 percent; Figure HA.4a), with over 1 in 5 children (21 percent) from Western Equatoria living with neither biological parent. In all other States the figure was below 14 percent, and children in Jonglei (7 percent) were least likely not to be living with a biological parent.

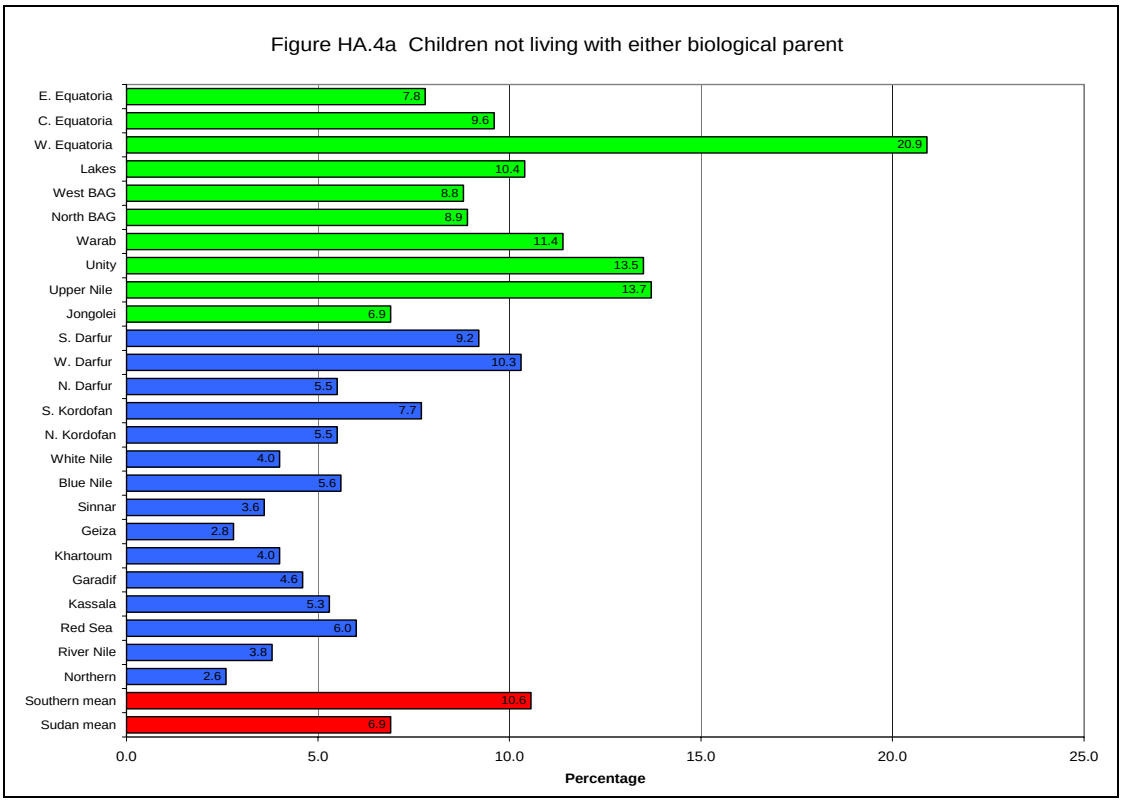

Figure HA.4a Percentage of children aged 0-17 not living with either of their biological parents

Southern children are roughly twice as likely as Northern children to have lost one or both their biological parents (Figure HA.4b). Within the South, figures were worst in Upper Nile (21 percent) and Warrap (19 percent). Children from Lakes (10 percent) and Jonglei (12 percent) were least likely to have lost one or both parents.

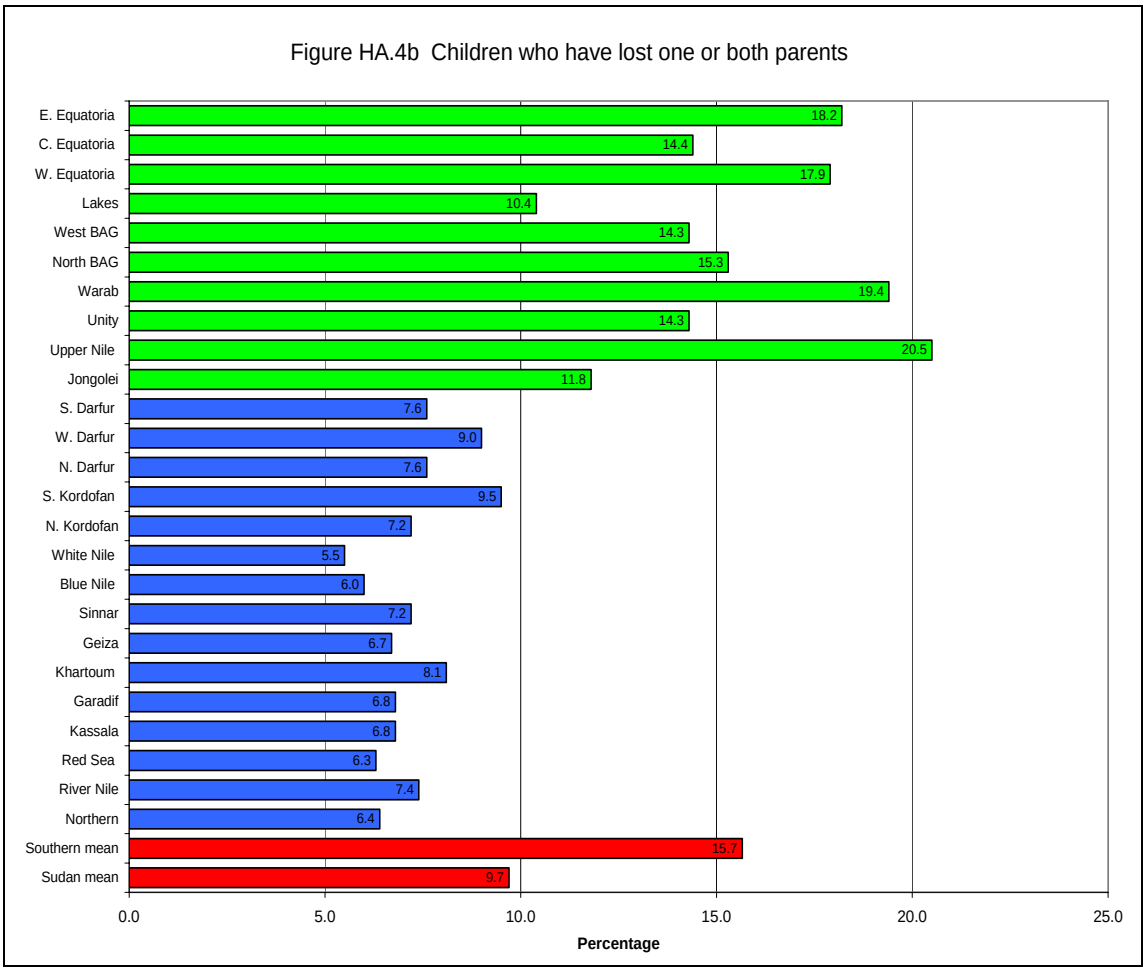

Figure HA.4b Percentage of children aged 0-17 who have lost one or both parents

KEY DEFINITIONS AND INTERPRETATIONS

For clarity purposes, some of the common words used in this household survey report are defined as follows:

Quintile: A quintile is one fifth or 20% of a given amount. The term is used when describing the statistical distribution of a population.

Weighted: A weight function is a mathematical device used when performing a sum, integral, or average in order to give some elements more of a "weight" than others. They occur frequently in statistics and analysis, and are closely related to the concept of a measure. Weight functions can be constructed in both discrete and continuous settings.

10 States: This refers to the 10 States of Southern Sudan.

15 States: Refers to the 15 States under the Government of National Unity.

Sample: In statistics, a sample is a subset of a population. It represents a subset of manageable size. Samples are collected and statistics are calculated from the samples so that one can make inferences or extrapolations from the sample to the population. This process of collecting information from a sample is referred to as sampling.

SHHS Indicators: These are indicators selected by the Sudan Household Health Survey Team that are important to assess some of the key issues in the Country and cannot necessary be considered as agreed upon international indicators.

North BAG: This refers to Northern Bahr El Ghazel (NBEG), spelled wrongly as Northern Bahr Al Ghazel in the graphic figures.

West BAG: Refers to Western Bahr EL Ghazel, spelled wrongly as Western Bahr Al Ghazel in the figures.

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APPENDICES

APPENDIX A:
SAMPLE DESIGN AND ESTIMATION PROCEDURES FOR THE SUDAN HOUSEHOLD HEALTH SURVEY

1. Background

The Sudan Central Bureau of Statistics (CBS) and the Southern Sudan Center for Census, Statistics and Evaluation (SSCCSE) conducted the 2006 Sudan Household Health Survey (SHHS) in all 25 states of Sudan in April/May2006. The CBS was responsible for the sampling and operations in the 15 states of Northern Sudan, and the SSCSE was responsible for the 10 states of Southern Sudan. Technical working group meetings between the CBS, SSCCSE (as well as UNICEF, the UNFPA, WFP, WHO and other stakeholders) were held to coordinate the questionnaires, procedures and sampling plans for the survey in the North and South. Following the survey data collection and partial editing, the data sets from the North and South were merged.

A similar Multiple Indicator Cluster Survey (MICS) had been conducted in Southern Sudan in 1999, although the geographic coverage did not include the garrison towns and areas affected by security problems during the conflict. The methodology and experience from the 1999 MICS were examined, although the SHHS is a more comprehensive national household survey that will have greater geographic coverage.

Although the SSCCSE did not have a complete geographic database such as recent census cartography to develop the sampling frame, there were different lists of villages and geographic information systems that could be used as sources for compiling an effective frame.

2. Objectives of Sudan Household Health Survey

The 2006 SHHS is a combination of the Multiple Indicator Cluster Survey (MICS) and PAPFAM (Pan-Arab Project for Family Health) multi-national surveys, designed to measure various indicators of fertility and family planning, maternal and child health, and other key socioeconomic characteristics. In addition to a core questionnaire, the North and South included individual modules for particular topics such as food security.

The geographic domains for tabulating the 2006 SHHS results are the 25 individual states of Sudan. In addition, it should be possible to obtain some urban/rural estimates at the national level. The 10 states of Southern Sudan are grouped into three regions, defined as follows:

Equatoria Region: Western Equatoria, Eastern Equatoria, Central Equatoria, Upper Nile Region: Unity, Upper Nile, Jonglei, Bahr-el-Ghazal: Lakes, Northern Bahr-El-Ghazal, Western Bahr-El- Ghazal, Warrap.

In addition to the state-level tables, survey results will also be tabulated for Southern Sudan, each of the three regions and the national level. Depending on the level of precision, some estimates such as infant mortality may be limited to the Southern Sudan, regional or national.

3. Sample Design for 1999 Multiple Indicator Cluster Survey in Southern Sudan

For the 1999 MICS in Southern Sudan the task of developing a sampling frame was very challenging due to the civil war (Deng, L., 2004). The sampling frame was based on traditional social hierarchy rather than on the formal administrative structure. Due to problems of security, access or data availability, five of the twenty-eight counties were excluded from the sampling frame, as well as the former garrison towns.

The sampling frame for the 1999 MICS was based on a listing of Executive Chiefs or their equivalents, together with the number of Sub-Chiefs under each. A stratified systematic sample of 200 Sub-Chiefs was selected from a total of 2,238 in the final adjusted sampling frame. For each Sub-Chief area selected, a list of village headmen or Gol Leaders was compiled, and one headman was selected at random. The selected headman assisted in producing a simple sketch map showing the number and relative locations of the households under his jurisdiction. This sketch map was then divided into segments of approximately 25 households each, and one of these compact clusters was selected for the survey.

Out of the 5,000 households originally selected for the survey, a total of about 4,300 were successfully interviewed. Therefore the overall survey response rate was 86 percent; most of the noninterviews resulted because survey staff could not reach the selected households for reasons of security and/or accessibility. The sample households reached by the survey staff all cooperated with the survey interview, so no refusals were recorded.

4. Sampling Frame and Units of Analysis

Given the Comprehensive Peace Agreement and the current availability of lists of villages and other administrative units from different sources, some with approximate population estimates, it was be possible to have much better coverage and a more efficient sampling frame for the 2006 SHHS compared to the 1999 MICS. This frame will also be very useful in preparing for the census cartographic operation, given that the formal administrative structure of the Southern Sudan geography needs to be established prior to the 2007 Sudan Census.

The target universe for the 2006 SHHS includes the households and population living in individual households, including the nomadic population such as cattle camps who were enumerated where they were camping at the time of the survey. The population living in institutions and group quarters such as hospitals, military bases and prisons, are excluded from the sampling frame. A few areas that are not secure or accessible may also be excluded from the sampling frame.

One of the more challenging aspects of planning for the 2006 SHHS was compiling a sampling frame with as complete coverage of the Southern Sudan population as possible, given the lack of a census cartographic

frame. The last Census in Sudan was in 1993 during a period of conflict, so only the garrison towns of Juba, Malakal and Wau and other selected areas were enumerated in Southern Sudan. Therefore various other sources of geographic information were examined. One of the sources with the best coverage is World Health Organization's list of villages and estimated population developed for the National Immunization Day (NID) campaign. The population estimates are actually a rough demographic estimate based on the number of children under age 5 identified by the WHO program in each village. The World Food Program (WFP) also has a geographic database of settlements, but it does not have population estimates. The SSCCSE has a geographic structure list with the following hierarchical administrative areas: states, counties, payams and bomas. One problem is that the lower levels of geography were still fluid, given that some counties and payams were being subdivided. As a result each geographic base had a slightly different set of counties and payams. This would not present a problem for the sampling frame for the 2006 SHHS, as long as the list of villages in the frame was fairly complete. It was also important to be able to locate the sample villages in the field once they were selected from the sampling frame. No survey estimates will be produced at the county or payam level, so it is not critical to use a particular geographic structure below the state level. However, for the census cartographic operations it will be critical to establish the official geographic structure for counties, payams and bomas that will be reflected in the tabulated distribution of the population enumerated in each administrative unit.

A stratified multi-stage sample design was used for the 2006 SHHS. For the first stage of selection it is important to establish a frame of primary sampling units (PSUs) which covers as much of the population as possible. Any areas that will not be included in the survey because of problems of security or accessibility should be excluded from the frame before the first stage selection of sample PSUs.

In order to improve the efficiency of the sample design, the PSU should be defined as the smallest area or administrative unit which can be identified in the field, ideally with maps, but at least with commonly recognized boundaries. This also depends on the types of lower level administrative units identified in the different geographic lists. It is ideal to have a measure of size such as a population estimate for each PSU so that the first stage sample can be selected with probability proportional to size (PPS); this will improve the efficiency of the sample design and the precision of the survey results. The WHO list of villages was the most effective sampling frame of PSUs for the first stage of sampling in most states, since it generally has good coverage, and approximate population figures are available for most villages. The coverage of this frame was improved with lists from other sources such as the WFP geographic database when gaps were found. In the case of villages in the frame with no population estimates available, it was necessary to impute an average population based on the WHO information for villages in surrounding payams or counties.

In some states such as Lakes the WHO listing includes primary health care centers corresponding to the surrounding catchment areas (instead of villages), together with the approximate population. This is also the case for some towns such as Rumbek. It was necessary to identify the approximate boundaries for such areas selected in the sample. In cases where no population figures were available in the WHO village frame, or where it is not possible to identify the health center catchment areas, the WFP geographic database could be used

for the frame when it had a more comprehensive list of villages at the payam level.

Some of the villages in the WHO frame had 500 or more households, so it would be costly and time-consuming to conduct a listing in such large areas. For this reason in sample villages with more than 200 households, the village was divided into approximately equal segments with about 80 to 120 households each. One segment was selected in each sample village with equal probability at the second sampling stage for the listing of households.

The quality of the WHO village summary data varied by state. For some states the list of villages appears to be fairly complete, and population estimates were available for all villages, so this frame was used for the first stage selection of villages with PPS. In a few states the WHO village frame was incomplete for some payams, in which case the WFP frame of villages was used to complete the frame. In the case of four states (Upper Nile, Jonglei, Unity and Lakes) the sampling frame did not include population estimates, so it was necessary to select the sample villages with equal probability. When most of the villages in the state had population estimates but figures were missing for some villages, an average measure of size was imputed for the villages without population estimates. In other words, the sampling frame of villages was compiled separately for each state based on the best available sources.

A listing operation was conducted to enumerate all housing units and households within the boundaries of each sample village or segment. At the last sampling stage the households were selected systematically with a random start from this household listing for each sample segment.

The units of analysis for the 2006 SHHS are the individual households and persons within the households. Some questionnaire modules correspond to particular subgroups of the population, such as that for women between the ages of 15 and 49.

5. Stratification

One of the most important features of an efficient sample design is the stratification of the sampling frame into homogeneous areas. The sample selection is carried out independently within each stratum, although it is also desirable to order the PSUs geographically or by other criteria within each stratum to provide further implicit stratification when systematic selection is used. The nature of the stratification depends on the most important characteristics to be measured in the survey and the available information, as well as the domains of analysis.

The first level of stratification corresponded to the major geographic domains defined for the SHHS, that is, the 15 states in Northern Sudan and 10 states of Southern Sudan. In the case of states with a garrison town or other relatively large town (for example, with a population of 50,000 or more), it was necessary to establish a separate stratum for the towns and for the remainder of the state. Within each state, the PSUs were ordered geographically by county, payam and boma to ensure a good geographic distribution of the sample through implicit stratification when the sample PSUs were selected systematically with PPS.

6. Sample Size and Allocation

The sample size for a particular survey is determined by the accuracy required for the survey estimates for each domain, as well as by the resource and operational constraints. The accuracy of the survey results depends on both the sampling error, which can be measured through variance estimation, and the non-sampling error, which depends on the quality of the data collected and processed. The sampling error is inversely proportional to the square root of the sample size. On the other hand, the non-sampling error may increase with the sample size, since it is more difficult to control the quality of a larger operation. It is therefore important that the overall sample size be manageable for quality and operational control purposes.

The sample size also depends on the geographic levels at which the survey data will be tabulated. Since reliable estimates for key indicators are needed for each of the 25 states of Sudan, it is necessary to ensure that each state has a sufficient sample size. The survey budget was based on a sample of 10,000 households for Southern Sudan and 15,000 households for Northern Sudan, or about 1,000 households per state. Even if the response rate in a state is 90 percent, an effective sample size of 900 households should be sufficient for most state-level estimates. Given the multi-purpose nature of the SHHS, it was recommended to use this maximum target sample size of 25,000 households for the survey. Depending on the level of precision provided by this sample, it may be necessary to limit the publication of some indicators such as the infant mortality rate to the regional or national levels.

It is also necessary to determine the number of sample PSUs (villages) for the SHHS, and the number of households to be selected within each sample village. The level of clustering will affect the statistical efficiency of the sample design as well as the logistics and cost of the field operations. The optimum number of households to select in each cluster depends on the intraclass correlation, or similarity of the households within the cluster for particular characteristics, compared to the variability between clusters. The intraclass correlation is generally higher for socioeconomic characteristics than for demographic characteristics. For socioeconomic surveys such as a household income and expenditure survey, the number of households selected in each sample cluster is limited to 15 or less, while in demographic surveys a larger number of households (for example, 25) per cluster is sometimes effective. In terms of statistical efficiency, a sample of 50 villages (or clusters) in a particular state, with 20 households selected in each sample village, would provide more reliable results than a corresponding sample of 40 clusters with 25 sample households each. Considering the nature of the survey as well as the logistics, cost of the field operations, and current transportation and communication constraints, it was decided to select 40 sample segments in each state, and 25 households per segment. This also facilitated the operational and quality control of the fieldwork.

The allocation of the sample to the states also depends on the survey objectives. For estimates at the national level, it would be more efficient to have a proportional allocation of the sample to the states based on their approximate population. Table 1 shows the approximate population for each state in Southern Sudan based on the WHO frame of villages, and the corresponding proportional allocation of 400 sample villages. It

should be noted that these population estimates are only approximate, and may be over-estimated; however, this will not affect the sample allocation if any estimation biases are similar in the different states. Given the large variability in the population by state, the sample size for the smallest states based on a proportional allocation would be too small to produce reliable results. Since a similar level of precision is required for the survey results from each state, it was decided to use an equal allocation of 40 sample segments per state.

7. Sample Selection Procedures

The sample selection methodology for the 2006 SHHS was based on a stratified multi-stage sample design. The procedures used for each sampling stage are described separately here.

a. First Stage Selection of Sample Primary Sampling Units (Villages)

At the first sampling stage the sample PSUs (villages) within each state were selected with PPS, where the measure of size is based on the estimated total population from the WHO frame or another source. Within each stratum (state) the following first stage sample selection procedures were used:

(1) Cumulate the measures of size (estimated population) down the ordered list of villages within the stratum. The final cumulated measure of size is the estimated total population in the stratum (M_h).
(3) To obtain the sampling interval for stratum h (I_h), divide M_h by the total number of villages or clusters to be selected in stratum h (n_h): $I_h = M_h / n_h$.

(4) Select a random number (R_h) between 0 and I_h. The sample villages in stratum h will be identified by the following selection numbers:

$$S_{hi} = R_h + [\, I_h \times (i - 1)], \text{ rounded up,}$$

where i = 1, 2, ..., n_h

The i-th selected village is the one with a cumulated measure of size closest to S_{hi} but not less than S_{hi}.

An Excel file was used for selecting the sample of 40 sample villages in each state for the 2006 SHHS following these procedures, based on the allocation of 40 sample villages per state. The Excel file includes a separate spreadsheet for each state, showing the ordered frame of villages with the corresponding information on population estimates from the WHO frame. When the estimated population was not available, an average measure of size was imputed; in this way such villages had an equal probability of selection in the frame. These spreadsheets have formulas for calculating the sampling interval, random start and selection numbers. This file documents the first stage systematic selection of sample villages with PPS for each stratum. It includes a summary spreadsheet with the frame information for all 400 sample villages for Southern Sudan, and formulas for calculating the weights, as described in the section on Estimation Procedures.

In cases where a selected village could not be found in the field or could not be reached because of security or access problems, it was replaced by a

neighboring village in the sampling frame.

b. Segmenting of Large Sample Villages

In the case of a sample village with a large number of households (for example, greater than 200), it was necessary to subdivide the village into smaller segments, and select one segment for the listing operation. The segments should have well-defined boundaries in order to facilitate the listing and avoid coverage problems. The village was divided into segments of similar size, and one sample segment was selected at random with equal probability.

c. Listing of Households in Sample Villages or Segments

A listing of households was conducted in each sample segment prior to the SHHS data collection in order to select the sample households. The supervisor was responsible for verifying the boundaries of the sample village or segment in order to ensure good coverage of the sample households.

d. Selection of Sample Households within Sample Village or Segment

A systematic sample of 25 households was selected from the listing for each sample village or segment. If a village had less than 25 households, all of them were selected. Once the listing was completed, the supervisor referred to the sample selection table to find the row corresponding to the total number of households listed; this row identified the 25 household numbers to be selected. This table was generated with an Excel spreadsheet, based on the following steps:

(1) All the households listed within a sample village or segment had been assigned a serial number from 1 to M_{hi}, the total number of households listed in the segment.

(2) In the household selection table a separate row was produced for each value of M_{hi}. To obtain the sampling interval for the selection of households within the sample village or segment (I_{hi}), M_{hi} was divided by 25, maintaining 2 decimal places.

(3) A random number (R_{hi}) with 2 decimal places, between 0.01 and I_{hi}, was generated for each value of M_{hi}. The sample households within a sample village with M_{hi} households listed were identified by the following selection numbers:

$$S_{hij} = R_{hi} + \left[I_{hi} \times (j-1)\right], \text{ rounded up,}$$

where j = 1, 2, 3,..., 25

The j-th selected household is the one with a serial number equal to S_{hij}. The random start identifies the first selected household, then the sampling interval is added to the random start to identify the second sample household; successive multiples of the sampling interval are added until 25 households have been selected.

8. Estimation Procedures

To obtain unbiased estimates from the 2006 SHHS data it is necessary to apply appropriate weights to the sample data based on the probabilities of selection. Given the sample design, these weights will vary by state and sample village. It is also important to calculate measures of sampling variability for key survey estimates. The procedures for calculating the weights and variances are specified in this section.

a. Weighting Procedures

In order for the sample estimates from the 2006 SHHS to be representative of the population, it is necessary to multiply the data by a sampling weight, or expansion factor. The basic weight for each sample household would be equal to the inverse of its probability of selection (calculated by multiplying the probabilities at each sampling stage). The 2006 SHHS sample was designed to be approximately self-weighting within each state. A weight will be attached to each sample household record in the computer files, and the tabulation programs can weight the data automatically. The sampling probabilities at each stage of selection are maintained in an Excel spreadsheet so that the overall probability and corresponding weight can be calculated for each sample village or segment.

Given that some of the large sample villages were segmented, the overall probability of selection for sample households includes factors for up to three

$$p_{hij} = \frac{n_h \times M_{hi}}{M_h} \times p_{2hij} \times \frac{k_{hij}}{K_{hij}},$$

sampling stages, expressed as follows:
where:

p_{hij} = probability of selection for the sample households in the j-th sample segment within the i-th sample village in stratum (state) h

n_h = number of sample villages selected in stratum h for the 2006 SHHS

M_h = cumulated measure of size (approximate population) in the sampling frame for stratum h

M_{hi} = measure of size (approximate population) in the frame for the i-th sample village in stratum h

p_{2hij} = probability of selecting the j-th sample segment within the i-th sample village in stratum h

k_{hij} = number of sample households selected in the i-th sample village in stratum h (generally 25)

K_{hij} = total number of households listed in the j-th sample segment within the i-th sample village in stratum h

The three components of this probability of selection correspond to the individual sampling stages. In the case of villages that are not segmented, the segment would correspond to the entire village, and p_{2hij} would be equal to 1. For the large villages that are segmented, one segment was selected at

random with equal probability, so the value of p_{2hij} would be calculated as follows:

$$p_{2hij} = \frac{1}{S_{hi}},$$

where:

S_{hi} = total number of segments in the i-th sample village in stratum h

The basic sampling weight, or expansion factor, is calculated as the inverse of this probability of selection. Based on the previous expression for the

$$W_{hijk} = \frac{M_h \times K_{hij} \times S_{hi}}{n_h \times M_{hi} \times k_{hij}},$$

$$W'_{hij} = W_{hij} \times \frac{m'_{hij}}{m''_{hij}},$$

probability, the weight can be simplified as follows:
where:

W_{hij} = basic weight for the sample households in the j-th sample segment within the
i-th sample village in stratum h

These weights will vary slightly by sample segment within each stratum, depending on the quality of the population data in the frame, the variability in the segment sizes, and the number of households listed.

It is also important to adjust the weights to take into account the noninterview rate for the 2006 SHHS. Since the weights will be calculated at the level of the sample segment, it is advantageous to adjust the weights at this level. The final weight (W'_{hij}) for the sample households in the j-th sample segment within the i-th sample village in stratum h can be expressed as follows:
where:

m'_{hij} = total number of valid (occupied) sample households selected in the j-th sample segment within the i-th sample village in stratum h (that is, the number of interviews plus the number of noninterviews in the sample segment)

m''_{hij} = total number of interviewed sample households in the j-th sample segment within the i-th sample village in stratum h

b. Survey Estimates

The most common survey estimates to be calculated from the 2006 SHHS data will be in the form of totals and ratios. The survey estimate of a total can be expressed as follows:

$$\hat{Y} = \sum_{h=1}^{L} \sum_{i=1}^{n_h} \sum_{k=1}^{m_{hj}} W'_{hij}\, y_{hijk} \ ,$$

where:

L = number of strata

y_{hijk} = value of variable y for the k-th sample household in the j-th sample segment within the i-th sample village in stratum h

The survey estimate of a ratio is defined as follows:

$$\hat{R} = \frac{\hat{Y}}{\hat{X}} \ ,$$

where $\hat{Y}$ and $\hat{X}$ are estimates of totals for variables y and x, respectively, calculated as specified previously.

In the case of stratified cluster sample designs, means and proportions are special types of ratios. In the case of the mean, the variable X, in the denominator of the ratio, is defined to equal 1 for each element so that the denominator is the sum of the weights. For a proportion, the variable X in the denominator is also defined to equal 1 for all elements; the variable Y in the numerator is binomial and is defined to equal either 0 or 1, depending on the absence or presence, respectively, of a specified attribute in the element observed.

c. Variance Estimation Procedures

In the publication of the results for the 2006 SHHS it is important to include a statement on the accuracy of the survey data. In addition to presenting tables with calculated sampling errors for the most important survey estimates, the different sources of non-sampling error should be described.

The standard error, or square root of the variance, is used to measure the sampling error, although it may also include a small part of the non-sampling error. The variance estimator should take into account the different aspects of the sample design, such as the stratification and clustering. One program available for calculating the variances for survey data from stratified multi-stage sample designs such as the 2006 SHHS is CENVAR, which is a component of the Integrated Microcomputer Processing System (IMPS). CENVAR uses the data dictionary defined in the DATADICT component of IMPS; it is menu-driven and user-friendly. It can be used to calculate the standard errors of totals, means, proportions and other ratios. It produces subpopulation estimates for each category of a classification variable, and these variables can be cross-classified. For each estimate, CENVAR calculates the standard error, coefficient of variation (CV), 95 percent confidence interval and the design effect (DEFF). This software package uses an ultimate cluster variance estimator. The IMPS software and manuals can be downloaded for free from the U.S. Census Bureau website (www.census.gov).

In order to tabulate estimates of standard errors using CENVAR, it is generally necessary to produce a new data input file in an ASCII (text) format from the original survey data. Since the CENVAR package will only accept one

type of record, it is necessary to generate one record for each unit of analysis in the CENVAR data input file. For example, in the case of the estimates by person, such as the immunization rate for children, the CENVAR input file should have one record for each in-scope sample person. For household-level estimates it is necessary to generate one record for each sample household. Each record in the CENVAR data input file should include fields for the stratum, cluster and weight, in addition to the classification and analysis variables that are required for the different CENVAR analyses. The classification variables are used to produce subpopulation estimates for all their respective categories. The analysis variables are generally continuous variables, such as the number of children ever born, or count variables, which are equal to 1 if the unit has a certain characteristic and 0 otherwise. CENVAR automatically creates a count variable named INTERCEPT, which is equal to 1 for each record. The INTERCEPT variable can be used to obtain the estimate of the weighted total number of units (for example, the total number of persons or households), or it can be used in the denominator of a ratio in order to obtain a mean or proportion.

CENVAR does not accept any blanks in the file. In the case of classification variables, any record with a blank should be imputed with a special code to identify "missing" or "not applicable." The CENVAR output will include estimates for these categories, which can be deleted from the tables that will be published. In the case of analysis variables, CENVAR assumes that any missing values are imputed. Once the file is zero-filled, CENVAR will treat any missing value as 0, thus introducing a downward bias in the estimates of means when there are missing values.

The ultimate cluster variance estimator for a total used by CENVAR can be expressed as follows:

$$V(\hat{Y}) = \sum_{h=1}^{L} \left[\frac{n_h}{n_h - 1} \sum_{i=1}^{n_h} \left(\hat{Y}_{hi} - \frac{\hat{Y}_h}{n_h} \right)^2 \right],$$

Variance Estimator of a Total

where:

$$\hat{Y}_{hi} = \sum_{k=1}^{m_{hj}} W'_{hij}\, y_{hijk}$$

$$\hat{Y}_h = \sum_{i=1}^{n_h} \hat{Y}_{hi}$$

The variance estimator of a ratio used by CENVAR can be expressed as follows:

Variance Estimator of a Ratio

$$V(\hat{R}) = \frac{1}{\hat{X}^2}\left[V(\hat{Y}) + \hat{R}^2 V(\hat{X}) - 2\,\hat{R}\,COV(\hat{X},\hat{Y})\right],$$

where:

$$COV(\hat{X},\hat{Y}) = \sum_{h=1}^{L}\left[\frac{n_h}{n_h - 1}\sum_{i=1}^{n_h}\left(\hat{X}_{hi} - \frac{\hat{X}_h}{n_h}\right)\left(\hat{Y}_{hi} - \frac{\hat{Y}_h}{n_h}\right)\right]$$

$V(\hat{Y})$ and $V(\hat{X})$ are calculated according to the formula for the variance of a total.

APENDIX B

STATE: **CLUSTER NUMBER:** **HOUSEHOLD NUMBER:** **CHILD'S LINE NUMBER:**

SUDAN HOUSEHOLD HEALTH SURVEY

QUESTIONNAIRE FOR CHILDREN UNDER FIVE

UNDER-FIVE CHILD INFORMATION PANEL	
This questionnaire is to be administered to all mothers or caretakers (see household listing, column HL6) of children under the age of 5 years (see household listing, column HL7). *A separate questionnaire should be used for each eligible child. Fill in the cluster, household number, names and line numbers of the child and the mother/caretaker in the space below. Each interviewer should also insert his/her name and number, and the date of interview.*	
UF1. CODES OF : State ☐☐ Cluster ☐☐	
UF2. HOUSEHOLD NUMBER: ☐☐	UF3. LOCALITY CODE: ☐☐
UF4. Child's Name and Household Line Number (from HL1): _____ ☐☐	
UF5. Mother's/Caretaker's Name and Household Line Number (from HL1): _____ ☐☐	
UF6. Interviewer Name and Number: _____ ☐ ☐	
UF8. Day/Month/Year of interview: ☐☐ / ☐☐ / ☐☐	
UF9. Result of interview for this child under 5 *(Codes refer to mother/caretaker.)*	Completed ..... 1 Not at home ..... 2 Refused ..... 3 Partly completed ..... 4 Incapacitated ..... 5 Other(*specify*) 6

UF10. NOW I WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT THE HEALTH OF EACH CHILD UNDER THE AGE OF 5 YRS IN YOUR CARE, AND WHO CURRENTLY LIVES WITH YOU. I.E. I WANT TO ASK YOU ABOUT (*name*). IN WHAT MONTH AND YEAR WAS (*name*) BORN? *Probe:* WHAT IS HIS/HER DATE OF BIRTH? *If the mother/caretaker knows the exact birth date, also enter the day; otherwise, circle 98 for day.*	Date of birth: Day .... DK day .....98 Month .... Year	
UF11. HOW OLD WAS (*name*) AT HIS/HER LAST BIRTHDAY? *Record age in completed months.*	Age in completed months	

BIRTH REGISTRATION MODULE		
BR1. DOES (*name*) HAVE A BIRTH CERTIFICATE? MAY I SEE IT?	Yes, seen ..... 1 Yes, not seen ..... 2 No..... 3 DK..... 8	1 ⇨ VA MODULE 2 ⇨ VA MODULE 8 ⇨ VA MODULE
BR3. WHY DOES (*name*) NOT HAVE A BIRTH CERTIFICATE?	Costs too much .....1 Must travel too far .....2 Did not know child should have birth certificate.....3 Did not want to pay fine .....4 Does not know where to get birth certificate .....5 Other(*specify*) .....6 DK.....8	
GO TO VITAMIN A MODULE (VA)		

VITAMIN A MODULE		
VA1. HAS (*name*) EVER RECEIVED A VITAMIN A CAPSULE (SUPPLEMENT) LIKE THIS ONE? *Show capsule or dispenser for different doses – 100,000 IU for those 6-11 months old, 200,000 IU for those 12-59 months old.*	Yes ..... 1 No ..... 2 DK..... 8	2⇨CA MODULE 8⇨CA MODULE
VA2. HOW MANY MONTHS AGO DID (*name*) TAKE THE LAST CAPSULE?	Less than 6 months ago ..... 1 More than 6 months ago ..... 2 DK..... 8	
VA3. WHERE DID (*name*) GET THE LAST CAPSULE?	On routine visit to health facility .. 1 Sick child visit to health facility .... 2 National Immunization Day campaign ..... 3 Other(*specify*) ..... 6 DK..... 8	
GO TO CARE OF ILLNESS MODULE (CA)		

CARE OF ILLNESS MODULE		
CA1. HAS (*name*) HAD DIARRHOEA IN THE LAST TWO WEEKS, THAT IS, SINCE (*day of the week*) OF THE WEEK BEFORE LAST? *Diarrhoea is determined as perceived by mother or caretaker, or as three or more loose or watery stools per day, or blood in stool.*	Yes ..... 1 No ..... 2 DK..... 8	2⇨CA5 8⇨CA5
CA2. DURING THIS LAST EPISODE OF DIARRHEA, DID (*name*) DRINK ANY OF THE FOLLOWING: *Read each item aloud and record response before proceeding to the next item.* CA2A. A FLUID MADE FROM A SPECIAL PACKET CALLED ORS (ORADEX)? CA2B. RECOMMENDED HOMEMADE FLUID?	Y N DK CA2A. Fluid from ORS packet 1 2 8 CA2B. Homemade fluid..... 1 2 8	

CA3. DURING (*name's*) ILLNESS, DID HE/SHE DRINK LESS, ABOUT THE SAME, OR MORE LIQUIDS THAN USUAL?	None..... 1 Less..... 2 About the same ..... 3 More..... 4 DK..... 8	
CA4. DURING (*name's*) ILLNESS, DID HE/SHE EAT LESS, ABOUT THE SAME, OR MORE FOOD THAN USUAL?	None..... 1 Less..... 2 About the same ..... 3 More..... 4 DK..... 8	
CA5. HAS (*name*) HAD AN ILLNESS WITH A COUGH AT ANY TIME IN THE LAST TWO WEEKS, THAT IS, SINCE (*day of the week*) OF THE WEEK BEFORE LAST?	Yes ..... 1 No ..... 2 DK..... 8	2⇨CA14 8⇨CA14
CA6. WHEN (*name*) HAD AN ILLNESS WITH A COUGH, DID HE/SHE BREATHE FASTER THAN USUAL WITH SHORT, QUICK BREATHS OR HAVE DIFFICULTY BREATHING?	Yes ..... 1 No ..... 2 DK..... 8	2⇨CA14 8⇨CA14
CA8. DID YOU SEEK ADVICE OR TREATMENT FOR THE ILLNESS?	Yes ..... 1 No ..... 2 DK..... 8	2⇨CA14 8⇨CA14

CA9. FROM WHERE DID YOU SEEK CARE? *Probe:* ANYWHERE ELSE? *Circle all providers mentioned, but do NOT prompt with any suggestions.* *If source is hospital, health center, or clinic, write the name of the place below. Probe to identify the type of source and circle the appropriate code.* _____ *(Name of place)*	**Public sector:** ..... Govt. hospital ..... A ..... Govt. health centre ..... B ..... Govt. health post ..... C ..... Village health worker ..... D .....Mobile/outreach clinic ..... E ..... Other public sector(*specify*) .....F **Private medical sector:** ..... Private hospital/clinic ..... G ..... Private physician ..... H .....Private pharmacy ..... I .....Mobile clinic (private) .....J ..... Other private sector(*specify*) ..... K **Other source:** ..... Religious healer .....L ..... Witch doctor .....M ..... Traditional healer ..... N Relative or friend..... O Other(*specify*)..... X	

Ask the following question (CA14) ***only once*** *for each caretaker.* CA14. SOMETIMES CHILDREN HAVE SEVERE ILLNESSES AND SHOULD BE TAKEN IMMEDIATELY TO A HEALTH FACILITY. WHAT TYPES OF SYMPTOMS WOULD CAUSE YOU TO TAKE YOUR CHILD TO A HEALTH FACILITY RIGHT AWAY? *Circle all symptoms mentioned, but do NOT prompt with any suggestions.* *Keep asking for more signs or symptoms until the caretaker cannot recall any additional symptoms.*	Child not able to drink or breastfeed ..... A Child becomes sicker ..... B Child develops a fever ..... C Child has fast breathing..... D Child has difficult breathing..... E Child has blood in stool .....F Child is drinking poorly..... G Other (*specify*).....X	
GO TO MALARIA MODULE (ML)		

MALARIA MODULE		
ML1. IN THE LAST TWO WEEKS, HAS (*NAME*) BEEN ILL WITH FEVER OR MALARIA? (THAT IS, SINCE *DAY----- OF THE LAST TWO WEEKS*)	Yes ..... 1 No ..... 2 DK 8	 2 ⇨ BF1 8 ⇨ BF1
ML2. WAS (*name*) SEEN AT A HEALTH FACILITY DURING THIS ILLNESS?	Yes ..... 1 No ..... 2 DK 8	 2⇨ML6 8⇨ML6
ML3. DID (*name*) TAKE A MEDICINE FOR FEVER OR MALARIA THAT WAS PROVIDED OR PRESCRIBED AT THE HEALTH FACILITY?	Yes ..... 1 No ..... 2 DK 8	 2⇨ML5 8⇨ML5

ML4. WHAT MEDICINE WAS PROVIDED OR PRESCRIBED AT THE HEALTH FACILITY? *Circle all medicines mentioned.*	**Anti-malarials:** .....SP/Fansidar tablet ..... A .....Chloroquine tablet ..... B ..... Chloroquine injection ..... C .....Chloroquine syrup .....D ..... Amodiaquine tablet ..... E .....Amodiaquine injection ..... F .....Metacalfin tablet .....G .....Quinine pills .....H .....Quinine injection ..... I ..... Artemisinin-based combinations ..... J ..... **Other medications:** Paracetamol/Panadol/Acetaminophen/ Action ..... K ..... Aspirin ..... L ..... Ibuprofen ..... M Other(*specify*).....X DK ..... Z	
ML4A. WHERE WAS THE MEDICINE OBTAINED?	Hospital ..... 1 PHCC (Primary Health Care Clinic) 2 PHCU (Primary Health Care Unit) . 3 Private pharmacy ..... 4 Market ..... 5 Other(*specify*)..... 6	
ML5. WAS (*name*) GIVEN MEDICINE FOR THE FEVER OR MALARIA BEFORE BEING TAKEN TO THE HEALTH FACILITY?	Yes ..... 1 No ..... 2 DK 8	1⇨ML7 2 ⇨ML8 8 ⇨ML8

ML6. WAS (*name*) GIVEN MEDICINE FOR FEVER OR MALARIA DURING THIS ILLNESS?	Yes ..... 1 No ..... 2 DK..... 8	 2⇨ BF1 8⇨ BF1
ML7. WHAT MEDICINE WAS (*name*) GIVEN? *Circle all medicines given.* *Ask to see the medication if type is not known.* *If type of medication is still not determined, show typical anti-malarials to respondent.*	**Anti-malarials:** .....SP/Fansidar tablet ..... A .....Chloroquine tablet ..... B ..... Chloroquine injection ..... C ..... Chloroquine syrup ..... D ..... Amodiaquine tablet ..... E .....Amodiaquine injection ..... F ..... Metacalfin tablet ..... G ..... Quinine pills ..... H .....Quinine injection I ..... Artemisinin-based combinations ..... J ..... **Other medications:** Paracetamol/Panadol/Acetaminophen/ Action ..... K ..... Aspirin ..... L ..... Ibuprofen ..... M Other(*specify*) ..... X DK..... Z	
ML8. *Check ML4 & ML7: Anti-malarial mentioned (code A - J)?* ☐ *Yes. ⇨ Continue with ML9* ☐ *No. ⇨ Go to BF1*		

ML9. HOW LONG AFTER THE FEVER STARTED DID (*name*) FIRST TAKE (*name of anti-malarial from ML7*)? *If multiple anti-malarials mentioned in ML8, read aloud all anti-malarial medicines mentioned.* *Record the code for the first day on which the anti-malarial was given.* *If anti-malarial not given, write '6.'*	ML9A. SP/Fansidar tablet ..... ML9B. Chloroquine tablet ..... ML9C. Chloroquine injection ..... ML9D. Chloroquine syrup ..... ML9E. Amodiaquine tablet ..... ML9F. Amodiaquine injection ..... ML9G. Metacalfin tablet ..... ML9H. Quinine pills ..... ML9I. Quinine injection ..... ML9J. Artemisinin-based combinations	*Codes for ML9A-ML9J:* 1 Same day 2 Next day 3 Two days after the fever 4 Three days after the fever 5 Four or more days after the fever 6 Drug not taken 8 DK
GO TO BREASTFEEDING MODULE (BF)		

BREASTFEEDING MODULE (CHILDREN UNDER 2 YEARS OF AGE)		
BF1. *Check UF11: Child aged under 2 years?* ☐ *Yes. ⇨ Continue with BF2* ☐ *No. ⇨ Go to IM MODULE*		
BF2. HAS (*name*) EVER BEEN BREASTFED?	Yes 1 No 2 DK 8	 2⇨BF6 8⇨BF6
BF2A. AT WHAT TIME AFTER DELIVERY WAS BREAST-FEEDING STARTED? *IF LESS THAN 1 HOUR, RECORD 00 HOURS* *IF LESS THAN 24 HOURS, record HOURS* *OTHERWISE RECORD DAYS*	HOURS.....1 DAYS.....2	
BF3. DID (*name*) RECEIVE ANY OTHER LIQUIDS OR SOLIDS BESIDES BREASTMILK IN THE FIRST 6 MONTHS?	Yes.....1 No .....2 DK 8	
BF4. IS HE/SHE STILL BEING BREASTFED?	Yes.....1 No .....2 DK 8	1⇨BF6 8⇨ BF6
BF5. AT WHAT AGE DID (*name*) STOP BEING BREASTFED?	Number of months.....	
BF6. HAS (*name*) STARTED TO HAVE FOODS?	Yes.....1 No .....2 DK 8	 2⇨BF8 8⇨BF8
BF7. AT WHAT AGE DID (*name*) BEGIN TO HAVE ADDITIONAL FOODS?	Number of months.....	

BF8. SINCE THIS TIME YESTERDAY, DID HE/SHE RECEIVE ANY OF THE FOLLOWING: *Read each item aloud and record response before proceeding to the next item.* BF8A. VITAMIN OR MINERAL SUPPLEMENTS, OR MEDICINE? BF8B. PLAIN WATER? BF8C. SWEETENED, FLAVOURED WATER OR FRUIT JUICE OR TEA OR INFUSION? BF8D. ORAL REHYDRATION SOLUTION (ORS)? BF8E. INFANT FORMULA? BF8F. TINNED, POWDERED, OR FRESH MILK? BF8G. ANY OTHER LIQUIDS? BF8H. SOLID OR SEMI-SOLID (MUSHY) FOOD?	Y N DK BF8A. Vitamin supplements . 1 2 8 BF8B. Plain water..... 1 2 8 BF8C. Sweetened water or juice 1 2 8 BF8D. ORS..... 1 2 8 BF8E. Infant formula..... 1 2 8 BF8F. Milk ..... 1 2 8 BF8G. Other liquids ..... 1 2 8 BF8H. Solid or semi-solid food 1 2 8	
BF9. SINCE THIS TIME YESTERDAY, HOW MANY TIMES DID (*name*) EAT SOLID, SEMISOLID, OR SOFT FOODS OTHER THAN LIQUIDS? *If 7 or more times, record '7.'*	No. of times..... Don't know 8	
GO TO IMMUNIZATION MODULE (IM)		

IMMUNIZATION MODULE		
If an immunization card is available, copy the dates in IM2-IM5 for each type of immunization or vitamin A dose recorded on the card. IM6-IM13 will only be asked when a card is not available.		
IM1. IS THERE A VACCINATION CARD FOR (*name*)? MAY I SEE IT?	Yes, seen.....1 Yes, not seen.....2 No.....3	 2⇨IM6 3⇨IM6
(a) Copy dates for each vaccination from the card. *(b) If the card shows only part of the date, record "98" in the column for the missing information.* *(c) Write '44' in day column if card shows that vaccination was given but no date recorded.* *(d) If a vaccination was not given, leave that line blank*	Date of Immunization DAY / MONTH / YEAR	
IM2. BCG	☐☐ ☐☐ ☐☐☐☐	
IM3A. OPV0	☐☐ ☐☐ ☐☐☐☐	
IM3B. OPV1	☐☐ ☐☐ ☐☐☐☐	
IM3C. OPV2	☐☐ ☐☐ ☐☐☐☐	
IM3D. OPV3	☐☐ ☐☐ ☐☐☐☐	
IM4A. DPT1	☐☐ ☐☐ ☐☐☐☐	
IM4B. DPT2	☐☐ ☐☐ ☐☐☐☐	
IM4C. DPT3	☐☐ ☐☐ ☐☐☐☐	
IM5. MEASLES(OR MMR)	☐☐ ☐☐ ☐☐☐☐	
IM6. HAS (*name*) EVER RECEIVED ANY VACCINATIONS TO PREVENT HIM/HER FROM GETTING DISEASES, INCLUDING VACCINATIONS RECEIVED IN A CAMPAIGN OR IMMUNIZATION DAY?	Yes.....1 No.....2 DK.....8	 2⇨IM14 8⇨IM14

IM7. HAS (*name*) EVER BEEN GIVEN A BCG VACCINATION AGAINST TUBERCULOSIS – THAT IS, AN INJECTION IN THE ARM OR SHOULDER THAT CAUSED A SCAR?	Yes.....1 No.....2 DK.....8	
IM8. HAS (*name*) EVER BEEN GIVEN ANY "VACCINATION DROPS IN THE MOUTH" TO PROTECT HIM/HER FROM GETTING DISEASES – THAT IS, POLIO?	Yes.....1 No.....2 DK.....8	2⇨IM11 8⇨IM11
IM9. HOW OLD WAS (*name*) WHEN THE FIRST DOSE WAS GIVEN – JUST AFTER BIRTH (WITHIN TWO WEEKS) OR LATER?	Just after birth (within two weeks) .1 Later.....2 DK.....8	
IM10. HOW MANY TIMES HAS HE/SHE BEEN GIVEN THESE DROPS?	No. of times..... ☐☐	
IM11. HAS (*name*) EVER BEEN GIVEN "DPT VACCINATION INJECTIONS" – THAT IS, AN INJECTION IN THE THIGH OR BUTTOCKS – TO PREVENT HIM/HER FROM GETTING TETANUS, WHOOPING COUGH, DIPHTHERIA? (SOMETIMES GIVEN AT THE SAME TIME AS POLIO)	Yes.....1 No.....2 DK.....8	2⇨IM13 8⇨IM13
IM12. HOW MANY TIMES HAS HE/SHE BEEN GIVEN DPT VACCINATION INJECTIONS?	No. of times..... ☐	
IM13. HAS (*name*) EVER BEEN GIVEN "MEASLES VACCINATION INJECTIONS" OR MMR – THAT IS, A SHOT IN THE ARM AT THE AGE OF **9** MONTHS OR OLDER – TO PREVENT HIM/HER FROM GETTING MEASLES?	Yes.....1 No.....2 DK.....8	

IM14. *Does another eligible child reside in the household for whom this respondent is mother/caretaker?*
Check household listing, column HL7.

☐ *Yes. ⇨ End the current questionnaire and then go to next UNDER 5 QUESTIONNAIRE to administer the questionnaire for the next eligible child.*

☐ *No. ⇨ End the interview with this respondent by thanking him/her for his/her cooperation.*

If this is the last eligible child in the household, go on to ANTHROPOMETRY MODULE (AN).

ANTHROPOMETRY MODULE		
After questionnaires for all children are completed, weigh and measure the length/height each child under the age of 5 years. Record the weight and length/height below, taking care to record the measurements on the correct questionnaire for each child. Check the child's name and household line number (HL1) on the household listing before recording measurements.		
AN1. Child's weight.	Kilograms (kg) ..... ☐☐.☐	
AN2. Child's length or height. *Check age of child in AG2.* ☐ *Child under 2 years old. ⇨ Measure length (lying down).* ☐ *Child age 2 or more years. ⇨ Measure height (standing up).*	Length (cm) Lying down.....L . Height (cm) Standing up .....H . .	
AN3. Measurer's identification code.	Measurer code.....	
AN4. Result of measurement.	Measured ..... 1 Not present ..... 2 Refused ..... 3 Other *(specify)* 6	
AN5. Perform the oedema press test to both feet to determine if the child has oedema and mark the result of the test.	<u>Child has oedema</u> Yes ..... 1 No ..... 2 Not present ..... 3 Refused 4	

AN6. *Is there another child in the household who is eligible for measurement? Check item HH14 on the household listing – you should have entered the total number of children in the household who are LESS THAN 5 years of age*

☐ *Yes. ⇨ Record measurements for next child.*

☐ *No. ⇨ End the interview with this household by thanking all participants for their cooperation.*
Gather together all questionnaires for this household and tally the number of interviews completed on the cover page on the household questionnaire.

APPENDIX B 2

SUDAN HOUSEHOLD HEALTH SURVEY

QUESTIONNAIRE FOR INDIVIDUAL WOMEN

WOMAN'S INFORMATION PANEL

WM

This questionnaire is to be administered to all women age 15 through 49 (see column HL6 of HH listing). Fill in one form for each eligible woman. Fill in the segment and household number, and the name and household line number of the woman in the space below. Fill in your name, number, and the date.

	STATE	CLUSTER
WM1. CODES OF:		
WM2. HOUSEHOLD NUMBER:		

WM4. Woman's Name and Household Line Number:

_____ ☐☐

WM5. Interviewer Name and Number: _____

☐☐

WM6. Day/Month/Year of interview: ☐☐ / ☐☐ / ☐☐☐

☐

After this woman's questionnaire has been completed, fill in the following information:

WM7. Result of women's interview:	Completed 1
	Not at home 2
Circle the appropriate code	Refused 3
	Partly completed 4
	Incapacitated 5
	Other(*SPECIFY*).....6

*Repeat greeting **if not already read** to this woman:*

WE ARE FROM THE INSTITUTIONS MANDATED TO COLLECT INFORMATION. WE ARE WORKING ON A PROJECT CONCERNED WITH FAMILY HEALTH AND EDUCATION. I WOULD LIKE TO TALK TO YOU ABOUT THIS. THE INTERVIEW WILL TAKE ABOUT (***45***) MINUTES. ALL THE INFORMATION WE OBTAINED WILL REMAIN STRICTLY CONFIDENTIAL AND YOUR ANSWERS WILL NEVER BE IDENTIFIED. MAY I START NOW?

If permission is given, begin the interview. If the woman does not agree to continue, thank her, complete WM7, and go to the next interview. Discuss this result with your supervisor for a future revisit.

WM8. IN WHAT MONTH AND YEAR WERE YOU BORN?	Date of birth: Month..... .....DK month 98 Year DK Year .....Year .....DK year 9998	
WM9. HOW OLD WERE YOU AT YOUR LAST BIRTHDAY?	Age (in completed years)	

State Name: Cluster Number: Household Number: Woman's Line Number:

WM10. HAVE YOU EVER ATTENDED SCHOOL?	Yes ..... 1 No..... 2	2⇨MA 1
WM11. WHAT IS THE HIGHEST LEVEL OF SCHOOL YOU ATTENDED: PRIMARY, SECONDARY, OR HIGHER?	Primary..... 1 Secondary..... 2 Higher ..... 3 Non-standard curriculum 6	
WM12. WHAT IS THE HIGHEST GRADE YOU COMPLETED AT THAT LEVEL?	Grade ..... ☐☐	
WM13. CHECK WM11: ☐ *SECONDARY OR HIGHER GO NEXT MODULE* ☐ *PRIMARY OR NON-STANDARD CURRICULUM CONTINUE WITH WM14*		
WM14. NOW I WOULD LIKE YOU TO READ THIS SENTENCE TO ME: *SHOW SENTENCE ES TO RESPONDENTS.* *IF RESPONDENT CAN NOT READ WHOLE SENTENCE, PROBE:* CAN YOU READ PART OF THE SENTENCE TO ME? *EXAMPLE OF SENTENCES FOR LITERACY* *1. THE CHILD IS READING A BOOK.* *2. THA RAINS CAME LATE THIS YEAR.* *3. PARENTS MUST CARE FOR THEIR CHILDREN.* 4. *FARMING IS HARD WORK.*	CANNOT READ AT ALL.....1 ABLE TO READ ONLY PARTS OF SENTENCE.....2 ABLE TO READ WHOLE SENTENCE.....3 NO SENTENCE IN REQUIRED LANGAUE.....4 *SPECIFY LANGAUE* BLIND/MUTE, VISUALLY / SPEECH IMPAIRED.....5	

MARRIAGE MODULE MA		
MA1. ARE YOU CURRENTLY MARRIED, LIVING WITH A PARTNER, NEVER MARRIED/ NEVER HAD A PARTNER, WIDOWED, DIVORCED, OR SEPARATED?	Never Married/ Never with Partner ..... 1 Married ..... 2 With Partner ..... 3 Widowed ..... 4 Divorced/ Separated/ No longer in partnership 5	1⇨ CM MODULE
MA2. IF MARRIED, EVER MARRIED, OR EVER LIVING IN A PARTNERSHIP, IN WHAT MONTH OR YEAR DID YOU GET MARRIED FOR THE FIRST TIME OR STARTED TO CO-HABIT WITH A MAN?	*If date of first marriage/partnership is known:* **Month:.....** **DK MONTH.....98** **Year:.....** **DK YEAR.....9998**	
If date of first marriage/partnership is not known: MA2A. HOW OLD WERE YOU WHEN YOU FIRST GOT MARRIED/ BEGAN LIVING WITH A REGULAR SEXUAL PARTNER?	Age: ☐☐	
MA4. DOES YOUR HUSBAND CURRENTLY HAVE ANOTHER WIFE/OTHER WIVES? (IF YES) HOW MANY WIVES DOES YOUR HUSBAND HAVE CURRENTLY?	Yes.....1 No.....2 Don't know.....8 Number of wives..... ☐☐	
GO TO REPRODUCTION AND CHILD SURVIVAL MODULE (CM)		

REPRODUCTION AND CHILD SURVIVAL MODULE		CM
NOW I WOULD LIKE TO ASK YOU ABOUT ALL THE BIRTHS YOU HAVE HAD DURING YOUR LIFE.		
CM1. HAVE YOU EVER GIVEN A LIVE BIRTH? *If "No" probe by asking:* I MEAN, TO A CHILD WHO EVER BREATHED OR CRIED OR SHOWED OTHER SIGNS OF LIFE – EVEN IF HE OR SHE LIVED ONLY A FEW MINUTES OR HOURS?	Yes ..... 1 No 2	2⇨ MN MODULE
CM2. DO YOU HAVE ANY SONS OR DAUGHTERS TO WHOM YOU HAVE GIVEN BIRTH WHO ARE NOW LIVING WITH YOU?	Yes ..... 1 No 2	**2⇨CM4**
CM3. HOW MANY SONS LIVE WITH YOU? AND HOW MANY DAUGHTERS LIVE WITH YOU? *If none record '00'*	CM3A. No. of Sons at home: CM3B. No. of Daughters at home:	
CM4. DO YOU HAVE ANY SONS OR DAUGHTERS TO WHOM YOU HAVE GIVEN BIRTH AND WHO ARE ALIVE BUT DO NOT LIVE WITH YOU NOW?	Yes ..... 1 No 2	**2⇨CM6**
CM5. 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'*	CM5A. Number of Sons elsewhere: CM5B. Number of Daughters elsewhere:	
CM6. HAVE YOU EVER GIVEN BIRTH TO A BOY OR A GIRL WHO WAS BORN ALIVE BUT LATER DIED? *If "No" probe by asking:* **ANY BABY WHO CRIED OR SHOWED ANY SIGN OF LIFE BUT ONLY SURVIVED A FEW HOURS OR DAYS?**	Yes ..... 1 No 2	**2⇨ CM8**
CM7. IN ALL, HOW MANY BOYS HAVE DIED? AND HOW MANY GIRLS HAVE DIED? *If none record '00'*	CM7A. Number of Boys dead: CM7B. Number of Girls dead:	

CM8. ***Check CM3, CM5, & CM7:***

Check the figures to sum.

JUST TO MAKE SURE THAT I HAVE THIS RIGHT, YOU HAVE HAD:

…SONS WHO ARE STILL ALIVE AND LIVING WITH YOU ***(from CM3A)***

…DAUGHTERS WHO ARE STILL ALIVE AND LIVING WITH YOU ***(from CM3B)***

…SONS WHO ARE STILL ALIVE AND NOT LIVING WITH YOU ***(from CM5A)***

…DAUGHTERS WHO ARE STILL ALIVE AND NOT LIVING WITH YOU (FROM CM5B)

…BOYS AND WHO HAVE DIED ***(from CM7A)***

…GIRLS WHO HAVE DIED (FROM CM7B)

SO YOU HAVE HAD IN TOTAL ☐☐ **…LIVE BIRTHS (*sum CM3A through CM7B*).**

IS THAT CORRECT?	**Yes……1** ***(If yes, then go to BH1)*** **No……2** ***(Probe and correct as necessary)***

GO TO LIVE BIRTH HISTORY TABLE (BH)

MATERNAL AND NEWBORN HEALTH MODULE		MN
MN1. HAVE YOU BEEN PREGNANT DURING THE LAST 2 YEARS?	Yes ..... 1 No 2	 2⇨ TT1
MN2. HOW MANY PREGNANCIES DID YOU HAVE DURING THE PAST TWO YEARS?	**Number:** ☐	
MN3. HOW DID THESE PREGNANCIES END? *Ask for each outcome and record conclusion for each pregnancy reported in MN2.* *Check that total number is equal to the number of pregnancies reported in MN2. If different, probe for MN2 and correct if necessary*	MN3A. LIVE BIRTH: .....1 ☐ MN3B. STILL BIRTH: .....2 ☐ MN3C. MISCARRIAGE:.....3 ☐	
Check MN3 were there any live births or still births? **Yes.....1 ⇨ MN3A** **No.....2 ⇨ MN20**		
FOR THE NEXT FEW QUESTIONS, I WILL BE ASKING ABOUT YOUR **LAST COMPLETED PREGNANCY** (LIVE OR STILL BIRTH).		
MN3A. WHAT WAS THE OUTCOME OF YOUR LAST COMPLETED PREGNANCY, LIVE BIRTH OR STILL BIRTH? ***Probe to make sure respondent differentiate between live and still births and include only last pregnancy.***	**LIVE BIRTH .....1** **STILL BIRTH.....2**	
MN4. BEFORE YOU GAVE BIRTH TO THIS CHILD, DID YOU SEE ANYONE FOR ANTENATAL CARE? ***If yes*: WHOM DID YOU SEE?** *Probe for the type of person seen and circle all answers given.*	Health professional: Doctor.....A Nurse midwife.....B Midwife .....C Other person: Traditional birth attendant.....D Community health worker.....E Relative/friend .....F Other *(specify)*.....X No one .....Y	 Y ⇨MN10

MN5. HOW MANY MONTHS PREGNANT WERE YOU WHEN YOU HAD YOUR FIRST CHECK ON THIS PREGNANCY?	**Months:** **Don't know.....98**	
MN6. HOW MANY ANTENATAL CHECKS DID YOU HAVE DURING THIS PREGNANCY?	*Number of check-ups:* *Don't know.....98*	
MN7. AS PART OF YOUR ANTENATAL CARE, WERE ANY OF THE FOLLOWING DONE AT LEAST ONCE? **MN7A. WAS YOUR BLOOD PRESSURE MEASURED?** **MN7B. DID YOU GIVE A URINE SAMPLE?** **MN7C. DID YOU GIVE A BLOOD SAMPLE?**	MN7A. Blood pressure Yes ..... 1 No ..... 2 MN7B. Urine sample Yes ..... 1 No ..... 2 MN7C. Blood sample Yes ..... 1 No 2	
MN8. AS PART OF YOUR ANTENATAL CARE, WAS THE MODE AND/OR PLACE OF DELIVERY DISCUSSED WITH YOU?	MN8A. MODE OF DELIVERY *(Normal/ CS)* Yes ..... 1 No ..... 2 MN8B. PLACE OF DELIVERY Yes ..... 1 No..... 2	
MN9. DURING ANY OF THE ANTENATAL VISITS FOR THE PREGNANCY, WERE YOU GIVEN ANY INFORMATION OR COUNSELED ABOUT AIDS OR THE AIDS VIRUS?	Yes..... 1 No ..... 2 Don't know 8	
MN10. DURING THIS PREGNANCY, DID YOU TAKE ANY IRON TABLETS OR IRON SYRUP SUCH AS THESE? *Show Iron Tablet and Iron Syrup.*	Yes..... 1 No ..... 2 Don't know 8	

MN11. AT ANY TIME DURING THIS PREGNANCY, DID YOU EXPERIENCE ANY OF THE FOLLOWING? *Read aloud each and circle the corresponding answers.*	**MN11A. Excessive vaginal bleeding** Yes..... 1 No ..... 2 Don't know..... 8 **MN11B. High blood pressure** Yes..... 1 No ..... 2 Don't know..... 8 **MN11C. Swelling of face or body** Yes..... 1 No ..... 2 Don't know..... 8 **MN11D. Severe headache** Yes..... 1 No ..... 2 Don't know..... 8 **MN11E. Very high fever** Yes..... 1 No ..... 2 Don't know..... 8 **MN11F. Pain in the upper abdomen** Yes..... 1 No ..... 2 Don't know..... 8 **MN11G. Convulsions (not from fever)** Yes..... 1 No ..... 2 Don't know..... 8 **MN11H. Painful urination** Yes..... 1 No ..... 2 Don't know..... 8 **MN11I. Jaundice** Yes..... 1 No ..... 2 Don't know..... 8 **MN11J. Severe breathlessness...** Yes..... 1 No ..... 2 Don't know..... 8 .	

MN12. WHO ASSISTED WITH THE DELIVERY OF YOUR LAST COMPLETED PREGNANCY? *Probe for the type of person assisting and circle all answers given.*	Health professional: Doctor ..... A Nurse midwife ..... B Midwife ..... C Other person: Traditional birth attendant ..... D Community health worker ..... E Relative/friend ..... F Other *(specify)* ..... X No one ..... Y	
MN13. WHERE DID YOU GIVE BIRTH TO YOUR LAST CHILD *(EITHER LIVE OR STILL BIRTH)*?	Home ..... 1 PHCC (Primary Health Care Center) ... 2 PHCU (Primary Health Care Unit) ..... 3 Public Hospital ..... 4 Private Hospital ..... 5 Other (specify) 6	
MN14. PLEASE TELL ME THE MODE OF DELIVERY OF YOUR LAST CHILD *(LIVE OR STILL BIRTH).*	Vaginal ..... 1 Forceps/extractor ..... 2 Caesarian Section ..... 3 DK 8	
MN15. DURING LABOUR OR SOON AFTER DELIVERY OF YOUR LAST COMPLETED PREGNANCY, DID YOU EXPERIENCE ANY OF THE FOLLOWING? *Read aloud each and circle the corresponding answers.*	MN15A. PROLONGED LABOUR LASTING MORE THAN 12 HOURS Yes ..... 1 No ..... 2 Don't know ..... 8 MN15B. VERY HIGH FEVER Yes ..... 1 No ..... 2 Don't know ..... 8 MN15C. CONVULSIONS/FITS Yes ..... 1 No ..... 2 Don't know ..... 8 MN15D. EXCESSIVE VAGINAL BLEEDING Yes ..... 1 No ..... 2 Don't know 8	

MN16. IN THE FIRST 6 WEEKS AFTER THE LAST DELIVERY, DID YOU SEE/WERE YOU VISITED BY ANYONE FOR A CHECK-UP ON YOUR HEALTH? ***If yes*: WHOM DID YOU SEE/ WERE YOU VISITED BY?** *Probe for the type of person and circle all answers given.*	Health professional: Doctor ..... A Nurse midwife ..... B Midwife ..... C Other person: Traditional birth attendant ..... D Community health worker ..... E Relative/friend ..... F No one ..... Y	**All responses other than "no one" ⇨ MN18** **Y ⇨ MN17**
MN17. IF 'NO ONE', WHAT WAS THE MAIN REASON FOR NOT RECEIVING A POSTNATAL CHECK-UP?	No complication ..... 01 Able to manage from experience ..... 02 Did not know check up was needed .. 03 Service not available ..... 04 Cost too much ..... 05 Too busy ..... 06 Husband too busy ..... 07 Other(*specify*) 96	

MN18. AT ANY TIME DURING THE 6 WEEKS AFTER DELIVERY, DID YOU EXPERIENCE ANY OF THE FOLLOWING PROBLEMS? *Read aloud each and circle the corresponding answers.*	MN18A. MASSIVE VAGINAL BLEEDING Yes..... 1 No ..... 2 Don't know..... 8 MN18B. SWELLING & PAIN IN LEGS Yes..... 1 No ..... 2 Don't know..... 8 MN18C. FOUL-SMELLING VAGINAL DISCHARGE WITH FEVER Yes..... 1 No ..... 2 Don't know..... 8 MN18D. LOWER ABDOMINAL PAIN WITH HIGH FEVER Yes..... 1 No ..... 2 Don't know..... 8 MN18E. SEVERE LOWER BACK PAIN WITH HIGH FEVER Yes..... 1 No ..... 2 Don't know..... 8 MN18F. SEVERE UPPER BACK PAIN WITH HIGH FEVER Yes..... 1 No ..... 2 Don't know..... 8 MN18G. PAINFUL URINATION WITH FEVER Yes..... 1 No ..... 2 Don't know..... 8 MN18H. SWOLLEN, PAINFUL BREAST WITH HIGH FEVER Yes..... 1 No ..... 2 Don't know..... 8 MN18I. DRIPPING OF URINE Yes..... 1 No ..... 2 Don't know..... 8	

MN19. IN THE FIRST 6 WEEKS AFTER THE LAST DELIVERY, DID YOU RECEIVE A VITAMIN A DOSE LIKE THIS? *Show 200,000 IU capsule or dispenser.*	Yes ..... 1 No ..... 2 Don't know 8	
MN20. IF YOU HAD MISCARRIAGE DURING THE LAST TWO YEARS, DID YOU SEEK MEDICAL CARE FOLLOWING YOUR LAST MISCARRIAGE?	Yes ..... 1 No 2	
GO TO TETANUS TOXOID MODULE (TT)		

TETANUS TOXOID MODULE		TT
TT1. DO YOU HAVE A CARD OR OTHER DOCUMENT WITH YOUR OWN IMMUNIZATIONS LISTED? MAY I SEE IT? *If a card is presented, use it to assist with answers to the following questions (TT2, TT3).*	Yes (card seen) .....1 Yes (card not seen) .....2 No .....3 DK 8	
TT2. HAVE YOU EVER RECEIVED ANY INJECTION TO PREVENT YOU FROM GETTING TETANUS, THAT IS, DISEASE WITH CONVULSIONS *(AN ANTI-TETANUS SHOT, AN INJECTION AT THE TOP OF THE ARM OR SHOULDER)*?	Yes .....1 No .....2 DK 8	2 ⇨ CP MODULE 8 ⇨ CP MODULE
TT3. IF YES: HOW MANY TIMES DID YOU RECEIVE THIS ANTI-TETANUS INJECTIONS DURING YOUR LIFE?	**No. of times:** ☐☐ DK 98	
GO TO CONTRACEPTION MODULE (CP)		

CONTRACEPTION MODULE		CP
NOW I WOULD LIKE TO TALK ABOUT FAMILY PLANNING, THE VARIOUS WAYS OR METHODS THAT A COUPLE CAN USE TO DELAY OR AVOID PREGNANCY (SUPPOSE FOR NONE PREGNANT)		
CP1. SOME PEOPLE USE METHODS TO DELAY OR AVOID PREGNANCY. HAVE YOU HEARD ABOUT THE FOLLOWING METHODS TO AVOID OR DELAY PREGNANCY? *List and describe methods. Circle each method known by respondent.*	CP1A. Condom (male) ..... A CP1B. Diaphragm/Cervical cap/Female condom ..... B CP1C. Spermicides/Cream/Jelly/Foam/ Vaginal pills/Suppositories ..... C CP1D. IUD ..... D CP1E. Oral hormonal contraceptives (pills) ..... E CP1F. Hormonal injections ..... F CP1G. Hormonal implants ..... G CP1H. Emergency contraception ..... H CP1I. Lactational amenorrhea method ..... I CP1J. Withdrawal ..... J CP1K. Calendar method ..... K CP1L. Abstinence ..... L CP1M. Douching ..... M CP1N. Tubal ligation (female sterilization) ..... N CP1O. Vasectomy (male sterilization) ..... O CP1X. Other methods ..... X CP1Z.DK/difficult answer ..... Z	**Z ⇨ HA1**
Check Marital Status (MA1). *If* MA1 = 1 (never married) ⇨ *HA Module.* *If* MA1 = 2, 3, 4, or 5 ⇨ *continue with* CP2.		
CP2. HAVE YOU EVER USED ANYTHING OR TRIED IN ANY WAY TO DELAY OR AVOID GETTING PREGNANT?	Yes ..... 1 No 2	**2 ⇨ CP5**
CP3. ARE YOU CURRENTLY DOING SOMETHING OR USING ANY METHOD TO DELAY OR AVOID GETTING PREGNANT?	Yes ..... 1 No ..... 2 Currently pregnant 3	1 ⇨ CP6 2 ⇨ CP5 3 ⇨ CP4

CP4. AT THE TIME YOU BECAME PREGNANT, DID YOU WANT TO BECOME PREGNANT THEN, DID YOU WANT TO WAIT UNTIL LATER, OR DID YOU NOT WANT TO BECOME PREGNANT AT ALL?	Pregnant then ..... 1 Wait till later ..... 2 Did not want to become pregnant . 3	**All ⇨ HA MODULE**
CP5. *Only ask non-pregnant women:* **DO YOU INTEND TO GET PREGNANT NOW?**	Yes ..... 1 No 2	**All ⇨ CP8**
CP6. WHICH METHOD ARE YOU USING? *Do not prompt.* *If more than one method is mentioned, circle each one.*	Female sterilization ..... A Male sterilization ..... B Pill..... C IUD ..... D Injections ..... E Implants..... F Condom..... G Female condom ..... H Diaphragm ..... I Foam/jelly..... J Lactational amenorrhoea method (LAM)..... K Periodic abstinence ..... L Withdrawal..... M Other (*specify*)_____X	**If ONLY A,B,K,L,M mentioned, ⇨HA MODULE**
CP7. WHERE DID YOU OBTAIN THE CURRENT METHOD THE LAST TIME?	Public health facility ..... 1 Private health facility ..... 2 Pharmacy..... 3 Health worker in the community..... 4 Other(*specify*)..... 6	**All skip to HA**

CP8. IF NOT USING ANY FAMILY PLANNING METHOD, WHAT IS THE REASON? *Do not prompt.* *If more than one reason is mentioned, circle each one.*	Want to have more children……. Religious beliefs against family planning……. Woman does not agree with family planning….. Husband does not agree with family planning… Relatives do not agree with family planning…… Afraid of side effects…… Not aware of family planning methods…… Difficulty in finding family planning methods…… High cost…… Difficult to use…… Menopause/ Infertility……. Husband/ partner is not present……. Other (*specify*)…… Don't know……	A B C D E F G H I J K L X Z
GO TO HIV/AIDS MODULE (HA)		

HIV/AIDS MODULE		HA
HA1. NOW I WOULD LIKE TO TALK WITH YOU ABOUT SOMETHING ELSE. HAVE YOU EVER HEARD OF THE VIRUS HIV OR AN ILLNESS CALLED AIDS?	Yes ..... 1 No 2	2 ⇨ FW1
HA2. HOW CAN A PERSON GET AIDS? ***Probe:* ANY OTHER WAY?** *(multiple responses possible)*	Sexual intercourse .....A Not using condom .....B Blood transfusion .....C Injections ..... D Mosquito bite .....E Supernatural means/ witchcraft .....F Sharing food ..... G Other (*specify*) .....X DK .....Z	
HA3. Is there anything a person can do to avoid getting AIDS?	Yes ..... 1 No ..... 2 DK 8	2 ⇨ HA5 **8 ⇨ HA5**
HA4. WHAT CAN A PERSON DO? ***Probe:* ANY OTHER WAY?** *(multiple responses possible)*	Sex with a single partner .....A Abstinence .....B Use condoms .....C Avoid blood transfusion .....D Avoid injections .....E Other(*specify*) .....X DK ..... Z	
HA5. IS IT POSSIBLE FOR A HEALTHY-LOOKING PERSON TO HAVE THE HIV VIRUS?	Yes ..... 1 No ..... 2 DK 8	
HA6. CAN THE HIV VIRUS BE TRANSMITTED FROM A MOTHER TO A BABY?	**Yes No DK** HA6A. DURING PREGNANCY..... **1 2 8** HA6B. DURING DELIVERY..... **1 2 8** HA6C. BY BREASTFEEDING..... **1 2 8**	
GO TO FINAL WOMAN'S QUESTIONNAIRE INSTRUCTIONS (FW)		

FINAL WOMAN'S QUESTIONNAIRE INSTRUCTIONS	FW

FW1. Check HL7, Is this woman a caretaker of a child under 5 in the household?

☐ Yes. ⇨ Go to UNDER 5 QUESTIONNAIRE
to administer the questionnaire to the caretaker of the eligible child.

☐ No. ⇨ Continue.

FW2. *Do any other eligible women reside in the household?*
Check household listing column. HH6.

☐ Yes. ⇨ Go to the next WOMAN'S QUESTIONNAIRE
to administer the questionnaire to the next eligible woman.

☐ *No. ⇨ End the interview by thanking the respondent for her cooperation.*
Gather together all questionnaires for this household and tally the number of interviews completed on the cover page on the household questionnaire.

APPENDIX B 3

State Name: …… **Segment Number:** …… **Household Number:** ……

SUDAN HOUSEHOLD HEALTH SURVEY

HOUSEHOLD QUESTIONNAIRE

We are a team from the Sudan Household Health Survey that is concerned with family health and education. We would like to talk to interview you for about 45 minutes. All the information we obtain will remain strictly confidential and your answers will never be identified. During this time I would like to speak with the household head and all mothers or others who take care of children in the household.

MAY I START NOW? *If permission is given, begin the interview.*

HOUSEHOLD INFORMATION PANEL	**HH**
HH1. CODES OF : state cluster	HH2. HOUSEHOLD NUMBER:
HH3.: . Interviewer number: ☐☐ Interviewer Name: _____	HH4 Supervisor number: Supervisor Name: _____
HH5. 3Day/Month/Year of interview	Day ☐☐ Month ☐☐ Year ☐☐☐☐
HH6. Area: Urban……1 Rural……2 South ……3	HH7. LOCALITY CODE:
HH8. Name of head of household: _____	
After all questionnaires for the household have been completed, fill in the following information:	
HH9. Result of HH interview: Completed 1 Not at home 2 Refused 3 HH not found/destroyed 4 Other (*specify*)_____ 6	HH10. Respondent to HH questionnaire: Household Line No. (from HL1): Name: _____ HH11. Total # of household members:
HH12. # of women eligible for interview:	HH13. # of women questionnaires completed:
HH14. # of children under age 5:	HH15. # of child questionnaires completed:
HH16. Data entry clerk name and number: Name_	
Interviewer / supervisor notes: *record notes about the interview, e.g. call-back times, revisit, etc.* …… . …… …… .	

of the household in line 01. List all household members (HL2), their relationship to the household head (HL3), and their sex (HL4). For each

AT WORK). If yes, complete listing. *Then, ask questions starting with HL5 for each person at a time. Add a continuation sheet if there are more than*

HL9-HL12.	If **over 10 years**, ask HL12A.	For household members age 5 and above			*For household members age 5-24 years*			
HL12.	HL12A.	ED1.	ED2.	ED3.	ED4.	ED6.	ED7.	ED8.
If alive: DOES (*name's*) NATURAL FATHER LIVE IN THIS HOUSEHOLD ? If yes, record Line no. *of father* If no, write "00".	HOW HAS (*name*) SPENT (*his/her*) TIME DURING THE PAST 3 MONTHS? WAS (*name*): 01..WORKING FOR PAY 02..WORKING FOR SUBSISTENCE ONLY 03..WORKING FOR PAY AND SUBSISTENCE 04..WORKING AS A VOLUNTEER 05..WORKING FOR FOOD 06..NOT WORKING 07..IN SCHOOL 08..SELF-EMPLOYED 09..RETIRED 10..HOUSEWIFE 96..OTHER (*specify*) 98..DK	CAN THIS PERSON READ AND WRITE IN ANY LANGUAGE ? 1 YES 2 NO 8 DK	HAS (*name*) EVER ATTENDED SCHOOL OR PRESCHOOL? 1 YES 2 NO ↘ NEXT LINE 8 DK ↘ NEXT LINE	What is the highest level of school (*name*) attended? What is the highest grade (*name*) completed at this level? LEVEL ATTENDED: 0..PRESCHOOL 1..PRIMARY 2..INTERMEDIATE 3..SECONDARY 4..POST SECONDARY DIPLOME 5..UNIVERSTY 6..POST UNIVERSITY 7..NON-STANDARD CURRICULUM 8..ADULT EDUCATION 98..DK GRADE 98..DK *If less than one grade, enter 00.*	DURING THIS SCHOOL YEAR, THAT ENDED IN LAST FEBRUARY (YEAR 2005-2006), DID (*name*) ATTEND SCHOOL OR PRESCHOOL AT ANY TIME? 1 YES 2 NO ⇨ ED7 8 DK ⇨ ED7	THIS SCHOOL YEAR, WHICH LEVEL AND GRADE IS/WAS (*name*) ATTENDING? LEVEL ATTENDED: 0..PRESCHOOL 1..PRIMARY 2..INTERMEDIATE 3..SECONDARY 4..POST SECONDARY DIPLOME 5..UNIVERSTY 6..NON-STANDARD CURRICULUM 7..ADULT EDUCATION 8..DK GRADE 98..DK *If less than one grade, enter 00.*	DURING THE PREVIOUS SCHOOL YEAR, DID (*name*) ATTEND SCHOOL OR PRESCHOOL AT ANY TIME? 1 YES 2 NO ↘ NEXT LINE 8 DK ↘ NEXT LINE	DURING THE PREVIOUS SCHOOL YEAR, WHICH LEVEL AND GRADE DID (*name*) ATTEND? LEVEL ATTENDED: 0..PRESCHOOL 1..PRIMARY 2..INTERMEDIATE 3..SECONDARY 4..POST SECONDARY DIPLOME 5..UNIVERSTY 6..NON-STANDARD CURRICULUM 7..ADULT EDUCATION 8..DK GRADE 98..DK *If less than one grade, enter 00.*

K		STATUS										
2			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	

Check HL7. Enter the number of women age 15-49 here (copy to HH12)

Check HL5. Enter the number of children under age 5 here (copy to HH14)

household members (HL2), their relationship to the household head (HL3), and their sex (HL4). For each question, use the appropriate code for answer.

Then, ask questions starting with HL5 for each person at a time. Add a continuation sheet if there are more than 12 household members.

k HL9-HL12.		If **over 10 years**, ask HL13.	For household members age 5 and above			*For household members age 5-24 years*			
HL11.	HL12.	HL12A.	ED1.	ED2.	ED3.	ED4.	ED6.	ED7.	ED8.
name's) URAL HER E? S O ⇨ 2A K **L12A**	*If alive*: DOES (*name's*) NATURAL FATHER LIVE IN THIS HOUSEHOLD? Record Line no. of father or 00 for 'no'.	*If **over 10 years** ask hl12a:* HOW HAS (*name*) SPENT (*his/her*) TIME DURING THE PAST 3 MONTHS? WERE YOU: 01..WORKING FOR PAY 02..WORKING FOR SUBSISTENCE ONLY 03..WORKING FOR PAY AND SUBSISTENCE 04..WORKING AS A VOLUNTEER 05..WORKING FOR FOOD 06..NOT WORKING 07..IN SCHOOL 08..SELF-EMPLOYED 09..RETIRED 10..HOUSEWIFE 96..OTHER (*specify*) 98..DK	CAN THIS PERSON READ AND WRITE IN ANY LANGUAGE? 1 YES 2 NO 8 DK	HAS (*name*) EVER ATTENDED SCHOOL OR PRESCHOOL? 1 YES 2 NO ↘ *CHECK Q HH6 IF ANSWER IS 1 OR 2 GO TO CD1 IF ANSWER IS 3 GO TO NEXT LINE)* 8 DK ↘ *CHECK Q HH6 IF ANSWER IS 1 OR 2 GO TO CD1 IF ANSWER IS 3 GO TO NEXT LINE)*)	What is the highest level of school [name] attended? What is the highest grade [name] completed at this level? LEVEL ATTENDED: 0..PRESCHOOL 1..PRIMARY 2..INTERMEDIATE 3..SECONDARY 4..POST SECONDARY DIPLOME 5..UNIVERSTY 6..POST UNIVERSITY 7..NON-STANDARD CURRICULUM 8..ADULT EDUCATION 98..DK GRADE 98..DK *If less than one grade, enter 00.*	DURING THIS SCHOOL YEAR, OR THAT ENDED IN LAST FEBRUARY (YEAR 2005-2006), DID (*name*) ATTEND SCHOOL OR PRESCHOOL AT ANY TIME? 1 YES 2 NO ⇨ ED7 8 DK ⇨ ED7	THIS SCHOOL YEAR, WHICH LEVEL AND GRADE IS/WAS (*name*) ATTENDING? LEVEL ATTENDED: 0..PRESCHOOL 1..PRIMARY 2..INTERMEDIATE 3..SECONDARY 4..POST SECONDARY DIPLOME 5..UNIVERSTY 6..NON-STANDARD CURRICULUM 7..ADULT EDUCATION 8..DK GRADE 98..DK *If less than one grade, enter 00.*	DURING THE PREVIOUS SCHOOL YEAR, DID (*name*) ATTEND SCHOOL OR PRESCHOOL AT ANY TIME? 1 YES 2 NO ↘ NEXT LINE(SOUTH 8 DK ↘ NEXT LINE(SOUTH	DURING THE PREVIOUS SCHOOL YEAR, WHICH LEVEL AND GRADE DID (*name*) ATTEND? LEVEL ATTENDED: 0..PRESCHOOL 1..PRIMARY 2..INTERMEDIATE 3..SECONDARY 4..POST SECONDARY DIPLOME 5..UNIVERSTY 6..NON-STANDARD CURRICULUM 7..ADULT EDUCATION 8..DK GRADE 98..DK *If less than one grade, enter 00.*

2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
2 8			1 2 8	1 2 8	1 2 3 4 5 6 7 8 98		1 2 8	1 2 3 4 5 6 7 8		1 2 8	1 2 3 4 5 6 7 8	
AL NO. OF ELIGIBLE CHILDREN												

5 = Son- or Daughter-In-Law | 06 = Grandchild
1 = Uncle/Aunt | 12 = Niece/Nephew by Blood
6 = Not Related | 98 = DK

HOUSEHOLD INCOME MODULE		
HI1. DOES ANY MEMBER OF THIS HOUSEHOLD OWN LAND FOR FARMING, GRAZING, OR FISHING?	Yes 1 No 2	
HI2. DOES ANY MEMBER OF THIS HOUSEHOLD USE LAND FOR FARMING?	Yes 1 No 2	
HI3. DOES THIS HOUSEHOLD OWN OR HAVE ANY LIVESTOCK, HERDS, OR FARM ANIMALS?	Yes 1 No 2	2 ⇨WS MODULE
HI4. HOW MANY CATTLE DOES THIS HOUSEHOLD OWN OR HAVE?	CATTLE? 0 … 1 1-5 2 6-20 3 21-50 4 51-100 5 101+ 6 DK 8	
HI5. HOW MANY CHICKENS DOES THIS HOUSEHOLD OWN OR HAVE?	CHICKENS? 0 … 1 1-10 2 11-20 3 21-50 4 51-100 5 101+ 6 DK 8	
HI6. HOW MANY GOATS DOES THIS HOUSEHOLD OWN OR HAVE?	GOATS? 0 … 1 1-5 2 6-20 3 21-50 4 51-100 5 101+ 6 DK 8	
HI7. HOW MANY MILK COWS DOES THIS HOUSEHOLD OWN OR HAVE?	MILK COWS? 0 … 1 1-4 2 5-9 3 10-14 4 15-20 5 21+ 6 DK 8	

HI8. How many Sheep does this household own or have?	Sheep? 0 … 1 1-5 2 6-20 3 21-50 4 51-100 5 101+ 6 DK 8	
HI9. How many Horses, Donkeys, or Mules does this household own or have?	Horses, Donkeys, or Mules? 0 … 1 1-3 2 4+ 3 DK 8	
HI10. How many Camels does this household own or have?	Camels? 0 … 1 1-3 2 4+ 3 DK 8	
GO TO WATER AND SANITATION MODULE (WS)		

WATER AND SANITATION MODULE		
WS1. What is the main source of drinking water for members of your household?	**Piped water:** Piped into dwelling 11 Piped into yard or plot 12 Public tap/standpipe 13 Borehole 21 **Dug well:** Protected well 31 Unprotected well 32 **Water from spring:** Protected spring 41 Unprotected spring 42 Rainwater collection 51 Tanker-truck 61 Cart with small tank/drum 71 Surface water (river, stream, dam, lake, pond, canal, irrigation channel) 81 Bottled water 91 Other(*specify*) 96	11⇨WS5 12⇨WS5 ⇨WS3 96 ⇨WS3

WS2. WHAT IS THE MAIN SOURCE OF WATER USED BY YOUR HOUSEHOLD FOR COOKING AND OTHER PURPOSES SUCH AS HAND WASHING?	Piped water Piped into dwelling ..... 11 Piped into yard or plot ..... 12 Public tap/standpipe..... 13 Tube well/borehole ..... 21 Dug well Protected well ..... 31 Unprotected well..... 32 Water from spring Protected spring ..... 41 Unprotected spring..... 42 Rainwater collection..... 51 Tanker-truck ..... 61 Cart with small tank/drum..... 71 Surface water (river, stream, dam, lake, pond, canal, irrigation channel)..... 81 Other (*specify*)96	11⇨WS5 12⇨WS5
WS3. BY FOOT, HOW LONG DOES IT TAKE TO GO THERE, GET WATER, AND COME BACK?	Number of minutes ☐☐☐ Water on premises 995 DK 998	995⇨WS5
WS4. WHO USUALLY GOES TO THIS SOURCE TO FETCH THE WATER FOR YOUR HOUSEHOLD? Probe: IS THIS PERSON UNDER AGE 15? WHAT SEX? CIRCLE CODE THAT BEST DESCRIBES THIS PERSON.	Adult woman 1 Adult man 2 Female child (under 15) 3 Male child (under 15) 4 DK 8	
WS5. DO YOU TREAT YOUR WATER IN ANY WAY TO MAKE IT SAFER TO DRINK?	Yes 1 No 2 DK 8	2⇨WS7 8⇨WS7
WS6. WHAT DO YOU USUALLY DO TO THE WATER TO MAKE IT SAFER TO DRINK? Probe: ANYTHING ELSE? Record all items mentioned.	Boil A Add bleach/chlorine B Use a filter (cloth, ceramic, or sand) C Solar disinfection D Let it stand and settle E Other(*specify*) X DK Z	
WS7. WHAT KIND OF FACILITY DO MEMBERS OF YOUR HOUSEHOLD USUALLY USE TO EASE THEMSELVES/ DISPOSE OF HUMAN WASTE? If necessary, ask permission to observe the facility.	Flush / pour flush Flush to piped sewer system..... 11 Flush to septic tank..... 12 Flush to pit (latrine)..... 13 Flush to somewhere else..... 14 Flush to unknown place/not sure/DK 15 Ventilated Improved Pit latrine (VIP) . 21 Pit latrine with slab..... 22 Pit latrine without slab / open pit 23	

	Composting toilet..... 31 Bucket..... 41 Hanging toilet/hanging latrine..... 51 No facilities or bush or field ..... 95 Other (*specify*) 96	95⇨ HC2
WS8. DO YOU SHARE THIS FACILITY WITH OTHER HOUSEHOLDS?	Yes 1 No 2	2⇨ HC 2
WS9. HOW MANY HOUSEHOLDS IN TOTAL USE THIS FACILITY?	No. of households (if less than 10) ☐ Ten or more households 10 DK 98	
GO TO HOUSEHOLD CHARACTERISTICS MODULE (HC)		

HOUSEHOLD CHARACTERISTICS MODULE		**H**
HC2. HOW MANY ROOMS/TUKULS BELONG TO THIS HOUSEHOLD?	No. of rooms/tukuls.....	
HC3. MAIN MATERIAL OF THE HOUSE/TUKUL FLOOR: Record observation.	Muddy/earth ..... 11 Mixture of dung, grass & mud..... 12 **Rudimentary floor:** Wood planks..... 21 Palm/bamboo..... 22 **Finished floor:** Parquet or polished wood..... 31 Vinyl or asphalt strips ..... 32 Ceramic tiles..... 33 Cement..... 34 Carpet ..... 35 Cement tiles.....36 Red pricks.....37 Cloth carpet ..... 41 Other(*specify*)..... 96	
HC4. MAIN MATERIAL OF THE ROOF: Record observation.	**Natural roofing:** No roof..... 11 Thatch/palm leaf..... 12 Sod/grass..... 13 **Rudimentary roofing:** Rustic mat..... 21 Palm/bamboo..... 22 Wood planks..... 23 Animal skin/fibers/wool 24	

	Finished roofing: Metal (zinc) ..... 31 Wood ..... 32 Calamine/cement fiber ..... 33 Ceramic tiles ..... 34 Cement (concrete) ..... 35 Roofing shingles ..... 36 Red pricks.....37 Asbestos sheet .....38 Other(*specify*)..... 96	
HC6. WHAT TYPE OF FUEL DOES YOUR HOUSEHOLD MAINLY USE FOR COOKING?	Electricity ..... 01 Liquid Propane Gas (LPG) ..... 02 Natural gas ..... 03 Biogas..... 04 Kerosene..... 05 Coal / Lignite..... 06 Charcoal ..... 07 Wood ..... 08 Straw/shrubs/grass ..... 09 Animal dung ..... 10 Agricultural crop residue..... 11 Other (*specify*)..... 96	

HC8. IS THE COOKING USUALLY DONE IN THE HOUSE, IN A SEPARATE ROOM/TUKUL, OR OUTDOORS?	In the house ..... 1 In a separate room/tukul..... 2 Outdoors ..... 3 Other(*specify*) 6				
HC9. DOES ANY MEMBER OF YOUR HOUSEHOLD OWN OR HAVE THE FOLLOWING ITEMS? DO YOU USE ANY OF THE FOLLOWING ITEMS, WHETHER YOU HAVE IT IN YOUR OWN HOUSEHOLD OR NOT? *Read aloud, and circle either "1" for yes or "2" for no for each item. Be sure and complete BOTH columns "Own/Have" and "Use".*		OWN / HAVE		USE	
		YES	NO	YES	NO
	ELECTRICITY?	1	2	1	2
	A REFRIGERATOR?	1	2	1	2
	A RADIO?	1	2	1	2
	A TELEVISION?	1	2	1	2
	A MOBILE TELEPHONE?	1	2	1	2
	A NON-MOBILE TELEPHONE?	1	2	1	2
	A COMPUTER?	1	2	1	2
	INTERNET?	1	2	1	2
	A WATCH?	1	2	1	2
	A BICYCLE?	1	2	1	2
	A MOTORCYCLE OR SCOOTER?	1	2	1	2
	AN ANIMAL-DRAWN CART?	1	2	1	2
	A CAR OR TRUCK?	1	2	1	2
	A BOAT WITH A MOTOR?	1	2	1	2
1 GO TO INSECTICIDE-TREATED NET MODULE (TN)					

INSECTICIDE-TREATED NET MODULE		
TN1. DOES YOUR HOUSEHOLD HAVE ANY MOSQUITO NETS THAT CAN BE USED WHILE SLEEPING?	Yes ..... 1 No..... 2	2⇨SI MODULE
TN2. HOW MANY AND WHAT KIND OF MOSQUITO NETS DOES YOUR HOUSEHOLD HAVE? *If respondent does not know whether or not net(s) have been treated, count as "other."*	TN2A.Number of treated nets..... DK..... 98 TN2B. Number of untreated nets ..... DK..... 98 TN2C. Number of other/unknown nets DK..... 98	

TN3. HOW MANY AND WHAT KIND OF MOSQUITO NETS ARE ACTUALLY IN USE IN YOUR HOUSEHOLD?	TN3A.Number of treated nets..... DK.....98 TN3B. Number of untreated nets ..... D98 TN3C. Number of other/unknown nets.. DK.....98	
TN4. HOW MANY CHILDREN UNDER 5 USUALLY SLEEP UNDER A TREATED NET?	Number of children.....	
TN5. WHERE DID YOU ACQUIRE THE MOST RECENTLY ACQUIRED MOSQUITO NET?	Market.....1 Government/NGO program .....2 Other(*specify*) .....6 DK.....8	
GO TO SALT IODIZATION MODULE (SI)		

SALT IODIZATION MODULE		SI
SI1. WE WOULD LIKE TO CHECK WHETHER THE SALT USED IN YOUR HOUSEHOLD IS IODIZED. MAY I SEE A SAMPLE OF THE SALT USED TO COOK THE MAIN MEAL EATEN BY MEMBERS OF YOUR HOUSEHOLD LAST NIGHT? Once you have examined the salt, circle number that corresponds to test outcome.	Not iodized 0 PPM 1 Less than 15 PPM 2 15 PPM or more 3 Salt not tested 4 No salt in home 5	5 ⇨ FH MODULE
SI2. WHERE DID YOU ACQUIRE THIS SALT?	Local market .....1 Food Aid .....2 Other or indigenous(*specify*) .....6 DK 8	
GO TO FINAL HOUSEHOLD INSTRUCTIONS (FH)		

FINAL HOUSEHOLD INSTRUCTIONS	FH
FH1. Does any eligible woman age 15-49 reside in the household? Check HL12. You should have entered the total number of women in the household who are between the ages of 15 and 49 years old. Begin a separate questionnaire for each eligible woman (check HL6) by filling in the Information Panel. ☐ Yes. ⇨ Go to WOMAN'S QUESTIONNAIRE to administer the questionnaire to the first eligible woman. ☐ No. ⇨ Continue.	
FH2. Does any child under the age of 5 reside in the household? Check household listing, column HL7. You should have a questionnaire with the Information Panel filled in for each eligible child. ☐ Yes. ⇨ Go to UNDER 5 QUESTIONNAIRE to administer the questionnaire to caretaker of the first eligible child. ☐ *No. ⇨ End the interview by thanking the respondent for his/her cooperation.* Gather together all questionnaires for this household and tally the number of interviews completed on the cover page.	

APPENDIX C

Questionnaire

ID……

SOUTHERN SUDAN CENTRE FOR STATISTICS AND EVALUATION (SSCCSE) –RUMBEK HQS

VILLAGE LISTING TALLY SHEET FOR THE PRE-SHHS ACTIVITIES.

State…… County/Mahalia …… Payam…… Boma……

Sample Segment/Cluster…… Village name or Quarter council in towns……

Enumerator's Name…… Start date……ending date……

Executive Chief or Sub Chief	Village Headman/Gol Leader	H/hold No.	Name of Head of Household	Description of the location of the household	Total pop. in H/hold	MMR forms filled? Yes/No	Remarks

APPENDIX D

LIST OF SHHS MANAGEMENT/IMPLEMENTATION TEAM, SOUTHERN SUDAN

1. SHHS MANAGEMENT TEAM

S/NO	NAME	POSITION
1.	Dr. Olivia Lomoro	SHHS Executive Director
2.	Mr. Eliaba Damundu	SHHS Field Director
3.	Mr. Phillip Dau	Logistic Manager
4.	Acwil Odhyang	Finance Officer

2. CENTRAL SUPERVISORS

S/NO	NAME	STATE
1.	Mr. John c Kulang	Lakes
2.	Mr. David Thiang	Unity
3.	Mr. Phillip Dau	Jonglei/WBEG/ NBEG/Warrap/UN
4.	Dr. Olivia Lomoro	EES/WES
5.	Mr. Eliaba Damundu	CES
6.	Mr. Acwil Odyang	Upper Nile
8.	Susan Akol	Warrap

3. LIST OF STATE MANAGERS/FOCAL PERSONS

S/NO	NAME	STATE
1.	Valeriano Lagu Robert Malis	Central Equatoria
2.	Augustino Ndikiri John Friday	Western Equatoria
3.	Aquilino Michael Oduma Daniel Arop	Eastern Equatoria
4.	Jacob Makur Majok Bol	Lakes
5.	Abraham Dau Riak Madio Kumliek	Jonglei
6.	William Garang William Aken Dut	Northern BEG
7.	Daniel Ollum Martin Kuol Dumo/Marlin James	Western BEG
8.	Stephen Chol Susan Akol	Warrap
9.	Mr. William Apar Othouk John Opiti	Upper Nile (Malakal)
10.	Jany Bol Ruay Samuel Reath	Unity

4. LIST OF KEYERS/DATA ENTRY

S/NO	NAME	STATE
1.	Johnson Akol	Lakes
2.	Viola Aluong	"
3.	Makos Kuoshnin Manyiel	"
4.	Rachael Ayeni	"
5.	Mathiang Marial	"
6.	Dictor Kuorang	"
7.	John Miith	"
8.	Malou Mading Adel	"
9.	Mabor Malok	"
10.	Justin Mauet	"
11.	Poni Catherine	C.E.S.
12.	John Kongor	Jonglei
13.	Tabitha Kide	WES
14.	Mugabe Morden Poul	Lakes
15.	Sarah Nyakuth	Lakes
16.	Madiang Marial	
17.	Mabor Malok	

5. LIST DATA ENTRY SUPERVISORS AND AUDITORS

S/NO	NAME	STATE
1.	Valeriano Lagu (Supervisor)	CES
2.	Majok Bol (Supervisor)	Lakes
3.	Achol Modesto (Supervisor)	Lakes
4.	Cicilia Konga (Supervisor)	CES
5.	John Friday	WES
6.	Yacoub Walla	WES
7.	Fasco Jang Gatkuoth	Upper Nile
8.	Jang Bol	Unity
9.	Betty Kiden Eluzai	CES
10.	Luke Lual	NBEG
11.	Wilson Lual	Jongeli
12.	Daniel Olum	WBEG
13.	Marlin James	WBEG
14.	Marko Piem	WBEG
15.	Susan Akol	Warrap
16.	Dack Meen	Lakes
17.	Makur Chol	Lakes
18.	Mayen Mario Bol	Jonglei
19.	Peter Achnil	Jonglei
20.	Ayiei Chol	Jonglei
21.	Rodolfo Sebit	Jonglei

6. LIST OF SUPPORT STAFF-SHHS

S/NO	NAME
1.	Sarah Subandria
2.	Mary Onesimo
3.	William Deng
4.	Ater Mangang
5.	Mr. Emmanuel K. Wilson
6.	Kiir Deng
7.	Joseph Romano
8.	Charles Wani
9.	Maker Ayuel
10.	Adwok Chol

7. LIST OF ENUMERATORS

1. Enumerators - Northern Bahr El Ghazal State.

S| No	Names	Position
1	William Aken Dut	Focal point manager
2	Luke Lual Majok	Supervisor
3	Joseph Garang Majok	Supervisor
4	William Garang Akue	Supervisor
5	Peter Majok Annei	Supervisor
6	Santino Deng Akol	Supervisor
7	William Mayen Mawien	Supervisor
8	Martin Ather Ather	Enumerator
9	Daniel Deng Thali	Enumerator
10	David Dau Dau	Enumerator
11	Atong Deng Ker	Enumerator
12	Maduok Peter	Enumerator
13	James Akol Dut	Enumerator
14	Stephen Wien Majok	Enumerator
15	Alek Lual Majok	Enumerator
16	Anyuon Deng Anei	Enumerator
17	Albino Akuei Akuei	Enumerator
18	Dominic Malek Adim	Enumerator
19	David Malek Kuch	Enumerator
20	Daniel Aduol Bol	Enumerator
21	Lino Akol Akol	Enumerator
22	Joseph Wac Akol	Enumerator
23	Elizebeth .A. Aduok	Enumerator
24	Salva Akoon Akoon	Enumerator
25	Tang Tang Aken	Enumerator
26	Marko Kuek Mayen	Enumerator
27	Zakeria Mayual Deng	Enumerator
28	Santino Neli Dut	Enumerator
29	William Deng Adhil	Enumerator
30	William De_unguec	Enumerator
31	Angelo Deng Adhil	Enumerator
32	James Manut Got	Enumerator

33	Joseph Garang Buk	Enumerator
34	Joseph Manut Wek	Enumerator
35	Garang Mawien Piol	Enumerator
36	Yai Aguer Mayual	Enumerator
37	Mary Abuk Lino	Enumerator
38	James Dut Aleu	Enumerator
39	Wol Mayen Mawien	Enumerator
40	John Aken Akol	Enumerator
41	Joseph Deng Akot	Enumerator
42	Deng Yei Aguer	Enumerator
43	Bul Bul Akol	Enumerator

2. ENUMERATORS-LAKES STATE

S/No	Names	Position
1	Majok Bol	Focal point manager
2	Makur Chol	Supervisor
3	Daniel Makmin	Supervisor
4	Ruai Madica	Supervisor
5	Maker Mager	Supervisor
6	Samuel Mading Gak	Supervisor
7	Daniel Dut Meen	Supervisor
8	Mary Akon Majok	Supervisor
9	Manyiel Ugol	Enumerator
10	Dok Meen Malak	Enumerator
11	Marial Makur Maneny	Enumerator
12	Arac William	Enumerator
13	Dhal Maker Dhal	Enumerator
14	Muoranar Majok	Enumerator
15	Ghar Mahual	Enumerator
16	Mario Meen Bool	Enumerator
17	Sunday Acwil	Enumerator
18	Mathiang James	Enumerator
19	Anger Mabor	Enumerator
20	Anok Abiar	Enumerator
21	Benjumin Mawut	Enumerator
22	Makur Nhial Yak	Enumerator
23	Agum Run Arac	Enumerator
24	John Maker Gammer	Enumerator
25	Jacob Kon Marial	Enumerator
26	Sabit Mading	Enumerator
27	Peter Akec Kuol	Enumerator
28	Arop Emmanuel	Enumerator
29	Maruol Makuer	Enumerator
30	Dictor Makor	Enumerator
31	Gabriel Bol Meen	Enumerator
32	Marial Denis	Enumerator
33	Adut Amgrin	Enumerator
34	Ayei Chol Maguong	Enumerator
35	Mayom Ruban	Enumerator
36	Daniel Makor Meen	Enumerator
37	Mangar Mapuer	Enumerator

38	Kawaja Kau Madoc	Enumerator
39	Abraham Akot	Enumerator
40	Makar Mabor	Enumerator
41	Samuel Mading	Enumerator
42	Abraham Maper	Enumerator
43	Bol Majok Meen	Enumerator

3. ENUMERATORS - UPPER NILE STATE

S/No	Name	Position
1	Fasco Jang Galk	Focal point manager
2	Tereza Adiang	Supervisor
3	Rita Akwac	Supervisor
4	James Amum	Supervisor
5	Nyaku Abda	Supervisor
6	Viviana Ofyeny	Supervisor
7	Mayio James	Supervisor
8	Amum Edword	Enumerator
9	Wuor Chol Bichiole	Enumerator
10	Chol Gal Chol	Enumerator
11	Khor Wal Dar	Enumerator
12	Changluth Wan	Enumerator
13	Simion Wal	Enumerator
14	Albino Tito Akol	Enumerator
15	Akol Goud	Enumerator
16	Mandyor Wieu	Enumerator
17	Dok Chan Dok	Enumerator
18	Nur Bilien	Enumerator
19	Monyrac Deng	Enumerator
20	Anow Fita	Enumerator
21	Butrus Yona	Enumerator
22	Fathi Musa	Enumerator
23	Yousif Demanyail	Enumerator
24	Gatwech Pur	Enumerator
25	David Duop	Enumerator
26	Nyakhor Kier	Enumerator
27	Chang Kuoth Reath	Enumerator
28	Koang Tiet Deng	Enumerator
29	Dak Chuol Chuol	Enumerator
30	Kolung Malaw	Enumerator
31	Simon Gathuak	Enumerator
32	Dobuol Ruot	Enumerator
33	Themkim Thoan	Enumerator
34	Isaac John Jode	Enumerator
35	Dar Koang	Enumerator
36	James Odoule	Enumerator
37	Manyany Manyiok	Enumerator
38	Touch Makuach	Enumerator

4. ENUMERATORS - WARRAP STATE.

S/No	Names	Position
1	Susan Akol	Focal point manager
2	Salva Abol Modit	Supervisor
3	Karabino Apaac Wol	Supervisor
4	Aleu Ayieny	Supervisor
5	John Akot Akot	Supervisor
6	James Bol	Supervisor
7	Abraham Maluak	Supervisor
8	Mary Awien	Supervisor
9	Mary Achol	Enumerator
10	Tersa Aping	Enumerator
11	Amou Jok	Enumerator
12	Angelo Anei	Enumerator
13	Deng Madut	Enumerator
14	Majok Arkenjeli	Enumerator
15	Karabino Kuol	Enumerator
16	Kondow Madium	Enumerator
17	Jalwau Thuou	Enumerator
18	Joseph Majok	Enumerator
19	Akuei Wunkuel Noon	Enumerator
20	Adaut Santino Ngor	Enumerator
21	Kac Kor	Enumerator
22	Mary Nyibol	Enumerator
23	Deng Akol	Enumerator
24	Machang Bath Apei	Enumerator
25	Akec Peter Makur	Enumerator
26	Athian Agok Ater	Enumerator
27	Simion Mathue	Enumerator
28	Joseph Malok	Enumerator
29	Awudo William	Enumerator
30	Karabino Bol Artuon	Enumerator
31	Lucia Magong Manyiee.	Enumerator

5. ENUMERATORS - UNITY STATE.

S/No	Names	Position
1	Jany Bol	Focal point manager
2	Manyok Tap	Supervisor
3	George Mathew	Supervisor
4	Jacob Tany Mayom	Supervisor
5	Samuel Reath	Supervisor
6	Nichael Gatkuoth	Supervisor
7	Tates Solomom	Supervisor
8	Benedtic Kam	Supervisor
9	Nguong Gorden Riek	Enumerator
10	Wicjal Buk Thack	Enumerator
11	Bol Badeng	Enumerator
12	Verminca Gatkuoth	Enumerator
13	Micheal Manyang	Enumerator
14	James Kuok Peter	Enumerator

15	Stephen Gatkuoth	Enumerator
16	Younes Garang Bieth	Enumerator
17	Peter Kam Koang	Enumerator
18	Luke Gatluok Luth	Enumerator
19	Nyateka Puoth	Enumerator
20	Peter Oyll Dobul	Enumerator
21	Younes Gatluok Ok	Enumerator
22	Luke Dak Galuak	Enumerator
23	Fasco Galuak Rien	Enumerator
24	Gabriel Koal Galual	Enumerator
25	Machar Mediang	Enumerator
26	Jeremaih Gatdet	Enumerator
27	Tiger Gatwach Rob	Enumerator
28	Daniel Kuet Riak	Enumerator
29	Martha Nygkuoth	Enumerator
30	Gabriel Ter Jock	Enumerator
31	Lim Kong Gai	Enumerator
32	Peter Top Kueth	Enumerator
33	Santo Mangjok	Enumerator
34	Mike Nhial Mabil	Enumerator
35	Elizebath Nyaboth	Enumerator
36	James Manyah Jack	Enumerator
37	Santo Maluol	Enumerator
38	Angelo Ngeuen Biel	Enumerator
39	Koung Kong Thieck	Enumerator

6. ENUMERATORS – WESTERN BAHR EL GHAZAL STATE

S/No	**Names**	**Position**
1	Daniel Olum	Focal point manager
2	Marlin James.	Supervisor
3	Santino Apai	Supervisor
4	Marko Piem	Supervisor
5	Andrea Ring	Supervisor
6	Agustino Mawien	Supervisor
7	Mark Umol Ukella	Supervisor
8	Peter Alen Kuc	Supervisor
9	Sophia Akung Ayiei	Enumerator
10	Santo Longar Manyuat	Enumerator
11	Franco Peter Albert	Enumerator
12	James Manut Mola	Enumerator
13	Santo Garang Deng	Enumerator
14	Peter Piel Ayaka	Enumerator
15	Dominic Lau Majok	Enumerator
16	Joseph Uchguec	Enumerator
17	David Makot Mabuoc	Enumerator
18	Albino Agui Agui	Enumerator
19	Rebecca Aker Wol	Enumerator
20	Gar Majok	Enumerator
21	Andrea Luke Nagor	Enumerator
22	Thomas Dor Agiu	Enumerator

23	Joseph Micheal	Enumerator
24	Nicola Terga	Enumerator
25	Lima Ali Dino	Enumerator
26	Albino Majok Awer	Enumerator
27	Marko David Deng	Enumerator
28	Peter Lemeyomo	Enumerator
29	Gismala Samuel Senda	Enumerator
30	Daniel Marjan Juma	Enumerator
31	Gisma Dhia Ahmed	Enumerator
32	James Mawien Makuac	Enumerator
33	Clement Agamy Mawien	Enumerator
34	Madeline Adut Uyu	Enumerator

7. ENUMERATORS – WESTERN EQUATORIA STATE

S/No	**Names**	**Position**
1	Augustino Ndikiri	Focal point manager
2	John Friday	Supervisor
3	Tabitha Kide	Supervisor
4	Yacuob Walla	Supervisor
5	Lawrance Monday	Supervisor
6	Jennifa Azaria	Supervisor
7	Gipson Timoteo	Supervisor
8	William Kumai	Supervisor
9	Juan Minisare	Enumerator
10	Rebecca George	Enumerator
11	Kenneth Peter	Enumerator
12	Evalin Basia	Enumerator
13	Lucia Basia	Enumerator
14	James Bandanvo	Enumerator
15	Dusman Saverino	Enumerator
16	Charles Nelson	Enumerator
17	Joseph Vungungba	Enumerator
18	Khadija Zakayo	Enumerator
19	Jackson Jethro	Enumerator
20	Elia Ezibon	Enumerator
21	Helda Simon	Enumerator
22	Godwil Baraka	Enumerator
23	Ashia Philip	Enumerator
24	Silvestor Juma	Enumerator
25	John William	Enumerator
26	Isaac Makun	Enumerator
27	Faki Amiro	Enumerator
28	Utu David	Enumerator
29	Ismail Mabe	Enumerator
30	Faisal Hakim	Enumerator
31	Wodu Apai Madeline	Enumerator
32	Susan Ngbapai	Enumerator
33	Martin Sigara	Enumerator

8. ENUMERATORS - EASTERN EQUATORIA STATE

S/No	Names	Position
1	Aquilino Oduma	Focal point manager
2	Arop Daniel	Supervisor
3	Juliet Achan	Supervisor
4	Dr. Idioro Joseph	Supervisor
5	Anglina Ibalu	Supervisor
6	Lopyen Albert	Supervisor
7	Peter Lochebe	Supervisor
8	Peter Mapito	Supervisor
9	Amos Andrew	Supervisor
10	Jane Amana	Enumerator
11	Dominic IoIdwac lope	Enumerator
12	Andrew Lowi	Enumerator
13	Kitil Wilfred Lotabo	Enumerator
14	Filex Lokom	Enumerator
15	George Lowi Lachebei	Enumerator
16	Thomas Koteen	Enumerator
17	Juma Rugosiano	Enumerator
18	Eliza Nagwas	Enumerator
19	Lovokson Edword	Enumerator
20	Emilio Lomilo	Enumerator
21	Madalina Aldu	Enumerator
22	Agustin Pgorok	Enumerator
23	Godfrey . A . Cofura	Enumerator
24	Henry Urai Ugala	Enumerator
25	Joseph Lidu Aburu	Enumerator
26	Okwahi John	Enumerator
27	Ilam Lily	Enumerator
28	Tarik Josephine	Enumerator
29	Ebur Simon	Enumerator
30	Dominic Adam	Enumerator
31	Okumu Robert	Enumerator
32	Iguma Emmaunel	Enumerator
33	Otto Deo	Enumerator
34	Taban James	Enumerator
35	Omolo Gaberiel	Enumerator
36	Oromo Raipeal	Enumerator
37	Nartistio Leirat	Enumerator
38	Ben Ibwai Karlo	Enumerator
39	Lowaha William	Enumerator
40	James Taban Kwanga	Enumerator
41	Ohisa micheal Thomas	Enumerator
42	Ochola Francis	Enumerator

9. ENUMERATORS - JONGELI STATE

S/No	Names	Position
1	Abraham Dau Riak	Focal point manager
2	Clement Augustino	Supervisor
3	Geu Makur	Supervisor
4	Bang Ogwan Gore	Supervisor

5	Madio Kumliek	Supervisor
6	James Makhor Kuol	Supervisor
7	Buoi Tut Chol	Supervisor
8	Reath Kong Reth	Supervisor
9	William Dak Lok	Supervisor
10	Jacob Mabil Tut.	Enumerator
11	Stephen Nhial Kuol	Enumerator
12	Wat Jok Puor	Enumerator
13	Sunday Ruei Kun	Enumerator
14	Dobuol Gai Ruei	Enumerator
15	James Chuol John	Enumerator
16	Stephen Kun Wan	Enumerator
17	William Latyer Lual	Enumerator
18	Stephen Yien Mut	Enumerator
19	Anderson Machar Luot	Enumerator
20	John Wiyu Al Raiok	Enumerator
21	Chol Kueth Kulong	Enumerator
22	Okello Oman Ojuno	Enumerator
23	Younis Okoth Ongol	Enumerator
24	John Kaka Gain	Enumerator
25	Benjamin Kenyatta	Enumerator
26	Romano Bilit Ajok	Enumerator
27	Philip Mabek	Enumerator
28	Philip Kon Anyang.	Enumerator
29	Peter Bul Malual	Enumerator
30	Daniel Gatdeat Majang	Enumerator
31	Garang John Akuel	Enumerator
32	Jacob Pac Alier	Enumerator
33	Manjok Robert Abuol	Enumerator
34	Bul Daniel Deng	Enumerator
35	Mojak Manyok Bul	Enumerator
36	Samuel Kuer Gac	Enumerator
37	John Chol Wuol	Enumerator
38	Daniel Deng Akec	Enumerator
39	Lueth Kuer Lueth	Enumerator
40	Dual John Adoor	Enumerator
41	Nadia Emam Elia	Enumerator
42	Jacob Chieng Kuoth Nyang	Enumerator
43	William Dak Maluit	Enumerator
44	Peter Gatkuoth Tut	Enumerator
45	David Dabek Tong	Enumerator

10. ENUMERATORS-CENTRAL EQUATORIA

S/No	**Name**	**Position**
1	Valerino Lagu	Focal Point Manager
2	Robert Malish	Supervisor
3	Anthony Ladu	Supervisor
4	John Tombe	Supervisor
5	Emmanuel Hakim	Supervisor
6	Joseph Laku	Supervisor

7	James Madi	Supervisor
8	Samuel Amule	Supervisor
9	Lokudu Cons	Supervisor
10	Lodiog A Julius	Supervisor
11	Mary Albino	Enumerator
12	Ezra Laku	Enumerator
13	Stephen Gwolo	Enumerator
14	Leone Kulang	Enumerator
15	Mary Onesimo	Enumerator
16	Cicilia Konga	Enumerator
17	Samuel Selle	Enumerator
18	Wani Elza	Enumerator
19	Migaba Duku	Enumerator
20	Elly Ramdan	Enumerator
21	Betty Kiden	Enumerator
22	Clementine Poni	Enumerator
23	Samuel Lokiko	Enumerator
24	Salla Mathew	Enumerator
25	Duku Moses	Enumerator
26	Taban Emmanuel	Enumerator
27	Rose Felix	Enumerator
28	Anges Keji	Enumerator
29	Yama Charles	Enumerator
30	Mary Kiden	Enumerator
31	Alkazi Scopas	Enumerator
32	Augustino Lodu	Enumerator
33	Jaciline Night	Enumerator
34	Lucy Arkanjelo	Enumerator
35	Samuel Juma	Enumerator
36	Ismail Taban	Enumerator
37	Matin Abugo	Enumerator
38	Henry Gago	Enumerator
39	Martin Sabit	Enumerator