

OUBRITENGA DEMOGRAPHIC SURVEILLANCE SYSTEM BURKINA FASO

**CENTRE NATIONAL DE RECHERCHE ET DE FORMATION SUR LE PALUDISME
(CNRFP)**



LOCATION OF OUBRITENGA DSS SITE, BURKINA FASO: 99,705 under surveillance.

Diadier Diallo

1. OUBRITENGA DSS SITE DESCRIPTION

1.1 Physical geography of the Oubritenga DSS area

The *Centre National de Recherche et de Formation sur le Paludisme* (CNRFP) demographic surveillance system (DSS) site is situated in the province of Oubritenga north of Ouagadougou, in Burkina Faso and involves 158 villages. The area covered is about 1,000 square kilometres, approximately 1/3 of the health district. The health district area covers all the Province of Oubritenga and 2 departments of the Province of Kadiogo. The DSS site is 38 kilometres long and 34 kilometres and lies between latitudes 12°28' and 12°47' north latitude and between 1°13' and 1°32' west longitude. The climate is characteristic of a Sudan savannah area, with a dry, cool season from November to February, a dry, hot season from March to May and rainy season from June to October. The mean annual rainfall is about 650 mm and the average annual temperature ranges between 23 and 33°C. A large and permanent reservoir lies within the area.

1.2 Population characteristics of the Oubritenga DSS area

Only populations living in rural settings were enrolled, therefore the peri-urban population from the District capital was not included in the DSS. Even though children less than 59 months of age were the population of interest, all age groups are followed-up. Population density is about 100 inhabitants per sq km. Of the more than 60 ethnic groups in Burkina Faso, only 2 ethnic groups live in the DSS site. More than 98% of the residents belong to the *Mossi* ethnic group, the largest single ethnic group in Burkina Faso, while the remaining 2% belong to the Fulani ethnic group. The main religions in the area are Islam, Christianity and local animist traditions. *Moore* is the language

spoken by at least 98% of the population. As in most of the rural areas in Burkina Faso, the great majority of population of the DSS site lives by subsistence farming. Millet, sorghum, peanuts and beans represent the main crops. In the dry season, villages close to water reservoirs practice market gardening. Formal education is provided in 49 primary schools and 5 secondary schools in the DSS area. About 88% of the population over 15 years of age has received no education at all, 3% have some level of literacy in local languages and 9% have attended primary school or beyond.

Villages range in size from 10 to 200 dispersed compounds, with an average village comprising about 60 compounds. Compounds are surrounded by walls and separated from each other by fields. A typical compound consists of, on average, 3-4 round huts and 2 rectangular houses made up with mud bricks. Round huts are covered with conical thatched roofs while rectangular houses are covered with corrugated iron or mud. Adult males have their own houses, often equipped with local beds, while women live in separate houses with their children and sleep on mats laid on the floor. On average, 10-12 people live in a compound. Generally, villages have some access to safe water since most of them are equipped with at least one drilled well. Latrine coverage, on the other hand, is very low. None of the 158 villages in the study area has access to electricity or telecommunications.

Access to the DSS site is possible through 2 main roads, one paved and one unpaved delimiting its western and eastern boundaries respectively. Interconnecting unpaved roads within the DSS are quiet good and allow access to most of the villages, except in periods of unusually heavy rainfall, which may render a few villages unreachable for a few days. It is important to note also that a railway linking Ouagadougou to a northern city crosses the site.

The whole province of Oubritenga has one District hospital and 32 governmental health centres/dispensaries. Of these, the district hospital and 10 health centres/dispensaries are located in

the DSS area. However, communities can also attend other health facilities located at the periphery of the DSS site. Consultations are free but patients pay for any drugs prescribed. Essential drug depots exist in 23 of the health facilities. However the extent to which all these facilities are used by the communities is questionable since utilization of health facilities in rural areas is low.

Several intervention programmes have been implemented in the district with support from a wide range of partners. One of the major interventions is the implementation of insecticide treated curtains (ITC). Thus, half of the DSS area was equipped with ITC in mid-1994 and the other half was equipped in mid-1996. Other intervention programmes were carried out at the district level by the district health management team (DHMT). These programmes include Expanded Programme of Immunisation, reproductive health, nutrition, water and sanitation, community information and education, etc. Data from the health district indicate that in 1997 BCG vaccine coverage was 77.5%, (DPT) vaccine coverage was 53.3% and measles vaccine coverage was 52%. Data from the same source indicate also that the 5 most important causes of death in the district are malaria, acute respiratory infections and, diarrhoea. Measles and meningitis are also among the important causes of death with year to year variations.

Since the beginning of DSS, two major epidemics occurred in the DSS site. One was measles epidemic and the other was a meningococcal meningitis epidemic, both occurring in 1996.

2. OUBRITENGA DSS PROCEDURES

2.1 Introduction to the Oubritenga DSS Site

Originally, the DSS was set up for the assessment of the impact of insecticide treated curtains on all-cause child mortality. It was one of the four settings in Africa that hosted large scale trials of insecticide treated materials, initiated and supported by UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR). Over two years (1994/96) of implementation of ITC, a 15% reduction in mortality was observed in children age 6 to 59 months (Habluetzel et al., 1997). From mid-1996 to 1999, the objective has shifted to studying issues relating to the sustainability of the initial impact of ITC on child mortality.

At the first census in 1993, 88,807 inhabitants lived within the DSS site. At the last census held in mid-1999, the population size had increased to 99,705 inhabitants. Seventy-nine additional villages, neighbouring the DSS site and totalling about 65,000 inhabitants, were enumerated in 1999 and will be included in the DSS (data not available yet).

Since 1993, annual censuses have been performed to collect basic demographic information. In addition, from 1993 to 1996, a continuous demographic surveillance was in place in all villages. Each village was visited once every three weeks. At each census or continuous demographic surveillance visit, births, deaths and migrations that occurred between the previous census or visit and the ongoing one were registered including the date each event has occurred. Pregnancies were also registered. Deaths from newborns are registered if the child was alive at birth. Any person living in the study area for at least six months was considered resident while people leaving their villages for over six months were considered migrants.

Apart from the monitoring of child mortality, research activities undertaken in the DSS area have focussed mainly on malaria transmission and malaria morbidity studies. Ascertainment of cause of death was conducted between 1994 and 1996 using structured and unstructured verbal autopsy questionnaires. Socio-economic surveys have been conducted between 1995 and 1996 to estimate

household income and to address issues related to communities' willingness to pay for insecticide treated curtains.

The nearest village within the DSS site is about 10 km from CNRFP while the farthest village is about 50 km away. The actual DSS team included a geographer, 3 drivers, 6 supervisors and 18 enumerators (for the census); since 1996 the 6 fieldworkers were not part of the team.

2.2 Oubritenta DSS Data collection and processing

The site was selected to host the ITC trial with approval from the health and administrative authorities of Burkina Faso. The main reason that led to its selection is the ease of access. Other aspects such as past contacts between CNFRP research staff and some of the communities and epidemiological considerations also favoured the selection of the site.

2.2.1 Oubritenga DSS Field procedures

a) Mapping

Details of the DSS methods have been published elsewhere (Diallo *et al.*, 1996). In brief, in 1993, 158 villages were identified. GPS was used to obtain villages' co-ordinates. Each village has a code and then each compound was given a number, which was painted on the wall. Households from each compound were also numbered and individuals in a household received a registration number. A unique identification number was then created for each individual using these 4 codes (village, compound, household and registration order number).

b) Initial Census and Update Rounds

Since 1993 annual censuses have been performed. At each census, enumerators used pre-printed "roll calls" generated from a computerised database. At each census, 3 teams of enumerators depart every morning from CNRFP by car for door-to-door visits. Each enumerator is trained to check all completed forms prior to leaving a compound. At the end of the day, forms from each team are gathered and checked by the team supervisors, and any discrepancies identified are corrected in the field before the forms are sent to the data management office, the same day. Forms undergo another thorough check by a team of three people in the data management office. Those not properly completed are returned to the team supervisors the following morning for the information to be checked in the relevant compound.

c) Continuous Surveillance

Between 1993 and 1996, continuous demographic surveillance was performed in all villages by a team of trained fieldworkers equipped with motorbikes. Six field workers were recruited and trained to perform the continuous demographic surveillance, using community key informants. Each field worker was responsible for 24 to 29 villages. Continuous DSS surveillance was stopped in 1996 since it added very little information to vital events captured during the census. A comparison between the census and the continuous demographic system has been published by Diallo et al., (1996).

d) Supervision and Quality Control

Quality control of information collected by enumerators is assessed through repeat visits performed by team supervisors in randomly selected compounds. Any major difference on reported information is checked by a third person.

2.2.2 *Oubritenga DSS Data management and analysis*

a) Data handling and processing

Roll calls were printed for each village using a DBASE programme. All roll calls completed during the census are sent to the data management office where they are kept until data is completed, entered and cleaned. Two data clerks are in charge of data entry into the computer using EPIINFO Version 6.0. Computers operate on a local network.

b) Data quality assurance and links to the field

Any discrepancy found during data entry is reported to the data manager and checked back in the field. Double entry is the standard procedure for all the data. Files are systematically validated and cleaned prior to merging them into one single file from which backup copies are made and kept at different locations.

c) Data analysis and dissemination

STATA 5.0 software is currently used for data analysis. Mortality rates by age and sex are calculated using number of deaths as the numerator and person years at risk as the denominator. Subsequent rounds of censuses have been used to disseminate results to the study communities. Annual reports are disseminated to local health and administrative authorities, including the district health management team and to the funding agency. Scientific publications and international meetings are the channel whereby results were disseminated to the scientific community.

3. OUBRITENGA DSS BASIC OUTPUTS

3.1 Demographic indicators.

Of the 99,705 inhabitants at the 1999 census, 46.8% were males and 53.2% were females. The population under 5 years represents 18.5% of the total while the population aged 5-14 years represents another 30.9%. 45.7% of the population was aged 15-64 years while only 4.9% was aged 65 years or over. Thus, this population is relatively young with about half the population aged less than 15 years.

In 1994-1995, the crude mortality rate for all age groups was 20.6 per 1000 in males and 16.8 per 1000 in females. For the subsequent period (1996-1997), CDR mortality rate figures indicated 15.1 per 1000 for males and 12.9 per 1000 for females. In the period 1998-1999, when follow-up was only over 17 months, CDR was 14.4 per 1000 and 12.9 per 1000 for males and females respectively. These figures indicate declining mortality with time and a higher mortality in males in comparison to females.

Age-specific mortality indicates high but declining infant mortality, with 179.3, 102, and 86.6 per 1000 live births for males and 142.1, 88.2 and 84.7 per 1000 live births for females in the period 1994/5, 1996/7 and 1998/9 respectively. Child mortality (1-4) fluctuates between 23 and 28 per 1000 live births over these 3 periods. It is important to stress that child mortality figures should be interpreted with caution as the malaria control intervention was implemented from 1994 to 1999. Lowest mortality rates are observed between age 5 up to less than 20 at the which age it starts increasing slightly to reach higher levels, comparable to infant mortality, in the oldest population.

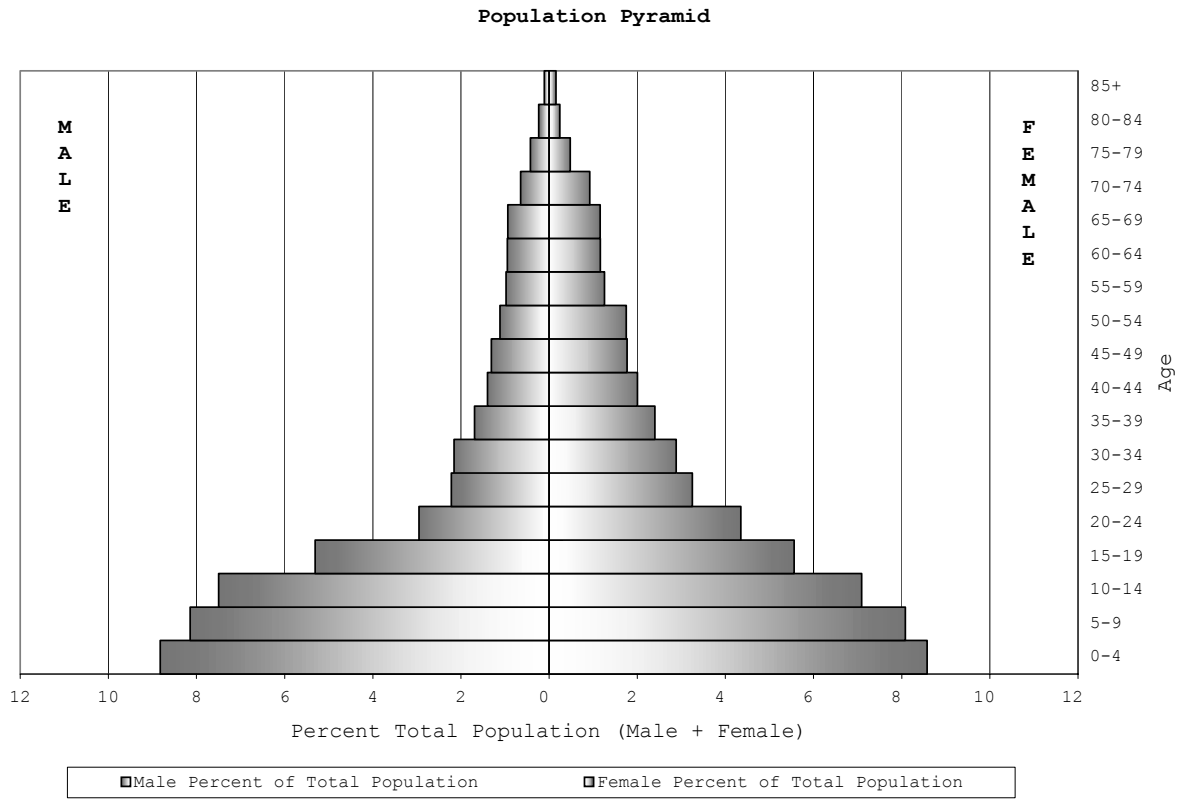


Figure 1. Population pyramid for the Oubritenga DSS Site

Table 1. Age and Sex Specific Mortality in the Oubritenga DSS Site

Age	Death (nDx)		Person Years (nPYx)	
	Male	Female	Male	Female
0	882	765	8,035	7,829
1-4	876	935	34,175	33,206
5-9	189	145	38,961	38,667
10-14	82	61	35,857	33,928
15-19	62	94	25,399	26,582
20-24	39	83	14,117	20,811
25-29	72	78	10,603	15,542
30-34	88	78	10,302	13,805
35-39	77	64	8,098	11,483
40-44	57	68	6,692	9,590
45-49	70	59	6,265	8,458
50-54	67	81	5,330	8,364
55-59	87	64	4,671	6,000
60-64	94	87	4,531	5,571
65-69	185	153	4,483	5,550
70-74	169	226	3,096	4,426
75-79	173	169	2,032	2,283
80-84	147	104	1,127	1,169
85+	101	136	519	759
Total	3,517	3,450	224,290	254,024

Births 17,070

CDR 14.57

CBR 35.69

CGR 21.12

4. REFERENCES

Cuzin-Ouattara, N., Van den Broek, A.H.A., Habluetzel, A., Diabate, A., Sanogo-Ilboudo, E., Diallo, D.A., Cousens, S.N. & Esposito, F. (1999). Wide-scale installation of insecticide-treated curtains confers high levels of protection against malaria transmission in a hyperendemic area of Burkina Faso. *Transactions of the Royal Society of Tropical Medicine and Hygiene* **93** 473-479.

Diallo DA, 1998. Do insecticide treated curtains prevent or delay child mortality ? A four year investigation in rural Burkina Faso. Master's Degree Thesis, at the London University, London School of Hygiene and Tropical Medicine, London, UK.

Diallo, D.A., Habluetzel, A., Cousens, S.N. & Esposito, F. (1996). Comparison of two methods of assessing child mortality in areas without comprehensive registration systems. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, **90**, 610-613.

Habluetzel A, Cuzin N, Diallo DA, Nebie I, Diabri-Belem S, Cousens SN & Esposito E (1999). Insecticide treated curtains reduce the prevalence and intensity of malaria infection in Burkina Faso. *Trop. Med. Int. Health*.

Habluetzel, A., Diallo, D.A., Esposito, F., Lamizana, L., Pagnoni, F., Lengeler, C., Traore, C. & Cousens, S.N. Do insecticide treated-curtains reduce all-cause child mortality in Burkina Faso? (1997). *Tropical Medicine and International Health* **2** 855-862.

Plan d'action 1998. District Sanitaire de Ziniare , 1998. Ministère de la Santé, Burkina Faso.

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