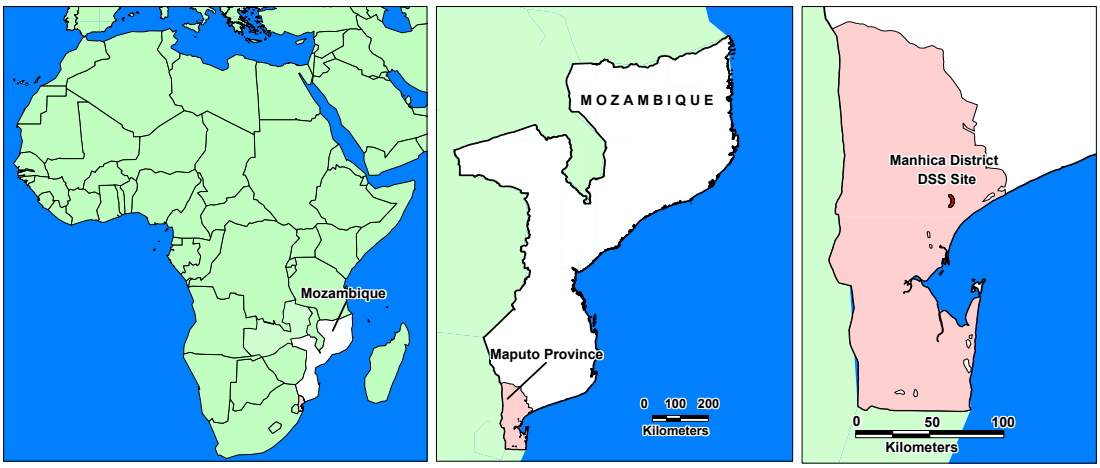
MANHIÇA DEMOGRAPHIC SURVEILLANCE SYSTEM

MOZAMBIQUE

CENTRO DE INVESTICAO EM SAUDE DE MANHICA



LOCATION OF MANHICA DSS SITE, MOZAMBIQUE, 36,000

Alonso PL, Saúte F, Aponte JJ, Gómez-Olivé FX, Nhacolo A, Thomson R, Macete E, Abacassamo F, Ventura PJ, Menéndez C, and Dgedge M.

1. MANHIÇA DSS SITE DESCRIPTION

1.1 Physical Geography of the Manhiça DSS Area

The DSS area is located in the District of Manhiça (Maputo Province) in Southern Mozambique (25º 24' south latitude, 32º 48' east longitude) and average altitude of 50 meters above mean sea level and covering an area of 100 sq km. The District has two distinct zones. The fertile lowlands comprise the flood plains of the Incomati River. This area is poorly inhabited and is subject to intensive sugar cane and fruit plantations. An escarpment of moderate height borders the river to the west and gives rise to a flat plateau, where practically the entire DSS area is situated. There are two distinct seasons. A warm season between November and April when most of the rains concentrate (annual rainfall during 1998 was 1,100 mm) and a cool and dry season during the rest of the year.

1.2 Population Characteristics of the Manhiça DSS Area

The town of Manhiça and the surrounding villages has a population of approximately 36,600 inhabitants with a population density of 360 inhabitants per sq km. The population could be characterised as peri-urban and rural. People of the area are mainly Xironga and Xichangana and their languages are often termed as Ronga and Changana. The two dominant religions are Muslim and Christians. The population of the DSS area are mostly subsistence farmers as well as workers in an agricultural co-operative that grows sugar cane, bananas and rice, and workers operating a large sugar cane processing factory. An increasing number of small traders with shops and business are sprawling along the busy road that transects the District from North to South. There are 10 Primary

Schools (6768 students and 85 teachers) and 1 Secondary School (1492 students and 32 teachers). 24% of male and 47% of female are illiterate. 66% of men and 49% of women went to primary school; 9% of men and 4% of women went to secondary school and less than 1% of both men and women have gone beyond their secondary education.

Villages in this area typically comprise a loose conglomeration of compounds separated by garden plots and grazing land. Houses are simple, with walls typically made of cane with thatched or corrugate roofs. In towns, houses are often grouped into family compounds and surrounded by grass fences. Towns grew substantially during the civil war in the 80's as displaced people looked for refuge. After the end of the war, few inhabitants returned to their original places and displaced settlements have now been integrated into towns. Some households have their own well. In some areas there are community-sustained pumps. Both wells and pumps are supervised and chlorinated regularly by the District Water and Sanitation Department. The Maputo-Beira road and the Maputo-Xai Xai railroad cross the area from North to South. With the exception of the (small) centre of Manhiça Town, where an erratic public electricity service exists, the rest of the area relies on more traditional systems for lighting.

The Health Centre of Manhiça is located in the centre of the study area. This 80-bed health facility includes a busy Outpatient Clinic, Maternity and Child Care unit which includes an EPI service and a Nutritional Service and a round the clock Emergency Room. Another smaller 10-bed health centre is located 6 km south of Manhiça village. Malaria, ARI and malnutrition remain as the most important causes of disease and death in children under 5.

Mozambique is recovering from the long period of wars which included both the independence wars against the Portuguese colonial power, as well as the more recent civil-armed conflict. The country still ranks as one of the poorest in the world with an estimated per capita income of less

than 300 USD. Although mild flooding of the alluvial plains of the rivers that cross Southern Mozambique is not uncommon, the devastation caused by the large scale floods of February 2000 seem to be unparalleled for the last 30 years.

2. MANHIÇA DSS PROCEDURES

2.1 Introduction to the MANHIÇA DSS Site

The overall objective of the Manhiça DSS site is to create a demographic platform that contributes to the research structure of the Manhiça health research centre. Its specific objectives are: 1) to describe the health profile of a rural population in Southern Mozambique that will help in identifying priority research issues and contribute to informing policy; 2) to describe in detail the epidemiology and burden of disease associated with malaria and acute respiratory infections; and 3) to create a platform that will assist in the implementation and evaluation of new control strategies.

The first census was carried out in the second half of 1996 registering a total of 33,500 inhabitants in the area. Currently the total population under surveillance is around 36,600 persons. The Demographic Surveillance System was set up in the area immediately after the first enumeration and was based in the HRS model with some modifications. Three four monthly rounds are carried out every year. During these rounds every household is visited and any vital events as well as changes of residency are recorded. Additionally two supervisors with motorbikes, supported by a large network of key community informants, record all vital events in the study area as well as maintaining a pregnancy register every week.

Vital events include all births and deaths of registered resident population in the study area. A resident is defined as any person living in the study area that will be there at least for the next three months. Should a resident leave the study area for at least three months, he or she will be considered as migrant.

The possible cause of death of all resident children age less than 15 years is investigated with the use of verbal autopsy technique. Specially trained medical students from Maputo University carry these out twice a year.

Field workers and supervisors collect all data onto pre-coded questionnaires. The researchers, through weekly spot checks of the forms carry out checks for incompleteness of information and inconsistencies. These are then transferred to the data management unit where they are recorded and issued with the unique identification serial number. Quality controlled double entry procedures are carried out on specially written Visual FoxPro programmes that run on a Windows NT network. Analysis is carried out using STATA software.

Every single household is visited and demographic events registered, namely, immigrations, emigrations, deaths, births, pregnancies, miscarriages and stillbirths. Migrations within the area are also registered and a localisation number, other than the original and permanent identification number, is given to all change of residence within the area. A number of socio-economic variables are recorded for every household including the material used to build the house, the number of constructions within the compound, the existence of a latrine and a kitchen and whether this is inside or outside the house. Finally, the level of education of all residents is recorded. a number of field surveys have been carried out to define the epidemiology of malaria. These have included both cross-sectional surveys in children, adults and pregnant women, as well as cohort studies. The DSS site is also the natural catchment population of the Manhiça District Hospital. Since late 1996 we

run a round the clock hospital surveillance system that helps identify all children attending hospital from the study area as well as characterising the morbidity patterns in this rural population.

The DSS operates under the direction of an epidemiologist and a junior demographer. A team of two supervisors and eight field workers assists them.

The Manhiça Health Research Centre researchers as well as other collaborators from the Ministry of Health and the school of Medicine, are the main users of this facility.

2.2 MANHIÇA DSS Data Collection and Processing

The selection of the site was made in early 1995. A suitable place to establish a peripheral research centre that would essentially investigate priority health issues of rural populations and with access to a District Hospital was being seeked. A necessary balance between rural populations and the logistic needs including supplies for a sophisticated research centre had to be met. The town of Manhiça and its surrounding population, only 80-km away for Maputo and with good road communications seemed like the optimum choice. Finally, the available data suggested that malaria was hyperendemic and, therefore, it was a potentially good site for further studies on malaria.

2.2.1 Field Procedures

a) Mapping

Aerial photography from the area was available at the National Cartographic Institute and was then digitized by the Catalan Cartographic Institute. The main geographic landmarks including the Incomati River, the national road and the railroad were geo-referenced. All households of the area

were systematically numerated and their position determined using GPS with differential correction. These data were then downloaded on the digitized photography. The limits of the neighbourhoods were designed on the map using the numbering of the households already positioned.

b) Initial Census

The initial census was carried out from August to October 1996. All households were numerated and every single person received a permanent identification number.

c) Regular update rounds

Update rounds are carried out in a four-monthly basis.

d) Continuous surveillance

Daily visits are carried out at both Manhiça and Maragra maternity by the two field work supervisors. Deliveries on the last 24 hours are registered. The child as well as the mother will be visited at home within the next week. The child is, then, visited weekly until the age of one month. The supervisors with the objective of collecting demographic information carry out regular fortnightly visits to the chief of the zones. Informal visits to other community key informants are done while doing the fieldwork. Verbal autopsies of all deaths occurring in children under 15 years old are carried out every six months by medical students of the Universidade Eduardo Mondlane in Maputo.

e) Supervision and Quality Control

There are two types of supervision, namely, field supervision and computer supervision. The field supervision consists on random visits to households already visited by the field worker on the last 24 hours to compare both the information collected by the supervisor and the information given by the field worker. The computer supervision consists on weekly comparisons between what the field worker wrote on the census book and the information available on the computer. Moreover, once a year there is a manual comparison between all information in the computer and the information written by the field workers on the book census.

2.2.2 Data Management and Analysis

a) Data handling

Paper processing is used for all information collected. Each paper form receives a serial number. Once the questionnaire is typed it is stored based on the type of demographic event ordered by serial number.

b) Data processing

Five working stations under an uninterruptable power supply and linked to a server are operated under a NT Windows and Windows 95 environment. Specific software written in Visual FoxPro is used for data entry and cleaning. Standardised Data Management procedures include systematic double entry of all forms by two different data clerks. Inconsistencies are listed and corrected, based on the form information. Once both entries are equal, the first entry is copied to a different folder accessible to researchers as "read only". The main server contains a mirror disk that produces

continuous back up. Moreover there is a weekly back up on to a CD. All databases are transferred to STATA for analyses.

c) Data Quality Assurance and links to the field

Data quality control is assured by weekly checks produced by Visual FoxPro. These checks produce lists of inconsistencies that later on are corrected on the field by the supervisors.

d) Data analysis and dissemination

Please add this section

3. MANHIÇA DSS BASIC OUTPUTS

3.1 Demographic Indicators Generated by the MANHIÇA DSS Site

Manhiça population size at 01/07/1999 is 35,373. Among them 3.76% are less than 1 year old, 14% are between 0-4; 26.8% are in the group 5-14; 53.4 % are in the group 15-64; and 5.9 % are 65 or plus. The age dependency ratio is 0.87. The sex ratio is 83. Total fertility rate is 5. Infant mortality rate is 78.5 per 1,000 live births. Under five-mortality rate is 130 per 1,000 children under five. Average household size is 4. 35% of household headships are female and 65% are male. 76.4% of male and 53% of female aged 15 years and over has, at least, primary school.

Out-migration and immigrations are registered as well as the destination and origin of this migration. When the migration is done within the study area the person receives a localisation

number related to the new house where he or she is going to live. In the case of a new immigration he or she will receive an identification number. In the case of a re-immigration of a former inhabitant of the area he or she will receive a localisation number, as the identification number is permanent.

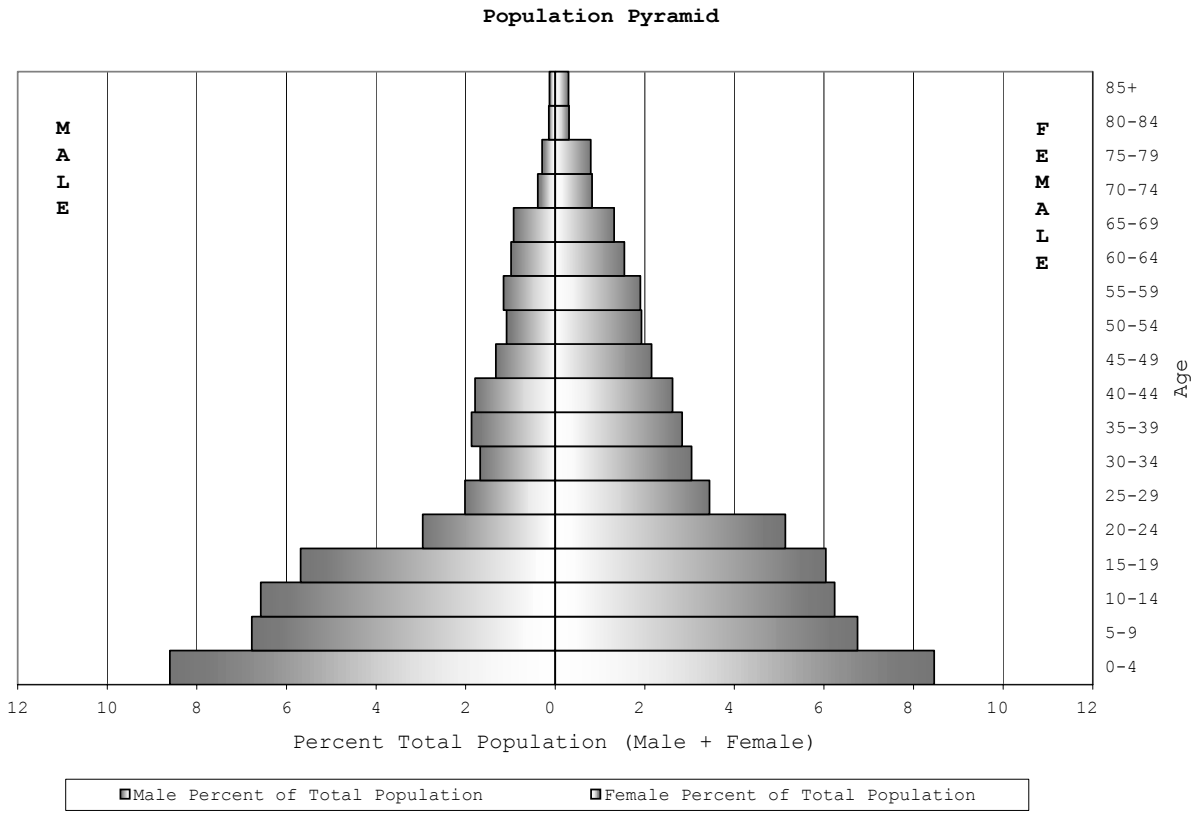


Figure 1. Population pyramid for the Manhica DSS site

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

Age	Deaths (nDx)		Person Years (nPYx)	
	Male	Female	Male	Female
0	119	77	1,308	1,247
1-4	81	70	4,486	4,450
5-9	11	15	4,561	4,547
10-14	12	6	4,429	4,201
15-19	12	11	3,828	4,068
20-24	6	23	1,991	3,460
25-29	13	17	1,357	2,321
30-34	25	15	1,128	2,050
35-39	22	9	1,257	1,908
40-44	30	11	1,204	1,765
45-49	17	17	893	1,449
50-54	20	16	730	1,298
55-59	32	34	777	1,279
60-64	26	25	664	1,041
65-69	27	20	627	885
70-74	14	28	262	554
75-79	15	32	199	532
80-84	9	17	94	207
85+	17	22	85	202
Total	508	465	29,880	37,464

Births	2,698
CDR	14.45
CBR	40.06
CGR	25.61

Table 2. Age Specific Fertility Rates

Age group	Females	Births	Age-specific fertility rate
15 - 19	1975	281	0.711
20 - 24	1648	373	1.132
25 - 29	1122	244	1.087
30 - 34	1001	188	0.939
35 - 39	924	138	0.747
40 - 44	854	46	0.269
45 - 50	705	10	0.071

Total fertility rate: 5
Data from 1998.

4. REFERENCES

5. ACKNOWLEDGEMENTS

The Spanish Agency for International Co-operation (AECI) funds the running costs of the CISM. During 1999 different studies were funded by 13 different sources including among others WHO, UNICEF, INDEPTH, Fundacio Clinic, MISAU, UEM. The CISM is the first peripheral research centre of the Mozambican Ministry of Health. It is being developed under the premises of the Co-operation Programme between Mozambique and Spain. A collaborative agreement, further developed between the Ministry of Health, the Maputo School of Medicine (Universidade Eduardo Mondlane) and the Hospital Clinic (Universidade de Barcelona, Spain), ensures the running of the centre.