INDEPTH Network

Manhiça Health Research Centre

(Manhiça HDSS)

Site Profile

2013
**Brief Introduction to Manhiça HDSS**

The Manhiça Health Research Centre (Centro de Investigação em Saúde de Manhiça, CISM) was established in 1996 as part of a joint collaborative program between the governments of Spain and Mozambique to promote and conduct biomedical research in those diseases representing a major morbidity and mortality burden for the local population (malaria, tuberculosis, HIV/AIDS, and bacterial disease), targeting primarily the two most vulnerable population groups, namely children under the age of five and pregnant women. In 2008 the Centre has been fully managed by the Manhiça Foundation, a Mozambican foundation of public interest (www.manhica.org).

<table>
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<th><strong>Mission:</strong></th>
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<td>The mission of CISM is to conduct biomedical research in health priority areas to promote and safeguard the health of the population</td>
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<th><strong>Vision:</strong></th>
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<td>The vision is to become a center of excellence in biomedical research and in generation of evidence to guide public health policy in Mozambique and the rest of the world.</td>
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<th><strong>Values:</strong></th>
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<td>Excellence, Ethics and Humanity</td>
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**Figure 1.** Manhiça HDSS
The Demographic Surveillance Area

Manhiça Demographic Surveillance Area (DSA) covers about 1/5 (about 500 km²) of the Manhiça District area, covering areas like Maciana and Maragra in the Southern part of the study area, Manhiça town (Manhiça Municipality) in the Centre; Malavela, Palmeira, Taninga and Ilha Josina Machel in the Northern part. Figure 1 shows the front part of the Centre and figure 2 shows the location of DSA in Manhiça district. Excluding a small part of the central area (Manhiça town) where the population is peri-urban, the majority of the population in the study area is rural. Most of them are engaged in subsistence farming, some as labourers in sugar cane plantations and others in sugary refinery companies and other companies that produce banana and rice.

![Figure 2. Location of study area of Manhiça HDSS](image)

The current population of the study area is 92,000 individuals, living in approximately 20,000 households (figure 3). Excluding in small parts of the study area like for example Manhiça town and Maragra where the population is per-urban, generally the settlements are characterized by loose conglomeration of compounds separated by garden plots and grazing land. Manhiça DSA comprises 6 health facilities with 24 hours emergency services, including the principal hospital of the district, the District Hospital of Manhiça. The district hospital has
laboratory and x-ray facilities and runs out and inpatient services, maternity, paediatric care, surgery, nutritional service and others.

![Manhiça HDSS population pyramid in 2011](image)

**Figure 3:** Manhiça HDSS population pyramid in 2011

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**Data collection process and data collected in Manhiça HDSS**

Since 1996 Manhiça HDSS has been running two powerful platforms that collect prospectively demographic information in the households and morbidity information in the 6 health facilities within the DSA. The demographic platform has changed from data collect in paper forms to data collected using electronic devices since 2012. With the funds received from INESS project, CISM was able to develop a Mobile Biometrics System to automate the DSS processes. The automation processes was implemented to eliminate paper forms or reduce the proliferation of paper forms and also will allows identifying people using biometric data. Figure 4 shows the demographic collection procedures of Manhiça HDSS.

Demographic histories of individuals including details of births, deaths, maternal data, migrations, pregnancies, household characteristics and assets were collected since 1996. The new paper-free system deployed in 2012 allowed collection of more socio-demographic variables. The new data capture is implemented on advanced PDAs (Cogent Mobile Ident 3 using Microsoft Net Visual Basic™ forms and a SQLite database, which feeds a central data warehouse based in MySQL™ version 5.1.
Morbidity surveillance is routinely conducted among all children less than 15 years old visiting the outpatient consultation and inpatient clinics in the study area. Clinical data, including medical history, physical examination, routine laboratory basic data, ICD-10 based diagnosis, outcome and medication prescribed) are collected daily. To guarantee identification of HDSS children the Permanent Identification Number is copied from a special HDSS card carried by all children. Data archiving relies on an application built in Microsoft FoxPro™ version 5 covering a range of specific forms with validation rules, alerts and error reporting lists.
admitted to the hospital are stored in the centralised databases, similarly with other study-specific laboratory data (molecular biology, immunology, etc).

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**Figure 7.** Lab senior staff of Manhiça HDSS

To accommodate specific needs from the studies, progressively paper forms are being substituted by paper-free methodologies involving mobile phones and scanned documents for archiving. Three software packages are currently used: (i) OpenClinica®, (ii) Data Management for Field Trials Software (DMFTT2) - an in-house application based on Microsoft Fox Pro™; and (iii) OpenDataKit (ODK) mobile applications. All of them allow the introduction of study-specific validation rules to leverage the different required study checks.

**Priority Research Areas**

The priority research area of Manhiça HDSS are: Malaria, HIV/AIDS, Tuberculosis, Diarrheal Diseases and Pneumonias and Invasive Bacterial Disease. See top raw of the research activities related with the research areas which is presented in horizontal lines, (figure 8).
Findings

During the past 16 years Manhiça have noted very important changes in the mortality patterns in this community where child mortality rates have dropped by about 50%, (figure 9). The top five causes of death according to verbal autopsy data, among children <5 years of age are: malaria (21.8%), pneumonia (9.8%), HIV/AIDS (8.3%), diarrhoeal diseases (8.0%) and malnutrition (6.4%).
Conversely, adult mortality not only has not decreased, but seems to be increasing particularly among men where the rates are double those of females, (figure 10). The HIV/AIDS pandemic and its high associated TB co-morbidity seem to have played a major role in these trends.

Figure 9. Under five mortality in Manhiça HDSS (1997-2011)

Figure 10. Adult mortality in Manhiça HDSS (1997-2011)
Data for morbidity surveillance from the past 6 years (Figure 11) reveals an increase in the total number of out-patient visits, ranging from about 60,000 patients annually in 2006 to 80,000 in 2011. In contrast, there is an overall reduction in hospital admissions, despite some fluctuations observed over the years. The highest peak in hospital admission was observed in 2006 with about 3500 cases, and the lowest point was in 2010 (about 2250 cases), mainly driven by decreasing malaria incidence rates in the area. Indeed, an upscale of malaria control tools in the past decade has probably contributed to the observed decrease in malaria transmission, which reduced the number of overall malaria cases and has contributed to emptying some of the hitherto very busy wards at Manhiça District Hospital MDH. Other major causes of paediatric morbidity in Manhiça such as pneumonia, diarrhoea, HIV/AIDS and neonatal conditions have remained relatively constant.

**Figure 11.** Out patient and inpatients visits in Manhiça HDSS for children <15 years
KEY PUBLICATIONS (2012 and 2013)


FUNDERS
Core funding:

- Spanish Agency for International Cooperation and development (AECID)
- Ministry of Health, Mozambique
- Fundació Clinic - University of Barcelona

Other funding bodies:

- Africa Viva Fundación
- Agència Catalana de Cooperació al Desenvolupament (ACCD)
- Bill & Melinda Gates Foundation
- European and Developing Countries Clinical Trials Partnership (EDCTP)
- Fondo de Investigación Sanitaria (FIS), Instituto de Salud Carlos III
- Fundació “la Caixa”
- GlaxoSmithKline Biologicals
- International Union Against Tuberculosis and Lung Disease
- Malaria Clinical Trials Alliance (MCTA)
- World Health Organization (WHO)
- PATH Malaria Vaccine Initiative (MVI)
- Pathfinder International
- PneumoADIP
- The Hib Initiative
- European Union
- International Network of Field Sites with Continuous Demographic Evaluation of Populations – INDEPTH (Ghana)

COLLABORATORS

- Aeras Global TB Vaccine Foundation (USA)
- Africa Centre for Health and Population Studies (South Africa)
- Medical Research Unit Albert Schweitzer Hospital (Gabon)
- Center for Vaccine Development, University of Maryland School of Medicine (USA)
- Centers for Disease Control and Prevention – CDC (USA)
- Centre de Recerca en Salut Internacional de Barcelona – CRESIB (Spain)
- Centre for Poverty-Related Communicable Diseases (Holland)
- Centre Hospitalier Universitaire Vaudois, Division of Immunology and Allergy (Switzerland)
- Contract Laboratory Services – CLS (South Africa)
- Direcção Provincial de Saúde de Maputo – DPS (Mozambique)
- Division of Infectious Diseases, University of Colorado Health Sciences Center (USA)
- EuroVacc Foundation (Switzerland)
- Fundação para o Desenvolvimento da Comunidade – FDC (Mozambique)
- GlaxoSmithKline Biologicals (Belgium)
- HIV Prevention Research Unit, Medical Research Council South Africa (South Africa)
- Hospital Central de Maputo (Mozambique)
- Ministério da Ciência e Tecnologia
- Hospital Clínic (Spain)
- Ifakara Health Institute (Tanzania)
- Imperial College London (United Kingdom)
- Institute for Medical Microbiology and Hygiene, Universität Regensburg (Germany)
- Institute of Tropical Medicine Antwerp (Belgium)
- Instituto Nacional de Estadística – INE (Mozambique)
- Instituto Nacional de Saúde – INS (Mozambique)
- Instituto Superior de Ciências de Saúde – ISCISA (Mozambique)
- International Center for Genetic Engineering and Biotechnology (India)
- International Network of Field Sites with Continuous Demographic Evaluation of Populations – INDEPTH (Ghana)
- International Partnership for Microbicides (USA)
- Johns Hopkins Bloomberg School of Public Health (USA)
- CDC/Kenya Medical Research Institute – KEMRI (Kenya)
- KNCV Tuberculosis Foundation