Epidemiology

E. Fox, E.A. Abbatte, H.H. Wassef, & J.N. Woody

A partnership in epidemiological research

Four medical research teams completed ten epidemiological investigations in Djibouti and thus provided the country’s Ministry of Health with valuable information on infectious disease risks. A major factor contributing to the success of the work was the high degree of cooperation between the Ministry, a United States naval medical research unit, and the World Health Organization as coordinator.

Djibouti, a small country in the Horn of Africa, shares borders with Ethiopia in the north and west and with Somalia in the south. Two-thirds of its population live in the capital.

In 1977 the government decided to develop health service based on primary care.

Dr Fox was Staff Epidemiologist at the United States Naval Medical Research Unit No. 3, Cairo, Egypt, and Research Assistant Professor in the International Health Program at the University of Maryland School of Medicine; the Unit’s postal address is the Fleet Post Office, New York, NY 09527-1600, USA; Dr Fox’s current address is c/o the WHO Representative, B.P. 1324, Kigali, Rwanda. Dr Abbatte is Technical Director of Health at the Ministry of Health, Djibouti; Dr Wassef is Medical Officer, Office of International Cooperation, World Health Organization, 1211 Geneva 27, Switzerland; and Dr Woody is Commanding Officer at the Naval Medical Research and Development Command, Bethesda, MD, USA. The views expressed in this article are the responsibility of the authors and do not reflect those of the Djibouti Ministry of Health, WHO, or the Navy Department, Department of Defence, or Government of the USA.

There was a deficiency of baseline data on common and epidemiologically important infectious diseases, and this became critical during the mid-1980s in connection with the AIDS epidemic. Technical assistance was sought from the United States Naval Medical Research Unit No. 3 in Cairo, a WHO Collaborating Centre on AIDS, so that epidemiological work could be carried out as a preliminary to planning a national AIDS control programme.

Planning and organization

A first set of projects was discussed by the Ministry of Health, the Unit, and WHO. A preliminary HIV survey was planned, and it was then decided to expand the work so as to obtain epidemiological information on as many infectious disease risks as possible. The roles and obligations of each party were agreed. For example, the Ministry was to
nominate a national physician as local contact and coordinator, provide a car and driver during the whole study period as well as space for a multidisciplinary field laboratory and storage of research materials, including frozen items. The Unit agreed to transport equipment and supplies from Cairo to Djibouti, provide scientific and technical personnel, train national technicians in the laboratory diagnosis of HIV infection and viral hepatitis, and train field teams in

Epidemiological research can be an important tool for strengthening the managerial process in national health development.

epidemiological and entomological research methods. The Ministry and the Unit agreed that the results would be accessible to both parties at all times and that reports and manuscripts would require joint approval. The local WHO office in Djibouti undertook to act as overall mission coordinator.

The first research team from the Unit left Cairo in September 1987 and worked in Djibouti for a month. Three additional visits were made over the next 17 months, each lasting between two and five weeks. Equipment weighing 500–1000 kg was sent from Cairo to Djibouti by air for each visit. It included medical items, test kits, data-processing material, an incubator, a centrifuge, a rotator, a water-bath, an ELISA reader, an autoclave, a microscope and computer hardware. The provision of advanced laboratory facilities allowed sophisticated assays to be performed. The available space was divided into sections for blood separation, serological studies, and bacteriology.

Local teams were trained to perform interviews and collect epidemiological data. National technicians were instructed in the laboratory diagnosis of HIV infection: they were taught the ELISA and Western blot techniques and were introduced to other rapid HIV testing procedures.

Epidemiological and laboratory results were entered daily into computerized files and analysed in Djibouti. On the last day of each visit a computer-generated preliminary report was presented to the Ministry and the local WHO officials. At the end of the projects the heavy equipment and unused perishable items were returned to Cairo for use by the Unit’s teams in other countries. The staff of the Unit advised national technicians on establishing their own laboratories. The equipment needed for these was funded from other sources, except for an ELISA Quantum II reader system, supplied by Abbott Laboratories of Chicago. This donation allowed national staff to continue HIV testing.

Fourteen of the Unit’s scientists and technicians spent 70 person-weeks working in excellent conditions on ten research projects. Approximately US$ 100 000 were required for air fares, subsistence allowances, air freight and miscellaneous expenses. An additional US$ 60 000 were spent on test kits, reagents and perishable laboratory materials. Heavy equipment is not included in these estimates, since it was returned to Cairo on completion of the work. The entire cost of the projects was met by the United States Naval Medical Research and Development Command.

Achievements

The research projects dealt with the following areas:

— HIV prevalence and incidence in populations at risk;
### Infectious diseases in Djibouti

<table>
<thead>
<tr>
<th>Disease or causal agent</th>
<th>Data before investigation</th>
<th>Study findings</th>
<th>Public health implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV-1</td>
<td>None</td>
<td>Prevalence and incidence in high-risk groups</td>
<td>Planning of AIDS control programme</td>
</tr>
<tr>
<td>HIV-2</td>
<td>None</td>
<td>Presence and prevalence</td>
<td>Planning of vaccination in newborns</td>
</tr>
<tr>
<td>HBV</td>
<td>Few</td>
<td>Prevalence according to age and ethnic groups</td>
<td></td>
</tr>
<tr>
<td>HAV</td>
<td>Few</td>
<td>Prevalence</td>
<td></td>
</tr>
<tr>
<td>HDV</td>
<td>None</td>
<td>Prevalence in ethnic groups</td>
<td></td>
</tr>
<tr>
<td>HTLV-I&lt;sup&gt;a&lt;/sup&gt;</td>
<td>None</td>
<td>Prevalence in high-risk groups</td>
<td></td>
</tr>
<tr>
<td>HHV-6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>None</td>
<td>Prevalence in general population</td>
<td></td>
</tr>
<tr>
<td>STD</td>
<td>Few</td>
<td>First data on knowledge, attitudes and practice</td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>Few</td>
<td>Prevalence in promiscuous individuals</td>
<td>Design of control programmes for sexually transmitted diseases</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>Few</td>
<td>Antibiotic susceptibility</td>
<td>Recommendations for drug treatment and diagnosis</td>
</tr>
<tr>
<td>Arboviruses</td>
<td>None</td>
<td>Absence of antibodies</td>
<td>Absence of current risk</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>Few</td>
<td>Types of pathogens and drug susceptibility</td>
<td>Diarrhoea control programme and treatment recommendations</td>
</tr>
<tr>
<td>Malaria</td>
<td>Few</td>
<td>Epidemiology</td>
<td>Control and surveillance</td>
</tr>
<tr>
<td>Sandflies</td>
<td>Some</td>
<td>Presence of <em>Leishmania</em> vectors</td>
<td>Alert and surveillance</td>
</tr>
</tbody>
</table>

<sup>a</sup> Abreviations used: HIV, human immunodeficiency virus; HBV, hepatitis virus type B; HAV, hepatitis virus type A; HDV, hepatitis delta agent; HTLV-I, human T-cell leukaemia virus type I; HHV-6, human herpesvirus type 6; STD, sexually transmitted diseases.

<sup>b</sup> Unknown in Djibouti before present study.

---

- comparative performance of various HIV screening assays, and systematic follow-up of indeterminate HIV serologies;
- prevalence of HTLV-I and HHV-6 in populations at risk;
- knowledge, attitudes, beliefs and practices pertinent to sexually transmitted diseases;
- prevalence of viral hepatitis markers (HAV, HBV, HDV);
- prevalence of arboviral infections, with particular reference to haemorrhagic fever viruses;
- sexually transmitted diseases, especially syphilis and gonorrhoea, and drug susceptibility of *Neisseria gonorrhoeae*;
- nature and drug susceptibility of microbial pathogens associated with infectious diarrhoea;
- epidemiology of malaria;
- ecology of sandflies in relation to human leishmaniasis.

All these projects were successfully completed. The majority of results had important operational implications (see table). The Ministry was able to present a comprehensive report on the epidemiological status of infectious diseases in Djibouti at an intercountry meeting in 1989. Seven presentations were made at international medical conferences, and 17 scientific papers have been published in nine international journals.

Valuable epidemiological data were collected during the short time spent in Djibouti. The costs in money and manpower seem reasonable when considered against the benefits generated and the operational implications. The data were utilized...
immediately in policy-making and the planning of disease control measures. As the results of each project became available, priorities were set for tackling the major public health problems identified, and preventive measures or control plans were discussed. Four weeks after completion of the initial HIV prevalence survey, a team from the WHO Global Programme on AIDS visited the country and, with the Ministry, developed a proposal for controlling the AIDS epidemic which was based entirely on the preliminary report of the Unit’s first visit.

The broad success of the investigations was largely attributable to the high degree of cooperation and coordination achieved between the three organizations involved. The Ministry was interested in the rapid generation of reliable information for policy-making and the planning of control measures in connection with diseases of public health importance. The Unit’s purpose was to assess infectious disease risks; as a WHO Collaborating Centre on AIDS, it is committed to providing technical resources and expertise for the Member States of WHO in the Eastern Mediterranean Region. WHO aims to assist national health authorities, partly through strengthening the training of nationals and improving local research capabilities. The coordinating role of the national and regional WHO offices was a key factor in the success of the projects.

The results allowed the Ministry to increase its ability to base decisions on solid scientific argument. National research capacities were strengthened, thus allowing the realization of further field research and surveillance programmes relating to AIDS, malaria, leishmaniasis, and other diseases. Local teams were stimulated to apply their newly acquired knowledge when undertaking additional epidemiological surveys. The Unit fulfilled its assignment of obtaining baseline epidemiological data for the Ministry. In the future, the Unit will assist the Ministry and WHO on a different level and in a more supportive capacity. It is anticipated that the Unit will serve as a consultant research agency for the Ministry and address precise public health issues. It will respond to enquiries from the Ministry and help to solve epidemiological problems needing quick operational solutions.

* * *

We think the success of the projects indicates the usefulness of epidemiological research, which can complement programmes of technical assistance in public health. Such research can be an important tool for strengthening the managerial process in national health development by enabling health planning activities to be based on correct epidemiological information, and by providing guidance for the reassessment of priorities. We invite public health administrators in other tropical countries who may be interested in generating similar epidemiological data to consider our experience in Djibouti. The type of research we performed seems essential if action for health is to be improved.

Acknowledgements

We thank the many people in Djibouti and Egypt who helped to assure the success of the projects, in particular Mr Waguui Sidrak, Mr Adel Mohamed, Dr Mohamed Wahdan, Dr Niel Constantine, Dr David Fryauff, Dr Richard Haberberger, Dr Isis Mikhail, Dr William Youshunis, Dr Said Salah, Dr Ahmed Mohamed, Dr Mohamed Goulan, Dr Guénaël Rodier, Dr Dominique Polycarpe, Dr Philippe Asselin and Dr Christian Bailly. Dr Jim Olson gave invaluable support during the preparation of the manuscript. The studies were supported by Unit No. 3M463105.H 29.AA.335 of the U.S. Naval Medical Research and Development Command, Naval Medical Command, National Capital Region, Bethesda, MD, USA.