



Malaria Control in Eritrea

No. 8
November 2002

Background

Eritrea lies along the Red Sea coast in the Horn of Africa, at the northernmost limit of malaria transmission in the region. About two-thirds of its 3.5 million people live in malaria endemic or epidemic-prone areas, and malaria accounts for approximately 30% of clinic visits and hospital admissions.



Two girls in Foro, one of the villages visited in the national malaria prevalence survey

Eritrea has made a strong commitment to malaria control. The National Malaria Control Program (NMCP) is implementing a Five Year Plan with technical and financial support from Roll Back Malaria (RBM) partners, including WHO, the World Bank and USAID. The NMCP has earned recognition for its success in increasing the availability of insecticide-treated bednets, revising policy to assure the use of effective antimalarial drugs, and regularly evaluating its progress using standardized indicators.

With funding from USAID/Eritrea, EHP is helping the NMCP strengthen its vector control

program, surveillance systems and operations research capacity.

Highlights

Operations Research. The NMCP has completed three essential baseline studies: a national survey of malaria prevalence; a national survey of the distribution of *Anopheles* mosquitoes; and a longitudinal study of the larval ecology and biting and resting behaviors of *Anopheles arabiensis*, shown to be the local malaria vector. The NMCP also is planning several studies of relevant human behavior, including bednet use, time/activity patterns for exposure to mosquito bites and health care practices.

Vector Control. Much of Eritrea is arid; hence, the number of mosquito breeding sites is limited and their locations are predictable. Effective control of breeding sites could substantially reduce malaria transmission. The NMCP has used environmental management and chemical larvicides to control breeding sites. With EHP support, they are examining how these practices can be improved.

Efficacy trials. The NMCP performed field trials to validate the effectiveness of two bacterial larvicides, *Bacillus thuringiensis* var. *israelensis* (Bti) and *Bacillus sphaericus* (Bs), to determine the rate, frequency and mode of application that will be most effective for routine use and to verify that these compounds do not have adverse effects on non-target species.

Village Pilot Program. Results from the field trials were used to design a pilot program for routine larval control operations in four villages. Local staff map mosquito breeding sites within



1 km of each village, check all sites weekly and apply one of the larvicides whenever mosquito larvae are present. Early results indicate these measures are reducing the abundance of adult *Anopheles* mosquitoes compared to control villages.

Surveillance. EHP is helping the NMCP develop sentinel sites for malaria surveillance and extend its surveillance program to gather key data on climate and vector populations.

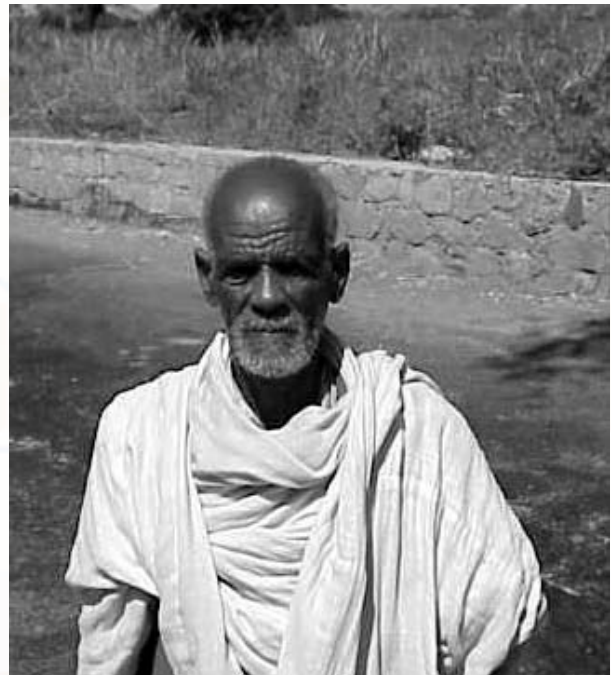
Malaria risk stratification. Understanding the geographic distribution of malaria risk helps national program managers select the best locations for sentinel surveillance sites. It also helps local staff focus their preparation on areas with the highest risk. EHP is analyzing data from the malaria prevalence and vector surveys to prepare maps of malaria risk stratification. A first version of the national map is available. Zonal-level maps will be ready early in 2003.

Epidemic forecasts. EHP is developing models for relating malaria transmission to specific ecological and climatic conditions in Eritrea. These will be used with regional climate forecasts to estimate the risk of malaria epidemics in the upcoming season, beginning in 2003.

Ongoing surveillance. EHP is helping define surveillance protocols for a network of sentinel sites being developed by the NMCP with World Bank funding. The NMCP is refining procedures for routine surveillance of rainfall, breeding sites and mosquito abundance, to detect when conditions arise that promote the rapid expansion of vector populations, when control program staff should be especially vigilant in monitoring for malaria outbreaks.

Other assistance. EHP has helped the Eritrea Ministry of Health prepare and teach a two-year curriculum for a new cadre of public health technicians, the first of whom will become available for service in 2004. Also, EHP helped

analyze data from clinical trials conducted by the NMCP to monitor the efficacy of antimalarial drugs, contributing to a dialogue that resulted in changing the first-line treatment protocol for malaria cases.



An elderly "oiler" responsible for finding and treating mosquito breeding sites on a citrus plantation in Anseba

Partnerships

Collaboration is one of EHP's core strategies. In the Eritrea program, EHP works closely with the following organizational partners:

- International Centre for Insect Physiology and Ecology, Nairobi
- International Research Institute for Climate Prediction, New York
- WHO Regional Office for Africa, Harare
- The World Bank HAMSET Project

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