COMMUNITY-BASED CONTROL OF *AEDES AEGYPTI* IN THE AMERICAS

by

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PROGRAMME DEVELOPMENT

In 1987, the Rockefeller Foundation convened a meeting of vector-control specialists at Parson's Island, Maryland, USA, to discuss the current options for Aedes aegypti and dengue control in the Americas. Results from Puerto Rico were reviewed, where well-controlled trials had shown that neither aerial or ground-applied ULV (Ultra-Low Volume) nor ground-applied thermal fog application of insecticides significantly reduced the adult mosquito population. Vertically-organized programmes to control mosquito breeding sites, such as old tyres and water storage containers, were thought to be feasible only in countries with highly centralized power and access to large amounts of funding. Community-based programmes to control mosquito breeding sites on the other hand, while attractive in theory, had not been developed to the point where there was a practical alternative to other methodologies.

One outcome of the Parson's Island meeting was the design of a multi-year collaborative programme between Johns Hopkins University, Baltimore, USA, and San Juan Laboratories, Centers for Disease Control in San Juan, Puerto Rico, to conduct applied social science research to develop and test community-based Aedes aegypti control programmes, and to train national Aedes aegypti control teams to carry out much of the field research, and eventually assume leadership roles in dengue control programmes with their respective health ministries. The programme is funded by the Rockefeller Foundation.

YEAR ONE ACTIVITIES

The Ministries of Health of Mexico and Honduras both formed national dengue control teams. The two teams enrolled in the Johns Hopkins University

School of Hygiene and Public Health in Baltimore, USA, in September 1988 in a Master's programme in Aedes aegypti control. The programme included a course on the entomology of Aedes aegypti, a course on the role of applied social science research in Aedes aegypti control as well as a wide range of other public health courses.

To launch the research, a workshop entitled "Dengue Control: The Challenge to the Social Sciences" was held from 20 to 22 October 1988 in the auditorium of International House. Social scientists and vector control experts from the United States, Mexico, Honduras, Brazil and Australia were invited to attend this multidisciplinary meeting. The aims of the workshop were to produce a clear statement of the social science research questions in Aedes aegypti control, the most effective methodologial approaches, and a commitment on the part of some of the participants to carry out the research. A report has been produced on the workshop, and can be obtained by writing to Dr Carl Kendall.

Field sites were set up in Merida, Yucatan, Mexico and in El Progreso, Yoro, Honduras.

Merida is a city of 600 000 people in the flat, semi-arid Yucatan peninsula. Mayan is widely spoken in rural areas, but Spanish is the dominant language in the city. Malaria has never been a significant disease in or around the city, perhaps due to the high porosity of the soils. A well-organized vertically-oriented vector control programme exists which uses both truck-mounted ULV spraying and periodic clean-up campaigns. Cases of DHF occurred during the course of a large dengue epidemic caused by Dengue 4 in 1984.

El Progreso is a city of 60 000 with both urban and rural characteristics. Malaria is a significant problem both within the city and in the surrounding rural areas. Although preliminary data indicate that dengue fever is common, DHF has not been documented.

The immediate objective of the research programme is to develop and test effective Aedes aegypti control strategies utilizing multi-disciplinary and innovative approaches and involving local researchers. A further objective will be to convince governments to use the control strategies that result from this research as models for national Aedes aegypti control programme.

The first year research consisted of gathering baseline data. Ethnographic studies were conducted to explore ethnoclassifications of insects and febrile illnesses, beliefs regarding the transmission of dengue and malaria, and to learn what health problems people felt were priorities. In El Progreso, where no baseline data were available, epidemiological and entomological studies were also conducted.

YEAR TWO ACTIVITIES: PUERTO RICO

In July and August, 1989 a course was held at the San Juan Laboratories, Dengue Branch, CDC, on field techniques in entomology and social sciences for use in Aedes aegypti control programmes. Persons attending the course included field staff of the Ministry of Health from Mexico and Honduras and members of the national teams from Mexico and Honduras.

The national teams from Mexico and Honduras will have two further activities in Puerto Rico before they return to their countries in July 1990. The Mexican team will be in the city of Ponce, and the Honduran team in the city of Caguas.

Ponce and Caguas are the second and third largest cities in Puerto Rico. Although the budget for vector control is many times higher than in Mexico and Honduras, dengue transmission continues and cases of dengue haemorrhagic fever occur each year on the island. No malaria transmission occurs in Puerto Rico.

One component of the dengue control programme in Puerto Rico, which is a joint effort of the Puerto Rico Health Department, the Rotary Club of Puerto Rico and San Juan Laboratories, has been the development of a dengue control activity book for students, and a teacher's guide. Directed towards students in the fourth, fifth and sixth grades, it is planned to incorporate the book into the curriculum of the Puerto Rico school system. From September 1989 to January 1990, the Honduran and Mexican teams, working closely with the staff of the Puerto Rico Health Department, will be implementing and evaluating this programme in selected schools in Caguas and Ponce. The evaluation will include the measurement of larval indices, structured questionnaires, focus groups and unstructured interviews.

The second activity in Caguas and Ponce will be the design, implementation and evaluation of small-scale, community-based Aedes aegypti control programmes, based on experience with the school programme and the results of interviews, questionnaires and larval surveys.

YEAR TWO ACTIVITIES: MEXICO AND HONDURAS

One or more interventions in the areas of community participation and health education will be subjected to small-scale controlled trials in different neighbourhoods of El Progeso and Merida. A questionnaire based on the results of the initial ethnographic studies will be administered before, half-way through and after the intervention. Entomological indices such as house, container and Breteau will also be determined before, during and after the intervention. The form of the entomological indices may need to be modified according to which breeding sites are found to be most important during the baseline studies. Operational expenses will be calculated throughout the intervention in order to be able to make an estimation of cost-effectiveness at a later date. Results of these small-scale interventions will be carefully evaluated, and will be available to the Honduran and Mexican teams for the design of their interventions in the third year. The activities in Honduras are being funded jointly by the Rockefeller Foundation and Pan-American Health Organization.

YEAR THREE ACTIVITIES

The Mexican and Honduran teams will move to Merida and El Progreso in July, 1990. They will implement larger-scale community-based Aedes aegypti control programmes based on their experiences in Puerto Rico and the previous research at the sites.