pass all members of groups at increased risk for AIDS, even though it includes many individuals who may be at little risk of transmitting AIDS.

As long as the cause remains unknown, the ability to understand the natural history of AIDS and to undertake preventive measures is somewhat compromised. However, the above recommendations are prudent measures that should reduce the risk of acquiring and transmitting AIDS.

(*Source:* Thomas C. Quinn, M.D., Senior Investigator, National Institutes of Allergy and Infectious Diseases, National Institutes of Health (USA), and MMWR32 (8): 102-103, March 1983.)

The Cuban *Aedes aegypti* Campaign: a Year Later

The *Epidemiological Bulletin* Vol. 3, No. 1 (1982) reported on the program for dengue elimination and *Aedes aegypti* eradication following the 1981 epidemic of dengue when 344,203 cases and 158 deaths were reported in Cuba. Dengue was declared eliminated from Cuba on 16 November 1981 and, at that time, the premises index had been reduced from 35 and greater before the epidemic to 0.09.

On 5 October 1981 the consolidation phase of the eradication program began. The initial strategy was to do treatment cycles at two month intervals and verification cycles every one or two months depending on the area. During November 1982, a team from PAHO accompanied staff from the National *Aedes aegypti* Eradication Program to several areas in Cuba where statistical information of the first year of the consolidation phase was analyzed.

The technical information obtained from the intensive control measures that are being directed against *A. aegypti* in Cuba and the flexibility to combat technical difficulties inherent in many programs have prompted a follow-up of the original report. The information presented may guide other member countries in seeking solutions for some of their control problems.

The program completed seven cycles on 11 December 1982. Table 1 gives the cycle schedule, number of positive premises, and the premises index. As anticipated, the index did not vary greatly between cycles due to the fact that it is fairly easy to bring about a rapid reduction when the index is high but as the index of infestation approaches zero, the expenditure of effort greatly increases. Consequently, without increases in staff and supplies, any campaign may expect a static period before eradication is completed. Considering that the Cuban campaign is only 16 months old and covers approximately 2.5 million houses, the progress is remarkable.

Several factors account for the continued presence of positive premises despite the intensity of the campaign. By the third cycle, it was evident that the problem of control had shifted from an urban to a rural environment (Table 2). At the same time it became necessary to place a greater priority on treatment of schools, factories, and other nonresidential structures. Rural and industrial areas were identified as a cause for continued positivity at the beginning of the rainy season. Rains caused an increase of natural containers (tree holes, bamboo, coconut shells, etc.) serving as *A. aegypti* breeding sites and aggravated logistical problems because of dispersed premises in treatment and evaluation. Despite the logistical problem, the cycle schedule was maintained and in some risk areas, the number of evaluations actually increased.

Closed houses, a problem in many programs, has not caused concern in Cuba. The goal of 100 per cent coverage was almost met in every cycle. For example, only 0.9 per cent of the houses were closed in the second cycle, 0.2 per cent in the third, 0.3 per cent in the fourth, and

Table 1. Premises found positive for *Aedes aegypti* and premises index, by treatment cycle, Cuba, 1982.

Cycle	Dates	Number of positive premises	Premises index
1	5 Oct. -12 Dec. 1981	504	0.020
2	14 Dec. -23 Jan. 1982	294	0.013
3	25 Jan. -20 Mar. 1982	501	0.019
4	22 Mar. -22 May 1982	497	0.020
5	24 May - 6 Aug. 1982	470	0.018
6	16 Aug. -16 Oct. 1982	298	0.012
7*	18 Oct. -11 Dec. 1982	117	0.005

* Data incomplete.

Table 2. Urban/rural distribution of premises found positive for *Aedes aegypti* in cycles 3 and 4, Cuba, 1982.

Positive premises	Cycle 3	Cycle 4
Total premises positive	501	497
Rural premises positive	344	299
Percentage of total positive premises that are rural	68.7	60.2
Urban premises positive	93	90
Percentage of total positive premises that are urban	18.6	18.1
Nonresidential premises positive*	64	108
Percentage of total positive premises that are nonresidential	12.7	21.7

*Factories, schools, etc.

Table 3. Distribution of breeding sites, by container, cycles 1-4, Cuba, 1982.

Type of container	Number positive	Percentage
Low level water tanks	743	30
Tires	488	20
55 gallon metal tanks	300	12
Tin cans	181	7
Animal watering tanks	73	3
Wide mouth earthen jars	44	2
Elevated tanks	22	1
Cisterns and walls	26	1
Flower vases	18	1
Miscellaneous	576	23

0.4 per cent in the fifth. This success was achieved by having staff follow a work schedule that fits the seasonal activity (in agriculture) and employment schedule (in industry) of the resident population. In addition, staff rotated shifts to be available for follow-up work on Saturdays.

Because of the potential threat of insecticide resistance to organophosphate compounds (temephos was used as a larvicide and malathion as an adulticide), the campaign kept records of the principal breeding sites (Table 3). Less than 50 per cent of the containers were associated with potable water. Many of these could be closed in such a way that mosquitoes could not enter. The other potable water containers were treated with temephos and the remaining containers were eliminated. For example, 1,257,792 containers were treated with insecticide during cycle 5, while 2,215,825 containers were destroyed. For cycle 6 a total of 1,979,259 containers were treated and 4,670,786 were destroyed. Some programs have questioned the economic efficiency of destroying breeding sites as a method of source reduction. However, the average number of premises treated per individual (18.9 from cycles 2 to 5) is competitive with programs in other countries and the conservation of insecticide is considerable. Because the evaluators are responsible only for premises inspection and health education, their output per day is greater.

Tires were identified as an important *A. aegypti* breeding site. One industrial area in Habana was recognized as a principal source for tires throughout the country. To minimize the influence of transporting *A. aegypti* eggs from the area, a special team was stationed there. One of its duties was to treat all tires with a residual insecticide.

The number of premises positive and the premises index per cycle is only a partial indication of the control picture. During cycles 5 through 7, the number of positive containers varied from 869 to 556 to 143 per cycle, and 1.85, 1.86, and 1.22 positive containers, respectively, per positive house. It is believed that this is an indication that the time interval between cycles is sufficiently short to curtail the spread of infestation.

Each positive premises is thoroughly studied to locate the primary breeding site. The history of the positive container is taken and if it originated from a site other than its present location, the earlier location is also inspected. Staff members of the Central Office visit more than 60 per cent of the premises found positive per cycle. They have noted that only rarely is the same container or premises positive for two consecutive cycles. For the most part, new breeding sources originate with the transportation of containers from sheltered areas to places where they are exposed to water where dormant fertile eggs hatch. This phenomenon of chance exposure of fertile eggs to water is another reason the final stages of eradication are a drawn out process.

The campaign continues to effect intensive control within a radius of 200 to 500 meters to each positive premises. Larviciding, adulticiding, and source reduction are used along with increased inspection for missed containers. Septic tanks, hidden cisterns, depressions beneath warehouses, road ditches, and natural containers have been identified as the missing primary breeding sites. When there is a problem of identification of a primary site, the number of ovitraps within the area is increased and space spraying is done daily for at least 10 days after all indication of adults or positive ovitraps stops.

Table 4 provides the status of the campaign within each province by cycle. Isla de la Juventud became negative during the intensive attack phase and has remained so for a year. The Province of Guantánamo became negative at cycle 6. A total of 16 municipalities in various provinces have been negative for a year and

Table 4. Status of eradication by cycle and province, Cuba, 1982.

Province	Total premises	Number of premises positive per cycle					
		1	*2*	*3*	*4*	*5*	*6*
Pinar del Río	173,914	20	43	38	42	28	2
Habana	160,452	2	13	36	39	33	28
Habana City	532,418	9	7	31	45	80	73
Matanzas	157,901	2	23	32	30	11	26
Villa Clara	209,482	6	3	8	17	10	13
Cienfuegos	86,904	45	36	13	16	12	4
Sancti Spíritus	101,943	1	27	36	17	67	19
Ciego de Avila	86,553	155	5	15	16	17	11
Camagüey	184, 382	2	12	10	54	49	11
Las Tunas	110,252	15	10	3	11	10	9
Holguín	216,534	8	10	3	11	10	9
Granma	166,355	26	24	42	18	8	2
Santiago de Cuba	197,763	57	81	200	154	114	79
Guantánamo	12,879	0	0	0	0	0	0

*Cycles 4, 5, and 6 were during rainy season.

four more were negative during the last five cycles (10 months). Whenever a municipality becomes negative a 1 km barrier is designated around it. In this area additional ovitraps are set out and more intensive inspections are made. In addition, previously identified risk areas within the municipality received more ovitraps and inspections.

Beginning in January 1982, 6,000 larvitraps or ovitraps were placed throughout the country. This number has been increased to 11,500. These are placed in air and sea port areas, cemeteries, known risk areas, and homes of staff members. Positivity is about 0.1 per cent.

Control activities are managed at the municipal and provincial level with a large component of community involvement. However, this horizontal-type program utilizes a technically strong central core to provide evaluation and technical guidance. The central core has a chief, assistant chief, epidemiologist, entomologist, two statisticians, and two technical officers which average about 60 to 80 per cent of the time in the field. Weekly statistical reports are received by telephone and cable from all provinces. A special report is made on each positive premises. By doing this, all information received is current. Extensive use of maps and statistical analysis makes it possible to study progress and adapt new strategies when required. An example of this is the fact that tropical storm David, which caused considerable damage in the area of Habana, did not produce a threat to the campaign due to this flexibility and ability to mobilize intensive control activities immediately.

As was mentioned in the 1982 report, an important factor in the campaign is the "esprit de corps" of the entire country toward the goal of *A. aegypti* eradication. The impact an informed and cooperative community has on a solution to the problem cannot be overestimated.

(Source: Tropical Diseases Program, Health Programs Development, PAHO, with assistance from staff of the *Aedes aegypti* Campaign, Ministry of Public Health, Cuba.)