

INTRODUCTION

After World War II, many countries in the Mediterranean and American regions applied DDT residual house spraying in malaria control with remarkable results, which had never been experienced before. Following the excellent performances, the *Third Report* of the World Health Organization (WHO) Expert Committee on Malaria (1949) stressed that "... by virtue of insecticides developed since 1940, it is now possible to obtain a degree of malaria control, amounting in some cases to actual eradication, formerly unattainable." Subsequently, the XIV Pan American Sanitary Conference (1954) and the Eighth World Health Assembly (1955) resolved to undertake a global campaign against malaria, with the ultimate goal of eradication. Practically all countries where malaria was a problem, with the exception of those in Africa south of the Sahara Desert, initiated their malaria eradication programs along the lines of the concept and technical criteria developed by the Expert Committee in its sixth to ninth reports (published 1957 - 1962). Generally speaking, in their initial stages these programs were carried out by specialized malaria eradication services - ad hoc organizations distinct from the general health systems.

Although some progress has been made during the last three decades, only a few countries have achieved malaria eradication. As of today, the global malaria problem is still far from being solved. According to the WHO World Health magazine, December 1989, the total number of cases reported annually is estimated at 103 million, and outbreaks of malaria have been increasing over the past two years in parts of Asia, Latin America, and Africa south of the Sahara.

In light of the global evolution of the malaria control or eradication programs, Taiwan has been fortunate to have eradicated malaria in the 1950s through early 1960s, and to have maintained the malaria-free status since 1965, following official certification and registration by WHO on its list of countries where malaria eradication has been achieved (Wemsdorfer, McGregor, 1988). For the residents of Taiwan, it has been a noteworthy achievement in public health. Taiwan has eradicated one of the most devastating diseases, having saved thousands of lives, avoided economic losses of individuals and their communities, and eliminated the risk of many hundreds of thousands of people suffering each year from this disease. The laborious task of the last four decades, from preparatory, attack, and consolidation through maintenance phases of the program, resulted in a model of malaria eradication, as stated by Brown, Haworth and Zahar (1976):

"An outstanding eradication program, however, is that on the island of Taiwan, where spraying had commenced in 1954 [1953, to be exact] ... By 1960 there were only 44 cases of malaria in the island's 10 million population . . . Taiwan was registered as malaria-free in 1965."

There are many elements which may have contributed to the success of the malaria eradication program in Taiwan. Among them the most outstanding features can be described as follows:

* Malaria was such a serious public health problem that the Japanese Government, during its presence in Taiwan (1895 - 1945), made great efforts in carrying out malaria research and control activities. The basic epidemiological and entomological knowledge acquired, and the establishment of the malaria stations over the entire hyperendemic region, were valuable assets for planning subsequent antimalaria activities.

* In 1946, after World War II, the Rockefeller Foundation, in collaboration with the Government, established a Malaria Research Center in Chaochou, southern Taiwan. This Center was later incorporated with the Provincial Health Administration (PHA) to become the Taiwan Provincial Malaria Research Institute (TAMRI). The Rockefeller Foundation provided valuable technical and financial assistance through the end of 1949, introducing new technology, training key malaria personnel for TAMRI, and testing diverse malaria control methods. It would not be an overstatement to say that the Rockefeller Foundation sowed the seeds for the subsequent malaria eradication program.

* An island-wide, four-year malaria control program planned by TAMRI in 1951 received the technical cooperation of WHO and the financial assistance of the Joint Commission for Rural Reconstruction (JCRR), the Mutual Security Agency (US/MSA) and the Council for United States Aid (CUSA). The assistance provided by these external agencies was very essential at that time for acquiring the insecticides and equipment critically needed to undertake an island-wide program.

* Malaria endemicity and the major transmission season in each epidemiological area had been studied and the malarious area stratified before the initiation of the malaria control program. DDT spraying was applied only once a year in a short period of two months just before the major transmission season. The spraying coverage was gradually increased from the pilot project area (156,000

inhabitants) in 1952 to the hyperendemic area (1.5 million inhabitants) in 1953 and finally to include meso- and a part of hypoendemic areas in 1954 and 1955 (5.5 million inhabitants). In view of the good results obtained from the control program, the spraying operations were expanded in 1956 to cover the entire malarious area (6.8 million inhabitants), toward the objective of malaria eradication. The year 1957 marked the last year of the regular spraying program, covering the same area as in 1953, *i.e.*, the hyperendemic area. The strategy adopted to regulate spraying coverage in accordance with the stratified areas and transmission season proved to be very effective at a minimum cost. The same stratification strategy, based on degree of transmission potentiality, was followed in the surveillance program initiated in 1954.

* TAMRI, with 11 professionals and 52 technical and administrative staff, served as the Headquarters in the malaria program during the attack and consolidation periods. It was responsible for planning work; training local health personnel at county and township levels; providing technical direction to local health services; and coordinating administrative activities among government agencies at all levels, international and bilateral organizations, the Chinese Armed Forces and the communities concerned. As a research institution, TAMRI was directly involved in field research activities and in the evaluation of the malaria control program. In addition, it encouraged local industries in the production of the needed insecticide and field equipment. However, as far as field operations were concerned, they were decentralized at the county and township levels. From the beginning, the malaria program has been an integral part of the general health activities; therefore, field operations were executed by the same health services in all phases of the program, *i.e.*, attack and consolidation and maintenance. This system of centralized planning and decentralized execution of the program was considered one of the crucial factors in achieving the most efficient and the least expensive field operations possible in Taiwan.

* The communities concerned were motivated by the local health personnel to take part in every phase of the program, providing needed facilities and sharing local costs of operation. The participation of the communities and the cooperation of the armed forces were also decisive factors leading to the success of malaria eradication in Taiwan.

* The last, but not least, important feature of the malaria program was the fact that the field supervisors at all levels, *i.e.*, provincial (TAMRI), county and township, worked closely in harmony and with dedication to their respective areas

of responsibility. The untiring endeavors of these field supervisors to fulfill their assigned duties were truly admirable. Today, nearly 40 years later, the camaraderie and friendship forged among the supervisors during that period remain surprisingly strong, as evidenced by the frequent social reunions held in their respective geographical regions.

The objective of this document is to compile all published and unpublished information on malaria in Taiwan, from the time the disease was first recorded, through the period of the Japanese efforts to control this disease, up to the achievement of malaria eradication.

It is hoped that this document will be a valuable record in the history of public health in Taiwan, and that it would also be of interest to other countries in the world where their malaria problems still long for a practical solution.