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Sixteenth report of the
WHO Expert Committee on
Vector Biology and Control



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Geneva, 6–10 December 1999

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1. Introduction

The WHO Expert Committee on Vector Biology and Control met in Geneva from 6 to 10 December 1999. Dr Maria Neira, Director, Communicable Disease Control, Prevention and Eradication, opened the meeting on behalf of the Director-General. She noted that the Expert Committee had last considered the chemistry and specifications of pesticides in 1989 (1). Since then, there have been major changes in the approach, methods and means for vector and public health pest control. These include: further integration of vector control into basic health services; assumption of greater responsibility by individuals and communities for personal protection and vector control; improvement in pesticide formulation and application technology and, therefore, availability of safer, more acceptable and more effective pesticide products; and drastic changes in the pattern of use of pesticides by Member States for economic, human and environmental reasons.

Because of the increase in over-the-counter insecticide products for personal protection, greater attention must be given to human and environmental safety, packaging and labelling, and disposal of containers. It is also becoming increasingly important to harmonize, as far as possible, the specifications developed by WHO for public health pesticides with those of the Food and Agriculture Organization of the United Nations (FAO) for agricultural pesticides. WHO welcomes continued collaboration with FAO in that regard. However, specifications are developed for particular product uses, and careful attention has to be given to the different requirements of public health and agricultural pesticides.

The Expert Committee was therefore requested to:

- review trends in the use of pesticides (chemicals and formulations) for vector and public health pest control programmes and the development of quality control of pesticide products in the WHO Regions;
- review existing WHO specifications (full and interim) and test methods, and recommend changes; propose interim specifications that could be accepted as full specifications; and identify actions to be taken to upgrade the remaining interim specifications to full status;
- review the current status of specifications being developed for household insecticide products, bacterial larvicides and plant-based pesticides for public health use, and make recommenda-

- tions on the establishment of WHO specifications for such products;
- review international rules/requirements for packaging, marking and storage of pesticides, and recommend actions to achieve the harmonization of international standards; and
 - identify and discuss critical factors related to the disposal of unusable pesticides and pesticide containers.

The Expert Committee was requested to provide clear recommendations, in particular in regard to ways in which activities related to the WHO Pesticide Evaluation Scheme (WHOPES) and the technical support provided to Member States could be strengthened.

2. The WHO Pesticide Evaluation Scheme

The WHO Pesticide Evaluation Scheme (WHOPES), set up in 1960, is the only international programme that promotes and coordinates the testing and evaluation of pesticides intended for public health use. The International Code of Conduct on the Distribution and Use of Pesticides (2) constitutes the framework for WHOPES in promoting the safe handling and use, efficacy, cost-effective application and quality control of pesticide products/formulations for public health use. WHOPES develops specifications for pesticides and application equipment for use in international trade and quality control.

WHOPES functions in close collaboration with national disease and pest control programmes and national pesticide registration authorities, many international and regional organizations and institutions concerned with pesticide management, legislation and regulation, research institutions and with industry.

The global objectives of WHOPES are to:

- facilitate the search for alternative pesticides and application methodologies that are safe and cost-effective; and
- develop and promote policies, strategies and guidelines for the selective and judicious application of pesticides for public health use, and assist and monitor their implementation by Member States.

In its present form, established in 1982, WHOPES comprises a four-phase evaluation and testing programme.

Phase 1. Technical products or their formulations are tested for efficacy and persistence using laboratory-bred arthropods. This phase

also comprises a study of cross-resistance with the various classes of pesticides currently available and the establishment of tentative diagnostic concentrations for the detection of vector resistance in the field. Compounds are also evaluated, in close collaboration with the International Programme on Chemical Safety (IPCS), for their safety for humans and the environment. Minimum laboratory experimentation to allow the confirmation of the basic toxicological and ecotoxicological information available from the manufacturer or other sources, in the light of the particular requirements of WHO, may also be carried out by appropriate WHO collaborating centres.

Phase 2. This phase comprises studies on natural vector populations in the field, on a small scale and under well-controlled conditions, to determine application doses and assess the efficacy and persistence of the product. Where appropriate, the action of products on non-target fauna is verified. Phase 2 is also the first opportunity to document any harmful effects of the product upon the operators in a field situation.

Phase 3. WHO, industry and one or more institutions located in disease endemic countries undertake to assess the efficacy of the product on a medium or large scale against a specified disease vector. Phase 3 comprises entomological, safety and, where appropriate, epidemiological evaluation. The institution supplies qualified staff for implementation, while the manufacturer supplies the insecticide and the funds needed for the trial. WHO bears the technical responsibility for the operation and is involved in the field through independent consultants. All three parties participate in drafting the trial protocol in accordance with a pre-established model that needs to be adapted to each situation. The final report is drafted by the institution, which submits it to WHO for evaluation. The report is then submitted for review to the manufacturer.

A scientific committee, the WHOPES Working Group, assists WHOPES in reviewing evaluation reports and assessing current knowledge about products for their intended applications, and makes recommendations to WHOPES on their public health use. The reports of the WHOPES Working Group meetings are issued as WHO documents and are widely distributed (3–5).

Phase 4. This phase is concerned with the establishment of specifications for the technical product and the formulations evaluated. Draft specifications proposed by industry are reviewed by members of the WHO Expert Advisory Panel on Vector Biology and Control and WHO collaborating centres and are then issued as interim specifications. These are reviewed every five to six years by the WHO Expert Committee on Vector Biology and Control, which may

recommend their publication as full WHO specifications. WHO specifications for pesticides (interim and full) are available on the Internet at <http://www.who.int/ctd/whopes>.

In order to strengthen WHOPES activities, a global network, the Global Collaboration for Development of Pesticides for Public Health (GCDPP), was established in 1997. Participants include universities and research institutions, regional and international organizations, national and government-supported agencies, and pesticide and pesticide application equipment manufacturers. One of the main functions of GCDPP is to serve as an advisory group to WHOPES in matters relating to the development and safe and proper use of pesticides within the context of the International Code of Conduct on the Distribution and Use of Pesticides and WHO's global disease control strategies.

Since the Expert Committee last considered the chemistry and specifications of pesticides in 1989, 12 pesticide products have been fully evaluated for vector control, mainly for indoor residual spraying and insecticide treatment of mosquito nets for malaria vector control; WHO specifications have been published for these products.

WHOPES is currently evaluating seven insecticide products for indoor residual spraying and insecticide treatment of mosquito nets for malaria and/or Chagas vector control, two insect repellents, and two insect growth regulator mosquito larvicides, with ongoing trials in 14 countries.

Guideline specifications for household insecticide products — mosquito coils, vaporizing mats, liquid vaporizers and aerosols, were drafted at a WHO informal consultation, held in Geneva from 3 to 6 February 1998 (6). The draft guidelines have been distributed to ministries of health and national registration authorities for comments and suggestions.

WHOPES has also drafted guideline specifications for bacterial larvicides for public health use, i.e. *Bacillus thuringiensis israelensis* (*Bti*) and *B. sphaericus*. At an informal consultation held in Geneva from 28 to 30 April 1999 (7), the use of bacterial larvicides in public health and their registration requirements, including quality control and safety aspects, were reviewed. In addition, the requirements and objectives for inclusion in the specifications of bacterial larvicides were also reviewed and guideline specifications for the most common formulations of bacterial larvicides were drafted. The draft guidelines