

WHO/CDS/CPE/PVC/2001.1  
DISTR.: GENERAL  
ENGLISH ONLY

**GUIDELINES FOR ASSESSING  
THE EFFICACY OF INSECTICIDAL  
SPACE SPRAYS FOR CONTROL  
OF THE DENGUE VECTOR  
*Aedes aegypti***

By:

P. Reiter & M.B. Nathan

©2001 World Health Organization

This document is not a formal publication of the World Health Organization (WHO), and all rights are reserved by the Organization. The document may, however, be freely reviewed, abstracted, reproduced or translated, in part or in whole, but not for sale or use in conjunction with commercial purposes.

The views expressed in documents by named authors are solely the responsibility of those authors.

## PREFACE

This document has been prepared in response to a recommendation of the Informal Consultation on 'Strengthening Implementation of the Global Strategy for Dengue Fever/Dengue Haemorrhagic Fever Prevention and Control', held at WHO/HQ, Geneva, 18-20 October 1999. It is intended to stimulate public health authorities to carry out entomological assessments of the impact of insecticidal space sprays on the main dengue vector, *Aedes aegypti*, and to guide them in that process. WHO will be pleased to assist countries in adapting the guidelines to their local needs. National authorities are encouraged to share the results of such studies and to assist the Organization to further develop the regional and global strategies for dengue fever prevention and control.

A complementary WHO document, 'Space Spray Application of Insecticides for Vector and Public Health Pest Control', will be published in 2002. This document describes the operational procedures and considerations needed to ensure correct use and application of insecticidal space sprays.

## ACKNOWLEDGEMENTS

The Department of Communicable Disease Control, Prevention and Eradication gratefully acknowledges the contribution of the lead author, Dr Paul Reiter, Research Entomologist, US Centers for Disease Control and Prevention, Dengue Branch, San Juan, Puerto Rico. We also thank the following persons for their critical review and valued contributions to the preparation of the document:

- Mr Manuel Amador, US Centers for Disease Control and Prevention, Dengue Branch, San Juan, Puerto Rico
- Dr Chang Moh Seng, University of Malaysia, Sarawak
- Dr Gary Clark, US Centers for Disease Control and Prevention, Dengue Branch, San Juan, Puerto Rico
- Dr Dana Focks, Gainesville, Florida, USA
- Dr Christian Frederickson, Pan American Health Organization, Brasilia, Brazil
- Dr John Invest, Aventis Environmental Health, Aylesbury, UK
- Mr Manuel Lluberas, H.D. Hudson Manufacturing Company, Jacksonville, Florida, USA
- Dr Michael Nelson, Tampa, Florida, USA
- Dr Scott Ritchie, Tropical Public Health Unit, Queensland Health, Cairns, Australia
- Dr Tom Scott, University of California, Davis, USA
- Dr Morteza Zaim, WHO Pesticide Evaluation Scheme (WHOPES), Geneva, Switzerland

## TABLE OF CONTENTS

Preface

Acknowledgements

1.	Introduction	1
	1.1 <i>What is a space spray?</i>	2
	1.2 <i>How long does a space spray remain effective?</i>	3
	1.3 <i>Why use space sprays?</i>	4
2.	Evaluation procedures: monitoring the <i>Aedes aegypti</i> population <i>in situ</i>	5
	2.1 <i>Infusion-baited ovitraps</i>	7
	2.1.1 <i>Description of ovitraps</i>	8
	2.1.2 <i>Preparation of the ovitraps</i>	9
	2.1.3 <i>Collection areas and sample sites</i>	13
	2.1.4 <i>Exchange of ovitrap pairs</i>	14
	2.1.5 <i>Counting the eggs and interpreting the results</i>	14
	2.2 <i>Collection of adults by backpack aspirator from indoor resting sites</i>	16
	2.2.1 <i>Backpack aspirators</i>	16
	2.2.2 <i>Field routine</i>	18
	2.2.3 <i>Processing the collection</i>	19
	2.3 <i>Advantages and disadvantages of the two mosquito sampling methods</i>	20
3.	Cage bioassays	22
4.	Summary	25

<b>Selected References</b>	<b>27</b>
<b>Annex 1</b>	<b>29</b>
<b>Annex 2</b>	<b>32</b>

## 1. Introduction

*Aedes aegypti* is the principal vector of dengue in urban areas. The global strategy for dengue prevention and control calls for selective, integrated vector control, with community and intersectoral participation.

During epidemics and periods with a high risk of transmission, local authorities frequently use insecticidal space sprays in efforts to control the adult mosquito. These sprays are usually delivered from portable (backpack or hand held) or vehicle-mounted equipment, although helicopters and fixed wing aircraft have also been used. Their adulticidal effect is transitory and there is little or no effect on the aquatic stages of the vector.

The efficacy of space sprays is greatly influenced by a wide range of environmental and operational factors. For this reason, the World Health Organization recommends that public health authorities assess the impact of treatments on the vector mosquito population *under local conditions*. Such assessments should form an integral part of control operations and may also be considered as a first step in determining cost-effectiveness relative to other control strategies.

The present document is written to assist vector control managers and other public health specialists in carrying out such assessments. It does not attempt to quantify adult vector densities and other entomological parameters relating to thresholds required for interruption or reduction of virus transmission. This requires additional knowledge of factors that affect the dynamics of dengue transmission under local conditions, including seroconversion rates in the human population and viral virulence of the circulating dengue strains.

Factors that are critical to the effective use of space sprays include:

- Choice of insecticide compound and its formulation, and the susceptibility of the mosquito population to the insecticide<sup>1</sup>
- Dosage
- Droplet size of the aerosol

In addition, it is important that treatments are made:

- At the correct application rate
- Under optimal meteorological conditions
- During periods of maximum flight activity of the mosquito

Discussion of these factors is outside the scope of these guidelines; however, further details can be found among the relevant documents in the list of Selected References.

### **1.1 What is a space spray?**

A space spray—technically an aerosol—is a liquid insecticide launched into the air in the form of hundreds of millions of tiny droplets. Early equipment used insecticides diluted in large volumes of fuel oil or water. A heat-driven pressure system forced this solution through an atomizing nozzle into a powerful blast of hot air to produce a dense, white ‘thermal fog’. Later studies showed that diluents were not critical to the efficacy of the method, and new, cold aerosol generators were developed to deliver small quantities of highly

---

<sup>1</sup> In many parts of the world, *Ae. aegypti* exhibits reduced susceptibility to several groups of insecticides, including those used most commonly for space spraying. For this reason, insecticide susceptibility tests should precede field evaluations. Standard test procedures are detailed in WHO/VBC/81.806.

预览已结束，完整报告链接和二维码如下：

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_30432](https://www.yunbaogao.cn/report/index/report?reportId=5_30432)

