World Health Organization
Communicable Disease Control,
Prevention and Eradication
WHO Pesticide Evaluation Scheme (WHOPES)

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GUIDELINES

FOR LABORATORY AND FIELD TESTING OF LONG-LASTING INSECTICIDAL MOSQUITO NETS

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1. INTRODUCTION

The purpose of this document is to provide specific and standardized procedures and guidelines for testing long-lasting insecticidal mosquito nets (LNs) for personal protection and malaria control. It is intended to harmonize the testing procedures carried out to generate data for registration and labelling of such products by national authorities.

An LN is a factory-treated mosquito net expected to retain its biological activity for a minimum number of standard World Health Organization (WHO) washes and a minimum period of time under field conditions. Currently, an LN would be expected to retain biological activity for at least 20 standard WHO washes under laboratory conditions and 3 years of recommended use under field conditions, as defined in these guidelines. The guidelines do not include the testing/evaluation of products for long-lasting post-factory treatment of mosquito nets, which will be subject to separate WHO guidelines, or of the LNs that may use insecticides not currently recommended by WHO for such application.[1] Rather, they reflect the current state of knowledge on LN technology and will be subject to revision as more information becomes available.

The guidelines were reviewed and recommended by the WHO Pesticide Evaluation Scheme (WHOPES) Informal Consultation on the development of guidelines for testing/evaluation of long-lasting insecticidal mosquito nets, held at WHO headquarters in Geneva, Switzerland, on 4–7 April 2005.[2]

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[1] http://whqlibdoc.who.int/hq/2003/WHO_CDS_WHOPES_2002.5_Rev.1.pdf (accessed 20 April 2005).

[2] The report will be available at: http://www.who.int/whopes/gcdpp/publications/en/

The document includes laboratory, small- and large-scale field studies to determine the efficacy and operational acceptability of an LN, as summarized below. Although some observations on the safety of such nets will be carried out in the field, a preliminary safety assessment has to be undertaken, following the generic risk assessment model developed by WHO for this purpose,[3] before any field study can be done. In addition, the physical properties of the fabric and factors relating to its structural integrity should conform to WHO specifications for netting materials.[4]

Phase	Type of study	Activities
Phase I	Laboratory	• Regeneration of insecticide and wash resistance • Efficacy
Phase II	Small-scale field trials	• Wash resistance • Efficacy and impact on vector behaviour • Safety observations
Phase III	Large-scale field trials	• Long-lasting efficacy • Community acceptance • Safety observations

[3] http://whqlibdoc.who.int/hq/2004/WHO_PCS_04.1.pdf (accessed 20 April 2005).
[4] http://www.who.int/malaria/vectorcontrol.html

2. LABORATORY TESTING (PHASE I)

The objectives of the laboratory testing are to determine the efficacy and wash resistance of an LN and to study the dynamics of the insecticide on the fibre. The aim of these experiments is not to simulate washing that would be experienced under field conditions but rather to provide a consistent, repeatable protocol that would allow for comparisons between different laboratories and different LN products.

The test includes:

- determination of the period of time required for full regeneration of the LN after washing;
- determination of the efficacy and wash resistance of the LN against susceptible vector species.

A certificate of chemical analysis must be provided by the manufacturer to ensure that the concentration of the active ingredient is within +25% of the declared content.

2.1 Regeneration and wash resistance

2.1.1 Regeneration time