

Title: Development of Field-Deployable Insecticide Resistance Testing Kits for Operational Conditions

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Summary: Insecticide resistance (IR) is one of the most significant obstacles in adequate control of arthropod vectors and preventing vector-borne disease transmission. The Navy Entomology Center of Excellence (NECE) has developed an IR tool that is portable and tailored to end users in operational environments. The Lightweight Insecticide Resistance Kit (LIRK) is a modified version of the Center of Disease Control (CDC) bottle bioassay standard protocol that facilitates evaluation of on-hand available products instead of active ingredient. This kit provides rapid detection of product efficacy measured by percent mortality at a standardized diagnostic time in field populations of target vectors. It also provides materials to perform IR bioassays that are more readily available and economical than typical lab quality supplies.

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Methods: The LIRK revised the CDC bottle bioassay protocol to demonstrate capture of live mosquitoes, container preparation and storage of mosquitoes, product application against mosquitoes, and translating results into actionable guidance. LIRK provides methodology to support quick product efficacy testing against captured adult mosquitoes (within 24 hours of collection) and increased reliability of product testing against captured larval mosquitoes (within 8 days of collection).

Conclusions: The LIRK simplifies efficacy testing by providing easy instructions and by outlining minimal materials and procedures needed to assess product efficacy in locations lacking laboratory standard testing. This kit can be adopted into military medical gear sets to facilitate pest and disease management programs.