Maximizing the Impact of Vector Control with Entomological Surveillance

A practitioner's quick guide | August 2026

Malaria programs face massive budget cuts, and hard choices about what to keep and what to cut are underway. Entomological surveillance is an early target. This guide is intended to help program staff navigate those choices well — not to argue that everything should be preserved, but to clarify what data are needed to make key vector control decisions and what a right-sized program looks like under severe resource constraints.

From 'More Data' to 'Right Data': A Decision-Driven Approach

Entomological surveillance is most defensible when it is directly linked to a programmatic decision: which tools to deploy, where to deploy or withdraw and when (the logic of sub-national tailoring of interventions[1]) and then assessing whether the deployment worked. Recent examples include: between 2019-2022, vector data guided a switch from standard to piperonyl-butoxide (PBO) nets, averting ~13 million malaria cases and saving health systems nearly US$30 million;[2] and in Uganda, a malaria spike following a switch of IRS insecticides was traced by entomological surveillance to a vector species shift.[3] The question for constrained programs is which data (including entomological data) are irreplaceable given the decisions at hand.

Practical Recommendations for Entomological Surveillance amid Severe Funding Constraints

1. Lead with decisions, not activities[4]

Link budget lines directly to programmatic decisions. Framing surveillance as 'insecticide resistance monitoring to guide product selection' rather than 'entomological surveillance' sharpens the case for funding. At minimum, resistance monitoring should be protected, as it drives procurement decisions, including when to invest more or less in specific tools. This decision-linked approach is consistent with WHO guidance on surveillance[5] and prioritizing interventions under resource constraints.[6]

2. Rethink sampling strategies for cost-efficiency

Maintain fewer fixed sites, if any, for longitudinal trend monitoring (if trend data are used); rotate others at a frequency that at minimum informs procurement. Reduce collection frequency where reliable baseline data already exist. Use geospatial tools to optimize site selection, such as the Entomological Adaptive Sampling Framework that optimizes sampling based on vector density.[7]

3. Expand community-based and technology-enabled collection

Community-based surveillance enables higher-density collection for trend monitoring at substantially lower cost per collection point, though expert-led collections remain important to quality and interpretability. AI-enabled field identification tools[8] can reduce dependence on scarce expert collectors where validated for local species.

4. Integrate across diseases and borders

Mosquito surveillance laboratory infrastructure, trained staff, and data systems can simultaneously support monitoring of dengue, lymphatic filariasis, and malaria, spreading fixed costs across programs. Regional hubs can concentrate expensive molecular equipment and expertise across multiple countries. Health security, One Health, epidemic preparedness, and pooled disease prevention funding offer opportunities for integrated public sector surveillance financing, especially at the local level.[9]

The goal in a funding crisis is not to preserve everything, but to preserve what matters most for the decisions programs actually need to make.

This guide is intended as a practical reference ahead of forthcoming work, including a fuller costing analysis of the approaches above and a deeper companion document on decision-driven entomological surveillance design. For any questions about this practitioner's quick guide, please contact Evelyn Olanga at eolanga@clintonhealthaccess.org and/or Edward Thomsen at edward.thomsen@ucsf.edu.

Developed by the Clinton Health Access Initiative and the University of California San Francisco's Malaria Elimination Initiative in collaboration with six national malaria programs through a workshop convened in March 2026 in Nairobi and in consultation with subject matter experts through key informant interviews that were conducted November 2025 through May 2026.

Footnotes and References

1 Global Malaria Programe. Subnational tailoring of malaria strategies and interventions. Geneva: World Health Organization. 2025. https://www.who.int/publications/i/item/9789240115712.

2 New Nets Prevent 13 Million Malaria Cases in Sub-Saharan Africa. The Global Fund, 2024. https://www.theglobalfund.org/en/news/2024/2024-04-17-new-nets-prevent-13-million-malaria-cases-sub-saharan-africa/. Accessed May 2026.

3 Krezanoski P, et al. Adjusting vector surveillance for human behaviors reveals *Anopheles funestus* drove a resurgence in malaria despite IRS with clothianidin in Uganda. Sci Rep. 2025;15(1):17728. https://doi.org/10.1038/s41598-025-00623-0.

4 Malaria Elimination Initiative. Entomological Surveillance Planning Tool. San Francisco: Institute for Global Health Sciences, University of California, San Francisco; 2020. Available at https://www.shrinkingthemalariamap.org/toolkit.

5 Global Malaria Programme. Malaria surveillance, monitoring and evaluation: a reference manual, second edition. Geneva: World Health Organization. 2025. https://www.who.int/publications/i/item/9789240112476.

6 Global Malaria Programme. Guiding principles for prioritizing malaria interventions in resource-constrained country contexts to achieve maximum impact, second edition. Geneva: World Health Organization. 2026. https://www.who.int/publications/i/item/B09790.

7 Sedda L, et al. Evaluation of the Entomological Adaptive Surveillance Framework for malaria vector monitoring: a comparative field trial with routine surveillance in Ghana and Mozambique. BMJ Public Health, 2026. https://doi.org/10.1136/bmjph-2025-004060.

8 Dasari S, et al. A Handheld Tool for the Rapid Morphological Identification of Mosquito Species (VectorCam) for Community-Based Malaria Vector Surveillance: Summative Usability Study. JMIR Hum Factors. 2024;11:e56605.

9 Sudathip P, et al. Leveraging geo-referenced malaria information to increase domestic financial support for malaria elimination in Thailand. Malar J. 2022 Jul 7;21(1):213. doi: 10.1186/s12936-022-04227-1.