
Maintaining vector surveillance in the context of COVID-19 mitigation

Adapting current recommendations and best practices to the unique challenges of mosquito surveillance

Joseph Wagman

jwagman@path.org

Senior Program Officer

PATH, Department of Malaria and Neglected Tropical Diseases

INTERIM RECOMMENDATIONS

Maintaining malaria vector surveillance in the context of COVID-19 mitigation

Version 1.1, updated 18 March 2021



Link to current version of the document on the RBM/VCWG website:

<https://endmalaria.org/sites/default/files/COVID-19-Malaria%20Vector%20Surveillance-v1.1.pdf>

Why create another set of COVID-19 related “recommendations”?

The purpose of the document is to provide guidance for adapting current recommendations and best practices to the unique challenges faced by vector surveillance personnel and the communities and households where we work.

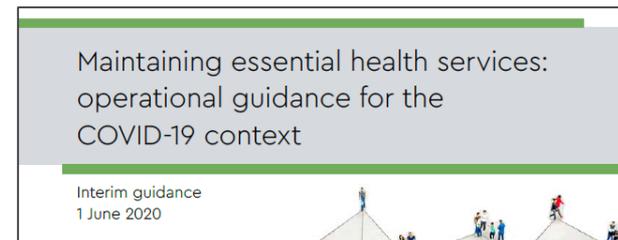
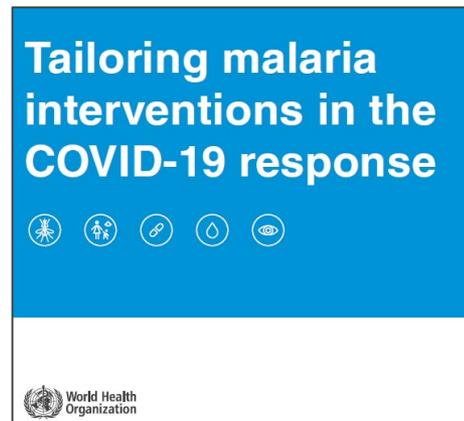
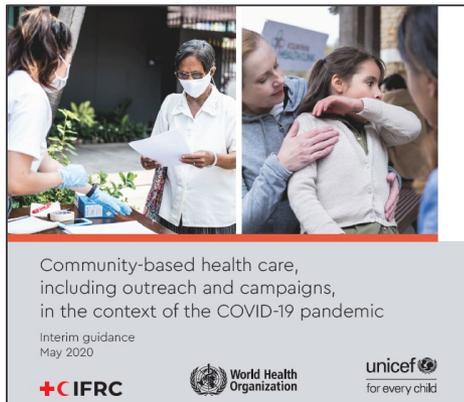
Why create another set of COVID-19 related “recommendations”?

The ongoing pandemic continues to challenge communities and health systems worldwide.

Infection prevention and control strategies are now the new normal:

- Physical distancing
- Use of medical masks and/or cloth face coverings
- Frequent and consistent hand hygiene
- Regular cleaning of equipment and work surfaces

Guiding recommendations include:

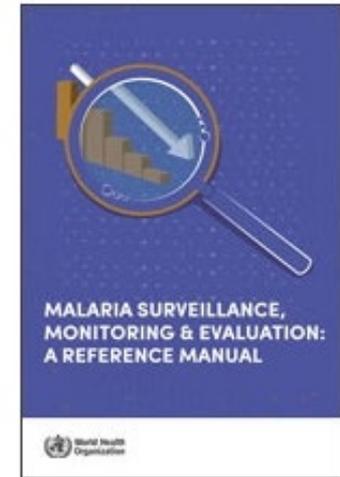


[Guiding recommendations are regularly maintained and updated at: https://www.who.int/health-topics/coronavirus#tab=tab_2](https://www.who.int/health-topics/coronavirus#tab=tab_2)

Outline strategies to apply these best practices to the unique circumstances of vector surveillance

Malaria vector surveillance

Regular, systematic collection, analysis, and interpretation of entomological data to assist in risk assessment, planning, implementation, monitoring, and evaluating of malaria control programs



Includes a range of activities at different levels of the public health system—from community-based sampling of mosquitoes to laboratory-based processing and analysis of specimens.

Most of the guidance compiled in the note applies to community-based activities involving:

- Sampling of mosquitoes from the environment
- Monitoring and evaluation of vector control implementation and/or bioefficacy
- Community and household engagement needed to support these efforts

However, downstream activities, including the laboratory processing and analysis of specimens and material collected in the field, should also follow the latest relevant guidelines and best practices.



Key concepts



Wear a mask
(encourage the same among community members)



Maintain a **physical distance** of 1–2 meters as much as possible (even when traveling in vehicles)



Avoid indoor, crowded, and poorly ventilated situations (community engagement outdoors as much as possible)



Frequent and consistent **hand hygiene** (encourage the same among community members)



Frequent and consistent **cleaning of supplies and equipment** (limit the sharing of equipment)



Regular **health monitoring** of team members and community members (particularly sentinel household members)

Vector surveillance workers should also be trained to confidently and consistently relay appropriate public health messages surrounding COVID-19 and malaria, including:

- Reinforcing, demonstrating, and encouraging all the above best practices for COVID-19 mitigation.
- Reassuring families not to delay seeking care for suspected cases of malaria or other life-threatening conditions.
- Stressing the importance of continued participation in community-wide malaria control activities like bed net distributions, indoor residual spray campaigns, and seasonal malaria chemoprevention—which will also proceed with modified procedures designed to keep communities and health care workers safe.

Special considerations for vector surveillance teams

Collection of adult mosquitoes by aspiration

When available and as possible, consider the use of Prokopack, backpack, or mechanical handheld aspirators instead of manual mouth aspirators. Other alternatives often used that could be considered include:

- Test tube and modified tube collection methods.
- Personal mouth aspirators equipped with a HEPA filter would allow the safe aspiration of mosquitoes and prevent the contamination of specimens. *Note that personal aspirators should never be shared, and daily cleaning of aspirators and periodic changing of filters should follow standard cleaning disinfection procedures.

BioQuip Products website. Aspirator filter page. <https://bioquipinc.com/catalog/collecting-equipment-supplies/aspirators-vacs/aspirator-filter/>

John W. Hock Company website. Mouth aspirators page. <https://www.johnwhock.com/products/aspirators/mouth-aspirators/>

Special considerations for vector surveillance teams

Pyrethrum spray collections

- Limit the number of team members active in each house to two
- Minimize the touching of surfaces (including doors) and objects
- Use newly cleaned and disinfected sheets and collection cups at each house
- Standard use of new gloves and clean masks during the pyrethrum spray
- Continued use of gloves and masks after the spray and throughout insect collections
- Only one person at a time should collect mosquitoes by aspirator from a house
 - Alternatives to the mouth aspiration of mosquitoes (e.g., mechanical or direct collection in modified test tubes) should be prioritized to minimize transmission risk
- Use consistent hand hygiene for all team members **and encourage the same among household members** at the conclusion of activities at each house

Special considerations for vector surveillance teams

Light trap collections

- Limit light trap setup and collection to one person per household
- Clean and disinfect all light trap components prior to setup
- Clean and disinfect all light trap components at collection from the household

Mosquito resting collections

- Clean and disinfect all aspirators and collection equipment before and after each collection
- Use test tubes and mechanical aspirators, such as backpack or Prokopack aspirators, when possible

Special considerations for vector surveillance teams

Human landing collections

- Have trained human landing capture (HLC) workers collect mosquitoes only in and near their own households, with brief supervision visits by surveillance technicians and/or entomologists
- When alternate approaches are available and appropriate (e.g., human-baited light traps, tent traps, etc), consider replacing HLCs to minimize transmission risk
- When alternatives to mouth aspiration of mosquitoes are available and appropriate (e.g., mechanical or direct collection in modified test tubes), consider replacing mouth aspirations to minimize transmission risk
- Use mouth aspirators equipped with a HEPA filter
- Permanently assign labeled collection equipment (e.g., aspirators, collection tubes, containers. etc.) to each HLC worker

Special considerations for vector surveillance teams

Wall and laboratory cone bioassays

- Pre-load holding tubes with test mosquitoes at the field laboratory, when possible

Household surveys for durability monitoring

- Conduct interviews in open, outdoor spaces near the home

Inspection and/or collection of nets for durability monitoring

- A member of the household should collect the bed net to be sampled from the house, bring it outdoors, and place it on the ground for collection by a field worker
- Used nets may provide a surface on which virus particles could survive for a short (but unknown) time after exposure to an infected person. Therefore:
 - Inspect bed nets outdoors
 - Wear gloves, face coverings, and other appropriate PPE when handling and inspecting nets
 - After inspection, nets selected for collection and subsequent laboratory evaluation should remain undisturbed in labeled collection bags for a minimum of 24 hours, or according to national recommendations, before processing using the latest guidelines

Special considerations for vector surveillance teams

Additional costs and budget implications

Performing malaria vector surveillance in the context of COVID-19 is more expensive and logistically challenging than before. Additional costs are expected, including:

- **Additional PPE**
- 60% to 80% alcohol-based hand rub
- Appropriate bleach or alcohol-based solution, or another suitable locally available product, for cleaning and disinfecting vector surveillance equipment
- **Additional vehicles, drivers, and fuel to accommodate fewer team members per vehicle**
- Additional soap and/or detergent for washing reusable face masks
- **Increased staffing requirements, pending country guidance on work schedules and limits on exposure times**
- Additional tools (e.g., handheld aspirators, forceps. etc.) so that staff can be assigned particular tools

Other potential costs include:

- Additional costs associated with potential shifts to mechanical aspirators during HLC (**aspirators and batteries**)
- Costs of COVID-19 testing of key personnel, if and as required by local guidelines

Relevant guidelines and recommendations

- Community-based health care, including outreach and campaigns, in the context of the COVID-19 pandemic (WHO)
 - <https://www.who.int/publications-detail/community-based-health-care-including-outreach-and-campaigns-in-the-context-of-the-covid-19-pandemic>
- How to Protect Yourself & Others (CDC)
 - <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick//prevention.html>
- Maintaining essential health services: operational guidance for the COVID-19 context interim guidance (WHO)
 - <https://www.who.int/publications-detail/covid-19-operational-guidance-for-maintaining-essential-health-services-during-an-outbreak>
- Tailoring malaria interventions in the COVID-19 response (WHO)
 - <https://www.who.int/malaria/publications/atoz/tailoring-malaria-interventions-in-the-covid-19-response/en/>
- AMP RECOMMENDATIONS ON ITN DISTRIBUTION DURING COVID-19 PANDEMIC (WHO)
 - <https://allianceformalariaprevention.com/tools-guidance/covid-19-pandemic/>
- Malaria surveillance, monitoring & evaluation: a reference manual. (WHO)
 - <https://www.who.int/malaria/publications/atoz/9789241565578/en/>
- Country & Technical Guidance - Coronavirus disease (COVID-19) (WHO)
 - <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance>
- Cleaning and disinfection of environmental surfaces in the context of COVID-19 (WHO)
 - <https://www.who.int/publications-detail/cleaning-and-disinfection-of-environmental-surfaces-inthe-context-of-covid-19>
- Interim recommendations on obligatory hand hygiene against transmission of COVID-19 (WHO)
 - <https://www.who.int/who-documents-detail/interim-recommendations-on-obligatory-hand-hygiene-against-transmission-of-covid-19>
- List N: Disinfectants for Coronavirus (COVID-19) (USEPA)
 - <https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2>



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This is envisioned as a living document
and an ongoing conversation. Feedback
is most welcome!

jwagman@path.org

Key concepts – for elaboration and discussion if needed

- Appropriate and open communication with participant households, community members, and local leadership.
- Reducing the number of people for all activities to the minimum required.
- When traveling, limit the number of individuals in a single vehicle, in accordance with local and national guidelines.
- Performing community and household engagement and coordination activities in large, open spaces—outdoors when possible—while still maintaining physical distance.
- Maintaining a minimum physical distance of 1 to 2 meters.
- Frequent and consistent hand hygiene
- Use of personal protective equipment (including face coverings) when moving and working in public spaces, and while conducting surveillance activities:¹
 - In some situations, reusable cloth masks may be preferable to disposable medical masks, which are often reserved for medical personnel and health care workers caring for potentially infectious individuals. Choice of mask type should be guided by the local availability and the demand for individuals at highest risk.
 - When used, reusable cloth masks should be washed and rinsed daily using soap or detergent and clean water, and allowed to dry completely before reuse.²
- Frequent and consistent cleaning of vector surveillance equipment and supplies.
- As possible, label and assign surveillance and laboratory equipment “**for individual use only**”—avoid the sharing of supplies and equipment among individuals.
- Any team member who has fever, cough, fatigue, or otherwise feels sick, or who has had contact with a person who has tested positive for COVID-19, should not travel or engage in field or laboratory work. Local testing, isolation, treatment, and contact tracing guidelines should be followed by any team member who feels unwell or has symptoms characteristic of a respiratory illness.
- Surveillance activities should not occur in any sentinel households in which a household member has tested positive for COVID-19, has fever, cough, fatigue, or otherwise feels sick, or has had contact with a person who has tested positive for COVID-19. Surveillance activities should occur in a suitable alternative sentinel location until local isolation and quarantine procedures have been satisfied. A brief checklist or questionnaire administered prior to each collection could help quickly identify households with active or potential cases and help determine appropriate action.

World Health Organization. *Cleaning and Disinfection of Environmental Surfaces in the Context of COVID-19*. Geneva: WHO; 2020. <https://www.who.int/publications-detail/cleaning-and-disinfection-of-environmental-surfaces-in-the-context-of-covid-19>

World Health Organization. *Interim Recommendations on Obligatory Hand Hygiene Against Transmission of COVID-19*. Geneva: WHO; 2020. <https://www.who.int/who-documents-detail/interim-recommendations-on-obligatory-hand-hygiene-against-transmission-of-covid-19>

Other considerations – for elaboration and discussion if needed

Processing of mosquito specimens

It is not likely that mosquitoes collected as larvae, in light traps, by a mechanical aspiration, or by mouth aspiration using an aspirator equipped with a HEPA filter will present any special COVID-19 transmission risk to laboratory personnel. However, specimens should be handled with standard extra precautions in place, including:

- Hand hygiene before and after the handling of specimens.
- Use of clean gloves and masks when handling, identifying, processing, or storing specimens.
- Frequent cleaning and disinfecting of all collection equipment and material, as well as work surfaces and laboratory equipment such as microscopes and forceps.

Laboratory and insectary practices (applies to permanent and temporary facilities)

- Limit work to one person in a room at a time and design a schedule so that individuals rotate to ensure limited or no contact. For example, when two technicians are working in the insectary, one could be in the larval room and the other in the adult room. Where this is not feasible, no more than two persons should work in a room, maintaining a distance of at least 2 meters at all times and using face masks and gloves.
- Ensure handwashing stations with soap or hand sanitizer are available, as well as gloves.
- Disinfect equipment (e.g., forceps, microscopes) and surfaces between individual use and at the end of the day.
- Label and assign entomological laboratory equipment to each person (e.g., forceps, microscopes); in particular, aspirators should not be shared between individuals.