

Mitigation Measures and Modifications for Vector Control Monitoring Activities in the Context of COVID-19

Objective: Ensure the safety of field teams, households selected for adult mosquito sampling, and community members when resuming vector control data collection. General mitigation methods and specific modifications for each monitoring activity are described below.

General COVID-19 transmission mitigation measures while implementing monitoring activities

- Do not allow any team member who has fever, cough, fatigue, or, who otherwise feels sick, or who has had recent contact with a person who has tested positive for COVID-19 to travel to the field or work in the insectary or laboratory. Any team member who develops symptoms or feels sick should stay in his/her room and away from other people. Supervisors should make arrangements to temporarily replace the sick person.
- Reduce the number of people for all activities to the minimum required (see individual sections below for specifics). This includes when:
 - Traveling to a surveillance site or elsewhere
 - Entering a house/room to sample mosquitoes
 - Working in the insectary or laboratory
- Wear masks while travelling, conducting entomological surveillance in the community, and working in the field around other people.
- Wear gloves while conducting entomological surveillance in the community, working in the field around other people, and in the laboratory or insectary. Discard/replace gloves and wash hands/use hand sanitizer between homes.
- Maintain a distance of at least two meters between persons whenever possible. Avoid physical contact including handshakes and fist bumps.
- All conversations with community or household members should be conducted outdoors.
- Where possible, label and assign equipment to individuals.
- Clean and disinfect field and laboratory entomological equipment between use and at the end of the day. Clean frequently touched surfaces in vehicles and workspaces between uses. Disinfectants recommended by the World Health Organization should be used, namely alcohol with 70-90% concentration or sodium hypochlorite at a concentration of 0.1% (1000 ppm)¹.
- Avoid use of mouth aspirators where possible and instead use handheld battery-operated mechanical aspirators. In those instances where mouth aspirator use cannot be avoided, aspirators should be fit with a HEPA filter.

Transportation for monitoring activities

- Specify the maximum number of occupants for each type of vehicle and if possible open windows while people are inside to allow ventilation.

¹ [World Health Organization. Cleaning and disinfection of environmental surfaces in the context of COVID-19. Interim guidance. 15 May 2020. WHO/2019-nCoV/Disinfection/2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-Disinfection/2020.1)

- Occupants shouldn't sit facing one another if there are opposed seats. Use of vehicles with seats facing each other should be generally avoided if possible.
- Maintain the same seating arrangements throughout the day of data collections; do not switch seats at each stop.
- Carry sufficient hand sanitizer and cleaning and disinfecting supplies, including for storage of waste, in vehicles at all times.

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 one 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, while wearing face masks and gloves.
- Ensure handwashing stations with soap or hand sanitizer are available, as well as gloves.
- Disinfect equipment (microscope, forceps, etc.) 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.

Larval collections

- Clean, disinfect, and properly dry larval collection equipment like dippers, buckets, pipettes, larval trays, sieve, and beakers before distributing to the entomology team.
- Label and assign collection equipment to each person. Each person should strictly use the equipment assigned to them at least until they complete one round of data collection.

Collection of indoor resting mosquitoes

- If available, use Prokopak, backpack, or mechanical handheld aspirators instead of manual mouth aspirators for the collection of live indoor resting mosquitoes.
- Only one person should collect mosquitoes by aspirator from a house at one time.
- Household members should remain outside the house for 10-15 minutes after the collector is done to allow for it to air out and allow the dust to settle.
- Use one collection cup or set of cups per house. Collection cups should be replaced between houses.
- If pyrethrum spray catches (PSCs) must be conducted, they should be conducted by only two individuals per house and white sheets must be cleaned and disinfected before use in another house.
- Avoid or minimize touching surfaces (including doors) and objects when entering houses to collect mosquitoes. Doors are to be opened by homeowners.

CDC light traps (CDC LTs)

- Only one person should enter a house to set up and take down CDC LTs.

- Clean, disinfect, and properly dry CDC LT components in between uses. Care should be taken when cleaning batteries to avoid electrical shock.

Human landing catches (HLCs)

- Where possible, HLCs should be conducted by trained home owners or household members of the selected houses.
- If four collectors capable of doing HLCs in six-hour shifts are not available in the selected households, assign two collectors to cover the entire collection period per house.
- As an alternative, train one or two household members to conduct HLC indoors while one entomology technician conducts HLC outdoors, using either a battery-powered aspirator or the tube collection method. This has the added benefit of providing on-site supervision/support to the trained homeowners.
- Permanently assign labeled collection equipment (e.g., aspirators, collection tubes, containers, etc.) to each HLC participant. Clean and disinfect other equipment needed for the HLC activity prior to supplying it to the collectors each day.

Wall cone bioassays

- Ensure that all materials used for the cone bioassay, such as aspirators, cones, paper cups, and rubber bands, are cleaned before and after the bioassay is conducted, and dried properly to ensure that they are not causing any mortality of mosquitoes during the bioassay tests.
- Use mouth aspirators to transfer mosquitoes into paper cups while still at the insectary or at the field station, prior to moving to the houses to conduct wall bioassays.
- In the field, use battery-powered aspirators* to transfer mosquitoes from the paper cups to the cones fixed on the wall and to retrieve exposed mosquitoes from the cones at the end of the exposure period. Users should refer to the aspirator manual and experiment with the aspirator prior to conducting assays to identify ideal performance parameters.
- If the battery-powered** aspirator has a collection chamber, cover the tip of the tube towards the collection chamber with a piece of untreated net to retain the mosquitoes in the tube and prevent entering into the chamber.
- To use the battery operated aspirators, aspirate-in the mosquitoes by turning-on the aspirators while outside of the houses, and transfer the mosquitoes to the cones by turning-off the aspirators and gently tapping the sides of the tubes while the tip of the tube is inside the cone fixed on the wall. The tip of the tube can be temporarily blocked with cotton wool or untreated netting to prevent escaping mosquitoes when the aspirator is turned-off and before transferring mosquitoes to cones or paper cups.
- Cone bioassays should be conducted by no more than two people per house.

ITN Durability Monitoring

- Interviews should be conducted outdoors and the interviewer and participants should maintain a distance of at least 2 meters. The interviewer should also wear a mask.

- Homeowners or household members should bring any ITNs to be sampled outside for the field teams to collect or assess; survey team members should minimize contact with household items.
- Ensure that all materials or equipment used for ITN hole counting are cleaned before and after use.
- Hole counting should be conducted outdoors and counters and those assisting should wear gloves while handling ITNs. Fresh gloves should be used at each household.

ITN bioassays

- Ensure that all materials used for the cone bioassays are cleaned before and after the bioassay is conducted, and dried properly to ensure that they are not causing any mortality of mosquitoes during the tests.
- Use battery operated aspirators* to transfer mosquitoes between paper cups and cones.

*If increased mosquito mortality due to suction pressure is observed, revert to using mouth aspirators equipped with HEPA filters.

** The fan speed of battery-powered aspirators is adjustable in most cases. Users must experiment the different options and determine appropriate fan speed that would have minimum impact on the mosquitoes prior to travelling for field for the actual work.