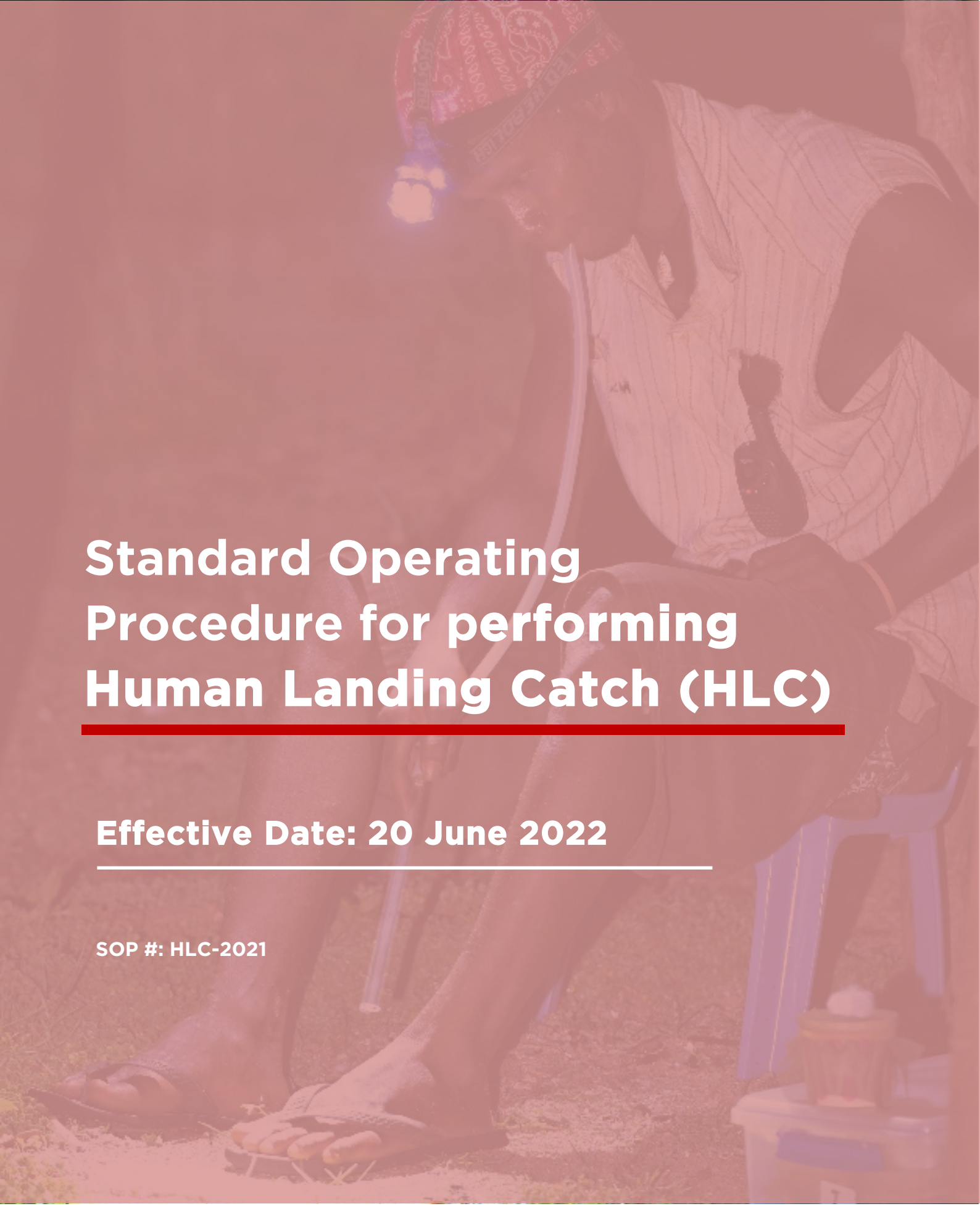


Standard Operating Procedure for performing Human Landing Catch (HLC)

Effective Date: 20 June 2022

SOP #: HLC-2021

PacMOSSI
Pacific Mosquito Surveillance Strengthening for Impact

Scope

The purpose of this SOP is to outline the materials and processes required to perform a human landing catch (HLC) of adult mosquitoes.

Overview

Description: HLC consists of collectors catching any mosquitoes that are attracted to them. Kerr (1933) working in West Africa was largely responsible for developing the HLC method, with has been widely used and is considered the gold standard method.

Target species and physiological states: Captures host-seeking females of many species.

Entomological surveillance indicators: Adult vector occurrence and density as well as adult vector behaviour (human biting rate, biting time, biting location).

Advantage: Is one of the only tools that can effectively estimate human biting rate, biting times and location. The equipment and supplies are inexpensive and portable.

Disadvantage: This method is labour intensive. There is a risk that field staff may become infected with mosquito-borne diseases. To mitigate the risk of malaria anti-malarial prophylaxis is provided; regarding arboviruses, HLC should not be done during times of known arbovirus transmission. Results depend on the collectors' skill and on the attraction a person exerts on mosquitoes.

Sample period: Catches are performed hourly across a 12 h or 24 h period, usually overnight.

Data: Total number of host-seeking females per sampling effort (by species). When necessary, field data is merged with the results of subsequent laboratory analyses.

Materials

- ◯ Oral aspirator (1 per collector + spares)
- ◯ Collection cups
- ◯ Rubber bands
- ◯ Cotton wool
- ◯ Mesh for cups
- ◯ Scissors
- ◯ Torches
- ◯ Batteries for torches
- ◯ Pencil/pens/markers
- ◯ Consent forms
- ◯ Data collection forms/digital device
- ◯ Labels
- ◯ Forceps
- ◯ Chloroform
- ◯ Microcentrifuge tubes
- ◯ Microcentrifuge tube storage boxes

Location of sampling stations

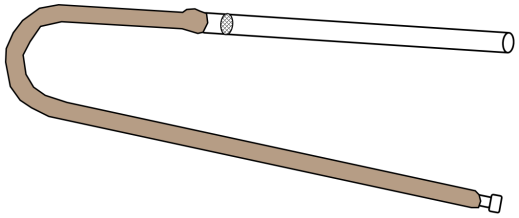
1. HLC can be performed in a variety of locations in houses, animal shelters, vegetated areas, on verandahs or in the peri-domestic area close to houses.

2. Typically indoor (inside the house) and outdoor (5-10 m outside the house in the peri-domestic areas) HLC are performed simultaneously and by hour to gather information on the amount of indoor and outdoor biting of mosquitoes and the range and time of peak biting activity.

3. Catches are usually performed at ground level.

4. The location of sampling is always negotiated with the owner of the property. Ensure that the owner is happy with the location of where sampling will be conducted.

Sampling procedure

1. Ensure collectors have mouth aspirators to sample mosquitoes.	
2. Ensure collectors have collection cups to store collected mosquitoes in during sampling. **a. At the start of the night, set up sufficient paper cups for the work. Ensure that the cups are used in the correct order for time.** **b. For further details about collection cups see SOP# MOS-2021.**	

3. **Collector position:**

   a. Commonly people sit on a stool and wait for mosquitoes to land on them.

   b. Collectors should face downwind of any breeze.

   c. Trouser legs should be rolled up to expose bare skin from the knee down.

4. **Collectors catch any mosquitoes that land on their exposed legs with an oral aspirator.**

   a. For further details about using an oral aspirator see SOP# MOS-2021.

5. **Transfer the mosquitoes from the aspirator to the cup.**

6. **Temporarily store the mosquitoes in labelled collection cups until processing and long-term storage. For further details see** SOP# MOS-2021.

Additional notes:

- **Whenever possible landing mosquitoes should be caught before they bite**

- **The catches for each hourly interval should be stored in separate collection cups labeled with date, location and hour of collection (e.g., 6pm to 7pm, 7 pm to 8 pm, etc).**

- **Usually there are multiple stations where HLC is conducted at across the night, the collectors (singularly or in a pair) should rotate across the stations to minimise bias due to the attractiveness (or skill) of individuals. One full night sampling effort may be completed by a team of two collectors with one individual collecting 'early' from 18:00 – 24:00, and another individual collecting 'late' from 24:00 – 06:00.**

- **Do not collect more than five mosquitoes in one sucking tube before transferring them to the paper cup.**

- **Mosquito collections for anopheline will be recorded for each hour between sunset and dawn but the hours of collection may be changed based on knowledge of the biting behaviours. Generally, it is good that collections start before the time of earliest biting and end after host seeking has stopped.**

- **When collections occur at night or in dark locations, torches are required – head torches are very useful as they provide a hands-free solution. People have used red lens (~680 nm) which is considered invisible to mosquitoes and therefore does not impact feeding behaviour.**

Videos

To watch a video on how to perform human landing catch go to:

- PacMOSSI How to conduct human landing catch: https://youtu.be/8Br10jfbz7s

- APMEN Human landing catch tutorial here: https://youtu.be/Ym47_gYeEYg

Human ethics

Where human ethics approval is required and granted, human landing catch participants will be recruited following standard informed consent procedures. The potential risks and benefits of mosquito sampling will be discussed verbally in the local language. It will be explained that participation in human landing catch would involve exposure to potentially infectious mosquito bites but collectors will be given anti-malarial drugs to prevent them from becoming infected with malaria.

Village collectors should be screened for malaria parasites using RDTs. If any of the collectors are infected with malaria, they should be treated with the antimalarial standard of care in the country where the work takes place.

For further details on human ethics see SOP# MOS-2021.

Safety/Risk assessment

Your workplace may require you to complete a risk assessment prior to conducting field work. There are a range of risks to which field workers could be exposed, and when sampling with human landing catch may include:

- Mosquito transmitted infections (Note: if working in a malarious area, provide access to malaria prophylaxis, rapid diagnostics and first-line malaria treatment)
- Chloroform
- Dogs

For further details on safety and risk assessments see SOP# MOS-2021.

References

Kerr J. (1933) Studies on the abundance, distribution and feeding habits of some West African mosquitos. *Bulletin of Entomological Research*. https://doi.org/10.1017/S0007485300035458

WHO. (2013), 'Malaria entomology and vector control. Guide for participants.' *World Health Organization*, Geneva, Switzerland. http://apps.who.int/iris/bitstream/handle/10665/85890/9789241505819_eng.pdf;jsessionid=5A0053696449FC8F7A5B1502B5D60BCD?sequence=1

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