Pan American Health Organization
World Health Organization
Regional Office for the Americas

PAHO

Interim Guidelines
Version 1

Control of *Aedes aegypti* in the scenario of simultaneous transmission of COVID-19

1. Introduction

Outbreaks of arboviruses transmitted by *Aedes aegypti* regularly overload health systems, and the situation may become more serious in 2020, with a complex epidemiological scenario of simultaneous transmission with COVID-19. Early detection and prompt medical attention to patients with severe dengue or other arboviruses has helped to dramatically reduce the case fatality rate from these diseases. However, the reality of the possible co-circulation of Dengue (DENV) and COVID-19, in the Americas and in the world, imposes new challenges for the treatment of cases that require immediate attention. Likewise, the impact on human health of the co-infection of any of the DENV and COVID-19 viruses is unknown. All efforts should be made to protect populations at risk and try to reduce the epidemic co-circulation of both viruses.

In addition to taking preventive measures to reduce the risks and spread of COVID-19, such as hand washing, respiratory hygiene recommendations of sneeze and cough etiquette, avoiding close/frequent contact with people with symptoms, and following distancing recommendations it is essential that health programs give continuity to essential *Aedes aegypti* control activities. **Vector control activities should be undertaken while observing the measures adopted by health authorities to control the pandemic of COVID-19 and with participation of families and individuals.**

A set of temporary recommendations for vector control programs, health agents and the population are described below, which must be adapted to the context of each country and according to their response capabilities. These recommendations are based on currently available evidence, and with the expectation that all vector control interventions and actions are accompanied by a communication campaign that explains and reinforces *Aedes aegypti* control options and personal protection measures. The selected communication channels will depend on the preferences of the target populations and country's capacity to make use of mass media and social networks.

2. Preparatory Activities

2.1 **Risk stratification for dengue**: There is an urgent need to carry out control actions based on the stratification of cities (or geographic areas), given potential risk of transmission of dengue and other arboviruses in order **to minimize the displacement** of the health agents responsible for the actions. The stratification uses historical information for the city and will allow prioritizing interventions based on the identification of areas with more transmission (high number of cases,

higher incidence rates, etc.), or areas with higher transmission potential (high vector density, introduction and/or recirculation of DENV, CHIKV, ZIKAV). More details on stratification methods can be found in ***Technical Document for the implementation of interventions based on generic operational scenarios for the control of Aedes aegypti (PAHO, 2019)***, the main stratification methods, the variable required for stratification and the recommended control interventions are detailed. https://iris.paho.org/handle/10665.2/51654

2.2 Characterization of *Aedes aegypti* breeding sites: the information from the available entomological surveys should be used to identify the main and most productive breeding sites of larvae or pupae (key breeding sites). After identifying key breeders, they should be monitored (and eliminated whenever possible) by families and individuals, with the support of the media and/or vector control staff. There is an important opportunity to convey clear messages to families and individuals to control all their breeding sites during this time of social distancing. This social mobilization will be combined with the work of health teams (doctors and nurses) and the health agents who will focus on the most important breeding sites with the application of chemical and biological larvicide, when necessary and **respecting and adopting the protection guidelines for COVID-19.**

2.3 **Management of the most frequent breeding sites**: Among the most common breeding sites in the region are water tanks used by families and individuals. Therefore, it is necessary to offer the population simple and effective options for the safe use of water tanks, given their use and the frequency and diversity of size and construction material, for example (1) top or cover with mosquito netting water tanks, (2) brush with detergent and rinse the water tanks internally, at least twice a week, among others.

2.4 Implementation of the control of the adult vector: Brigades of health agents should be organized for the spatial or residual application (intra or extra domiciliary) of insecticides in the identified risk areas. To achieve a reduction in the mosquito population, adult mosquito control activities with insecticides must be carried out in coordination with interventions to reduce mosquito "breeding sites". In addition, it is important that efforts to control breeding sites in and around houses are maintained for this application to be effective, **which must be reinforced through educational messages directed at families and individuals, using the available communication channels (tv, radio, social networks, etc.).**

2.5 **Care and protection of the health agent during the home visit**: surveillance and control activities that require the action of the health agent (chemical or biological treatment of breeding sites, spatial or residual application of adulticides), already have specific indications regarding the use of personal protective equipment (PPE), which are useful in protecting professionals. In the context of circulation of COVID-19, the health agent must take in to account some additional precautions before entering the home, such as the following:

- In homes with confirmed cases of COVID-19, at the time of the visit, vector prevention and control guidelines should be provided by the heath teams that aid patients. Health workers should not do activities inside these houses.

- It is important that health agents receive basic training focused on protection for COVID-19. You can use the material available online to carry out this training, (https://openwho.org/courses/introduction-to-ncov)
- Maintain a minimum distance of 2 meters from the residents of the homes.
- Ask before entry if any inhabitant of the home has a fever, cough or other symptoms compatible with dengue or with respiratory infections;
- The health agent must adopt the use of a mask and gloves (disposable) recommended for COVID-19;
- Do chemical and/or biological treatment in the home environment without the presence of the suspicious inhabitant. If the person cannot leave the room where they are, do not carry out the application in this room.
- Maintain distance, and do not touch on any surface, and do not enter the room with the sick person and use the PPE indicated by the health authorities are the indicated measures to avoid exposure to COVID 19;
- Do not enter the Room where the person with suspicious symptoms of COVID-19 is;
- Make chemical and / or biological treatment in the rooms of the residence without the presence of the suspicious inhabitant.
- Notify the suspect's health authorities, in accordance with the guidelines establish in each country and city.

3. Control method options

Dengue and other arbovirus prevention measures are based on actions focused on the vector mosquito *Aedes aegypti*, the main vector of dengue in the region of the Americas. These actions can be divided into two main groups: (i) control of the various stages of *Aedes aegypti*, which seek to prevent the mosquito from developing from egg to adult, or reduce its abundance/longevity, and (ii) reduce contact between mosquitoes and human, that is, aimed at preventing the mosquito from biting. Considering that the mosquito has domestic habits, the involvement of families and individuals in the elimination of breeding sites from their homes is essential, especially those in which chemical or biological treatment carried out by a health agent is not required. The current social distancing scenario faced by many countries imposed by COVID-19 can be used to encourage the community to reduce the risk of transmission in their home by elimination or controlling mosquito breeding sites.

3.1 Control of eggs, larvae and pupae

Breeding sites Type	Control Methods	Responsibility
Disused and/or disposable containers	- Eliminate small containers such as cans, bottles, old cans and buckets, tires, etc. - For those whose disposal is not possible (for example, tires and large furniture),	- Families and individuals with the reinforcement of the media

	make sure that they are stored correctly so that the water cannot accumulate, or they are recycled. -	- Coordination with the municipality - Other sectors (garbage collection services, recycling, municipal landfill)
Disused containers, but useful	- Containers such as cans, buckets drums, etc. must be turned or stored properly under cover	- Families and individuals with the reinforcement of the media -
Containers and tanks that store water and in use.	- To remove eggs and other immature stages of the mosquito, empty, clean and scrub the tanks internally every 5 days, before refilling them. - Place mosquito nets that do not allow mosquitoes to enter the tanks, and thus avoid laying eggs - Apply WHO prequalified larvicides to kill immature forms of the mosquito. The application of chemical or biological larvicide will be done where it is not possible for the population to carry out its elimination of physical protection. The treatment cycle will depend on the seasonality of the transmission, the rainfall patterns, the duration of the efficacy of the larvicide and the types of larval habitat. Furthermore, this activity must be in line with the guidelines of the health authorities so that the expansion of COVID-19 is avoided.	- Families and individuals with the reinforcement of the media - Health agents
Structures in home homes and peri-domicile	- Clean roof gutters and air conditioner trays - Treat, or empty and keep without water swimming pools, in case it is not used - Clear the drains	- Families and individuals

Note: the other environmental risks that operate at the area level, such as drainage systems junkyards, tires, etc., must be monitored and intervened by the competent authorities in accordance with local technical indications so that they do not become breeding grounds for mosquitoes.

3.2 Control of adult *Aedes* mosquitoes

The use of insecticides for the control of adult *Aedes* mosquitoes is an activity that should be carried out by trained professionals, and in many of the countries of the Americas, it is an activity exclusively for health agents.

3.2.1 Spatial application

In outbreak situations, the implementation of the spatial application of insecticides is necessary with the aim of rapidly eliminating the adult mosquito population and reducing dengue transmission, and WHO prequalified insecticides are recommended (https://www.who.int/pq-vector-control/prequalified-lists/en/), and preferably based on evidence of susceptibility of the local population of *Aedes* to the applied products. Another methodology that can be used are intra-home applications with thermal fogging, low-volume spray (LV) and ultra-low volume (ULV) are much more effective than extra-home applications if properly applied within the environments where the *Aedes* rests and bites to feed.

3.2.2 Residual application

The intradomicile application should be selectively directed at resting places of the *Aedes aegypti*, such as under furniture and on dark, wet surfaces. Selective application, and especially residual application, Will not require the use of insecticides throughout the home and will decrease the agents visit time. Respective precautions must be taken not to fumigate storage tanks for drinking and cooking water. It is not important to say that the use of this methodology helps to reduce the need for other insecticide applications to be made in treated areas for a period of up to 4 months; which would avoid new visits by health agents in that period of time. This methodology is also important to protect health units, schools and churches.

Note: For adult mosquito control activities, health agents should adopt the same recommendations indicated in the home visit as previously described under heading 2.5 of this document.

Additional information on topics related to the application of insecticides can be obtained at the following links:

- List of insecticides prequalified by WHO:
  - https://www.who.int/pq-vector-control/prequalified-lists/en/
- Residual intradomicile appliacion for Aedes control:
  - https://iris.paho.org/handle/10665.2/51638?show=full&locale-attribute=pt
- Spatial application of insecticides:
  - https://apps.who.int/iris/handle/10665/68057
- Videos on the use of insecticide application equipment and personal protection:
  - https://www.paho.org/hq/index.php?option=com_wrapper&view=wrapper&Itemid=72335&lang=en
- Equipment specifications for insecticide application:
  - https://www.who.int/whopes/resources/9789241500791/en/

3.3 Personal protection measures

Messages for the population with guidelines on the adoptions of measures to minimize contact with mosquitoes are fundamental and must be widely disseminated by the health authorities of the countries. The main personal protections measures include:

- Application of repellents on expose skin containing DEET), Ir3535 or Icaridin. Repellents must be used in strict accordance with the indications on the product label (https://www.paho.org/hq/index.php?option=com_content&view=article&id=11841:preguntas-frecuentes-control-vectores-virus-zika&Itemid=41711&lang=en);
- Wear clothing the minimizes exposure to mosquito bites (pants, long-sleeved shirts);
- Use mosquito nets on windows and doors to reduce the possibility of mosquitoes entering the home;
- Use mosquito nets to sleep or when resting during the day. This measure is especially indicated for pregnant women, children, the elderly and sick individuals.

3.4 Activities in high-risk places (nursing homes, health units and hospitals)

Due to their high vulnerability and risk of transmission of arboviruses and COVID-19, they must receive special attention from vector control programs and bust be free of the presence of *Aedes aegypti* in and around, and for that it is recommended:

1. Mapping of these places and that an entomological risk assessment be carried out to support decision-making as to the best and most effective control action and its subsequent execution.
2. Constitute special brigades to act in these places, with the use of appropriate PPE.
3. Prepare the work plans for the execution of the identified control actions.
4. Train the professionals of these places to keep the place free of the mosquito vector.

4. References

- Organización Panamericana de la Salud. Documento técnico para la implementación de intervenciones basado en escenarios operativos genéricos para el control del Aedes aegypti. Washington, D.C.: OPS; 2019.
- Organización Panamericana de la Salud. Manual para aplicar rociado residual intradomiciliario en zonas urbanas para el control de Aedes aegypti. Washington, D.C.: OPS; 2019.
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- World Health Organization. Equipment for vector control specification guidelines, second edition; (2018).
- World Health Organization. Vector control operations framework for Zika virus; (2016).
- World Health Organization. Space spray application of insecticides for vector and public health pest control: a practitioner's guide; (2003).
- Combining contact tracing with targeted indoor residual spraying significantly reduces dengue transmission. Vazquez-Prokopec et al. Sci. Adv. 2017;3: e1602024