

EMERGENCY GUIDELINES FOR VECTOR CONTROL



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These guidelines have been prepared in the light of best practices available in the world for vector control under **Flood, emergency, epidemics situations and natural disaster**. These guidelines are also very effective for the **armed forces** when they deployed in a new area, particularly in forests. This is an approach that aims at strengthening provincial/district level capacities in entomology and vector control as well as the promotion of functional national mechanisms for inter-sectoral coordination for cost-effective and sustainability of vector control interventions under natural disasters and epidemics and depending on local settings. These guidelines mainly focus on following main areas;

1. Selective Indoor Residual Spraying (SIRS)
2. Larviciding
3. Personal protection (use of LLINs, Repellents, etc)
4. Health education
5. Space spraying

1). SELECTIVE INDOOR RESIDUAL SPRAYING (SIRS)

Indoor Residual spray should only be adopted when necessary infrastructure to be sprayed exists (e.g. Stable house structures, tents, barracks etc.). In routine following are key points of national vector guidelines for SIRS;

1. Spraying must be completed at least one month before the start of transmission (normally July).
 2. At least two cycles of spraying (July & -----) should conducted in areas of stable malaria.
 - 3.
- Special mobile malaria squads (Entomologists, Assistant Entomologists, Malaria Supervisor, Malaria Superintendent, Assistant Malaria Superintendent, Insect Collector etc) should be raised to carry out vector density surveys as far as possible in the affected areas.
 - Indoor Residual spraying activities should be completed as soon as possible before the peak transmission period.
 - Try to finish spraying in shortest period of time by employing more number of
 - The recommended dose of deltamethrin and Alphacypermethrin should be 25-30 milligrams/m² - active ingredient) for plastered smooth surfaces. In case of mud walls, dose might be 75 milligram/ m²
 - Always use equal distribution (E type) nozzle for indoor spraying.
 - Make sure up to 80% coverage of target area with insecticides.
 - All sleeping rooms, stores, bath rooms and animal sheds should be sprayed thoroughly.

- The spraying of animal shed will also be helpful to control leishmaniasis in addition to malaria.
- Ceilings of rooms particularly if made of straw must also be sprayed along with walls.
- Doors and windows from inner side and undersides/behinds of furniture boxes should also be sprayed.
- Treatment of curtains will be most useful to control mosquitoes.
- After spraying, close the room for at least one hour.
- Keep the children and animals away from room for this period.
- Never leave any food item inside room during spraying and always transfer food item insides at least after one hour of spray.
- Never clean (broom) the wall after spray.
- In case of displaced population or deployment of armed forces, spraying the tents from inside will also be very effective and spraying operation should be completed before mid of the day.
- In such cases spraying should be done after the transportation and installation of tents.
- Hang a black cloth sheet (CHADDAR) in rooms (preferably in corners) and spray it thoroughly. This will give maximum mortality of vector mosquitoes resting inside.
- No need of spraying in open air or on debris/garbage.

In case of heavy rains and subsequent floods and outbreak of the disease the top most priority should be given to "Personal; Protection using LLINs, repellants, cloth treatment as explain in **table -----**.

- Best practice to control vector densities and transmission is to find and eliminate their breeding places. However, larviciding is very effective tools when carried out during dry months.
 - Larviciding should be carried out very carefully after proper breeding sites assessment surveys and mapping.
 - Normally there should be no larviciding during rains and floods.
 - Larviciding should be carried out at least two to three weeks of cessation of rains (permanent water bodies).
 - Larviciding should be focused only to those water bodies which are close to human population (with 1-2 kilometer radius).
 - Larviciding should be focused in water bodies less than 100 sq. meters of size.
 - In case of very large water bodies >100 sq. meters, larviciding (if very necessary) should be confined to areas where there are emergent vegetations along margin.
 - Granulars (Fenthion 2g) should be sprinkled along the 2-3 feet from margin. The dose of Fenthion 2G should be 75 gram per 100 sq. meters.
 - Liquids larvicides (Temephos 500E) should be sprayed along margin up to 3-4 feet.

- No larviciding should be done in the center of water bodies.
- The recommended dose of Temephos should be 1.5 lit/5hec. (0.5 ml/ m²).
- Ideally larviciding should be carried out at 2nd and 3rd stage/instars of development stage of mosquitoes.
- For spraying of larvicides, hallow/solid cone nozzles are only recommended.
- Direct mixing of liquid larvicides (Temephos) is strictly prohibited.
- For most efficient larviciding program, treatments must be repeated at fairly short cycles which may vary from 10-15 days depending upon larval density and availability of resources (2-3 cycles per month). Larvicides should be carrier out for at least 2 months.
- In areas with very strong wind movements larviciding should be confined only along margin downwards of wind.

3). PERSONAL PROTECTION

A). Use of Long lasting Insecticides treated bed nets (LLINs & ITNs)

The use of Long Lasting Insecticides Treated mosquito nets (LLINs) should be the one of the major intervention particularly for peoples living outdoor during peak breeding season. Following are the major instruction for the use of bed nets as per national guidelines;

- **ONLY** WHOPES approved bednets will be promoted and will be used in the country.
- All population at risk during flood/epidemics will be provided bed nets.
- Major Target groups for distribution of bed nets should be pregnant women and children <5 year.
- 2 bed nets per house hold or at least 1 per tent will be provided.
- Armed forces when deployed outdoors during rainy/flood days must use LLINs.
- Every *P. falciparum* confirmed malaria patient must be kept under LLIN.
- Leishmaniasis patients should also kept under LLINs.
- Dengue patients should also be kept under bednets.
- After opening of packet, bed net should be spread under shade for 1-2 hrs before use.
- Never leave the net in sun in day time after use.
- Never fold the net after use but hang it in room or tent (preferably in corners).
- The use of LLINs as curtain will also give significant control of vector densities.
- In tents, LLINs should also be used as curtains at entrance.
- Keep the bed net away from hooks (nokdar objects).
- Put the hanging edges under bed before sleeping.
- In areas with humidity >80% (as usual in rainy days), LLINs must be kept in open air under shade for 1-2 hours before use.
- Bednets should be washed after at least 4 months.
- Don't wash LLINs during rainy days.
- Washing should not be done in lakes, well and other drinking water resources.
- Avoid the washing of bed net during peak transmission months.
- During emergency/epidemic/natural disaster washing of net should also be avoided

- Make sure the 80% coverage of target population particularly children below 5 years and pregnant women and rest population will be automatically protected through 'Community Effect'

B). Use of repellents

The repellents containing N, N-Diethyl-m-toluamide (DEET), ICARIDINE (odorless and more advance form of repellants) etc are highly recommended.

The repellants should be applied to exposed part of body to prevent mosquito bites.

- Children <5 and pregnant women could use cream, lotion and other repellent at time of sleeping, particularly when sleeping outdoors. However prolong use of more than 2 months should be consulted with doctor.
- These repellents should also be used for children <5 years even when they are not sleeping. However in this case no material should be applied to their hand and/or faces.
- The repellent which gives at least 8 hrs should be used.
- For acceptance to community a repellent should not cause any irritation on skin.
- Clothing can also be treated with DEET, ICARIDINE etc to repel mosquitoes.
- Natural repellants like Garlic, onion, neem, Cedar, Eucalyptus spp, cloves oils, can also be used.
- In case of room, burn the leaves of neem, Eucalyptus spp (smoke only) inside and close the door and windows for at least half an hour. This practice should be done at least 2-3 hours before sleeping.
- In case of open air, burn (smoke) the leaves of neem, Eucalyptus spp close to sleeping place at the time of sleeping however any fire or burning item should be kept supervised for fire safety. It is recommended that such fogging is undertaken at least 1 hr before the sleeping time and stopped before sleeping for avoiding health hazards.

C). Screening of houses.

- Mosquito-proof screens on doors and windows should be promoted to prevent the entry of mosquitoes.
- Screen of mesh size 150-170/ inch² or 25-30/cm² should be used.

D). Others personal protection measures

- Wear long sleeves
- Full trousers
- Loose fittings
- light color cloth

These cares are particularly recommended for children <5 years of age.

These measures are very effective for personal protection from mosquito biting.

These measures should be promoted through health education campaign.

4). HEALTH EDUCATION

- Health Education unit through public participation should be into fully operation at community level for;

- a) Promotion of self protection practices against malaria (use of bed nets, repellents)
- b) Promotion of prompt treatment seeking behavior
- c) Cleanliness of the surroundings
- d) Draining of standing water
- e) Treatment of stagnant water with used motor oil and chemicals (larvicides) where necessary.
- f) Sensitization of district government.

5). SPACE SPRAYING/FOGGING

- Space spraying should be considered as epidemic contingency measure.
- The space spraying is not recommended for routine vector control operations in Pakistan at present.
- Space spraying is usually designed to provide a rapid knock-down effect on exophilic vector mosquito in emergency or epidemic situation.
- It should be implemented in a compact community and should be within 500 meter radius of affected areas.
- For endophilic vector mosquito control during emergencies situation, particularly for dengue control space spraying should also be an important component of vector control. However, it should be concentrated inside houses with the help of hand carrying fog machines (Indoor thermal fogging).
- A team of 2 persons should target 75-100 houses per day.
- The person operating should move backwards, from one end of house to other, starting with upper floors.
- Other persons should assist in moving furniture, exposing hidden sites and guide the spray man through tight spaces.
- During indoor fogging windows and doors should be closed.
- Residents and pets should move out.
- Leave the room closed for at least 15-30 minutes after treatment.
- **For out door fogging**, first prepare plan with respect to layout of streets and wind directions.
- Fogging should be done perpendicular to the wind direction.
- While using vehicle mounted fog machine, maintain speed of vehicle 5-10 km/hr.
- There should be 3-4 cycles/month during the epidemic/emergency situation.
- In case of outdoor fogging, the operation should not be carried out when;
 - ▶ wind speed is >10 km/h.
 - ▶ wind speed is less than 3 km/h
 - ▶ Relative humidity is >90% (during/immediately after rains)
- Ask community to open doors and windows during fogging operation.
- Space spraying must be conducted at the time of peak activity of adult vector mosquitoes.
- Follow the dose criteria of manufacturer mentioned on label.

