Operational guidelines for Dengue prevention and control in emergency situation

To reduce and control dengue outbreaks in emergency situation a number of actions need to be taken by public health authorities, other stakeholders and the community.

Following actions are recommended to mitigate the current outbreak within a short period and should be continued until the outbreak is controlled. Outbreak response action plans should commence with the high risk GN/ PHI areas.

1. Vector control
   1.1. Space spraying or fogging for adult vector control
   1.2. Breeding sites treatment (Larviciding)
2. Environmental management
   2.1. Source reduction
   2.2. Personal protection measures
3. Monitoring and communication

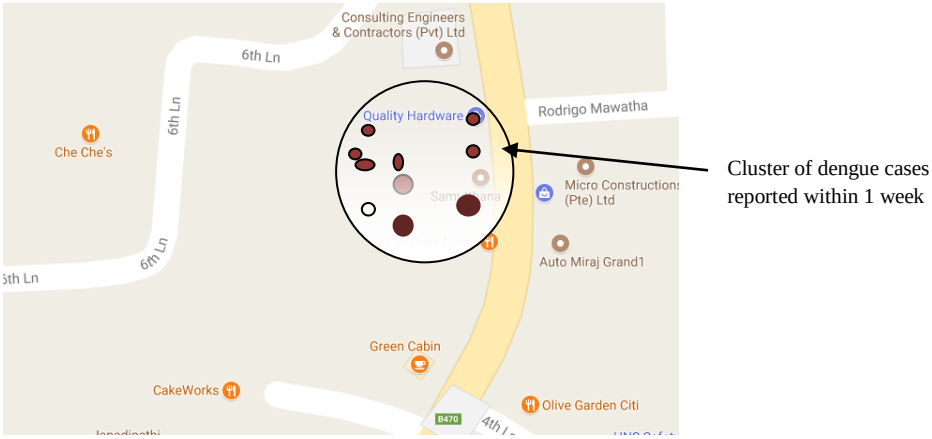
1. Vector control

1.1. Space spraying or fogging for adult vector control

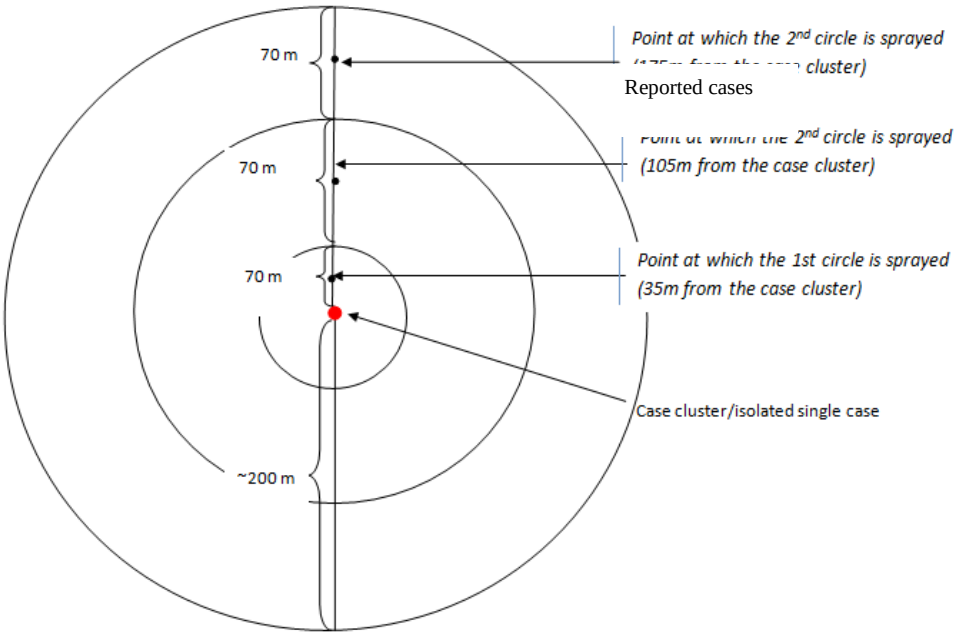
- Fogging is essential during this emergency situation.
- Even though the elimination of breeding places should be of high priority in affected areas, routine fogging needs to be carried out.
- The aim of the fogging operation is to kill or knock-down any adult *Aedes* (dengue) mosquitoes that may be carrying the dengue virus.
- Fogging operations should be continued until dengue case numbers have dropped substantially (to pre outbreak levels).

Important steps for fogging operation for a single/cluster of dengue cases

- The first round of fogging should be carried out as early as possible of the notification of the case (at least, within 2 days of the notification) or a cluster of cases should be fogged at least within a week.
- There should be a prior announcement to the community about the date, time of the fogging activity and important preparatory actions to be taken.
- The streets maps of the area marked with the reported cases must be studied carefully before the fogging operation begins. See e.g. below:



- The area covered should be at least 200m within the radius of the premises/ cluster of premises where the dengue cases are located.
- Following diagram could be used as a guide to cover required area considering local situation (e.g. street lines, wind direction etc.)



- Fogging should be done perpendicular to the wind direction. When using vehicle mounted fogging machine, speed of vehicle must be maintain at 5-8 km/hr
- The downwind side of spray area should be treated first working systematically from downwind to up wind
- It is required for residents to leave all doors and windows in their house open at the time of fogging as this will allow the fog to enter the house and kill any mosquitoes inside
- Outdoor fogging operation may require combination of vehicle mounted and hand held machines particularly for areas with difficult or limited vehicle access.

- Depending on the area to be covered relevant vector control officers should deploy sufficient number of hand-held fogging machines and vehicle mounted fogging machine.

- The fogging operation is best to be carried out when;
- Wind speed is <10 km/h.
- Day time heat is <28 ^{O}C (6.30am – 10.30am and 4.00pm – 6.00pm- as this is the time when the dengue vector is most active and is looking to bite))
- relative humidity is < 85% (do not fog during and immediately after rains)

- Following insecticides should be used accordingly in given concentration.

Table 1. Insecticides and their relevant concentration used in thermal fogging in Sri Lanka

Insecticide	Mixing proportion		Required insecticide amount for 5 Litre capacity hand held fogging machine	Required insecticide amount for 50 Litre capacity vehicle mounted fogging machine
	Insecticide	Kerozine oil/ Diesel		
Pesguard® FG 161 (Indoor+outdoor)	1	159	30 ml	300ml
Technical malathion (outdoor)	1	19	250 ml	2.5litre
Gokilahts® 5 EC (Indoor+outdoor)	1	99	50ml	500ml

1.2. **Breeding sites treatment (Larviciding**)

- In situations, when elimination or rearrangement of breeding places are not practical, regular larvicide spraying with mist blowers or hand compression sprayers using Temephos 50EC and Bti are recommended.
- For special situations (e.g.: cement tanks, roof gutters etc.) Temephos 1% SG is recommended.
- Following are the doses recommended by the National Dengue Control Unit

Table 2. Insecticides and their relevant concentration used in larviciding activity in Sri Lanka

Product	**Formulation**	**Application methods**	**Dosage (active ingredient) Container breeding (mg/l)**	**Dilution factor**	**Frequency of application**
Temephos	EC	By hand compression sprayers,	01	20 ml in 09 liters of water	Fortnightly intervals
Bti	Liquid	mist blowers		3.5 l of Bti to 6.5 l of water	Fortnightly intervals
Temephos	GR	in cotton cloth pouches(put the required amount of granules in the pouch and keep it suspended in the water	1ppm (1g of the product in 10 litres of water)		03 months interval
Sumilarv 0.5G	GR	Direct application	2g per cubic meter of water volume		4-6 weeks

Additional stocks of insecticides are issued to MOOH via RMO-office, Anti Filariasis Unit, from National Dengue Control Unit (NDCU) on demand.

2. Environmental Management

2.1. Source reduction

- Residents of the community should get together and collectively remove mosquito breeding places from their houses at least once a week.
- Community health committees (including Grama Niladari and community leaders) should be empowered for regular inspection and motivating community.
- Responsible officers of government and private institutions, religious places, schools, institutions of higher education should arrange programmes at least one hour per week on a selected date to remove mosquito breeding places from their premises.

(Refer: Immediate intersectoral action plan for Dengue prevention and control)

2.2. Personal protection measures

- Personal protection methods which are used to prevent infected mosquito bites, include the use of:
- Repellants - most commonly used method to prevent biting. They are applied directly on skin or to cloths and they evaporate much quickly. Children and pregnant women should use repellents day time and at time of sleeping
- Bed nets - people should be advised to use mosquito nets during day time sleeping giving priority to pregnant women and children
- Protective clothing – People, especially children should be advised regarding wearing protective cloths during outdoor activities.

3. Monitoring

- Each activity should be monitored and supervised by the relevant authorities to get the maximum benefit of the control programme.

- Regular review meetings at village and sub-divisional levels should be organized
- Weekly meetings of divisional (MOH) outbreak response team
- Review district and divisional level dengue situation, vector surveillance and control measures, entomological data and logistics
- Ensure preparation of brief reports on district dengue situation and vector control measures and send copies to DGHS, PD, Epidemiology Unit and NDCU

Monitoring Format 1: Fogging activity should be monitored using following format

Date	MOH area	Locality – street name	No. of hand held machines used	No. of vehicle mounted fogging machines used	Time		No. of fogging rounds	*Amount of insecticide used (ml)			Amount of diesel/kerosene oil used (L)	Signature of supervisor
					starting	End		P	TM	G		

*Pesguard-P, Tehnical malathion-TM, Gokilaht-G

Monitoring Format 2: Larviciding application should be monitored using following format

Date	MOH area	Locality –street name	Number of breeding places treated	*Amount of insecticide used (ml/g)				Signature of supervisor
				A,E	A-G	B	S	

*A,E- Abate EC, A,G-Abate Granule s, B-Bti , Sumilarv 0.5G

Communication

- Establish a communication linkage within the health and other sectors
- Supply adequate communication materials, public addressing systems to facilitate field activity.
- Provide weekly entomological indices and data to AGA office, PHI office, PHM office and GS office

National Dengue Control Unit
Ministry of Health, Nutrition and Indigenous Medicine