

Dengue Fevers in Taiwan

Strategies for Prevention, Implementation and Operations of Organization



The southern part of Taiwan, the area most seriously affected by Dengue Fever, is where *Aedes aegypti* is found. *Aedes aegypti* is a non-indigenous species on Taiwan island; if we completely eliminate breeding sources of mosquitoes, keep natural and living environments clean, and properly use pesticides, we shall reach a target of eliminating *Aedes aegypti* and reducing the proliferation of *Aedes albopictus* (To be scattered under 1,500 meters of the plain and mountains in the island)

And, the elimination of breeding places is the first strategy for Dengue Fever prevention (i.e. the first class prevention). The second strategy is to create an effective monitoring system; in case of discovery of any cases of dengue fever, proper measures should be adopted to guard against the epidemic (i.e. the second class prevention). The third strategy is to intensify the functions of health care and to reduce death rate in patients with dengue hemorrhagic fever (i.e. the third class prevention).

{1}. Primary prevention

(i.e. eliminating of breeding sources and control of infectant mosquitoes)

[1] Since no vaccine can prevent the infection with Dengue Fever, once patients are infected with it there is no medicine to cure them and kill the bacteria living within their bodies. However, through an intensive propagation of health education via different channels, people become well aware of Dengue Fever prevention; in addition, through cultivating in daily life the habits of not-creating the mosquito breeding places and eliminating the breeding places, the infection can be prevented. The key points of health education are as follows:

- (1) Knowledge of epidemic characteristics and prevention of Dengue Fever (e.g., a brief introduction regarding Dengue Fever/Dengue Hemorrhagic Fever, channels of infection, clinical symptoms, etc.).
- (2) Recognition of breeding sources and cultivation of habits of not-creating the mosquito breeding places and eliminating the breeding places
- (3) Cultivation of the awareness and daily habits in regard with the infection prevention (e.g. when visiting the domestic or foreign areas affected by the disease, one should wear long sleeve clothing and apply

some ointment preventing from mosquito stings to uncovered body parts, etc.).

- (4) Concept that only a complete elimination of breeding sources is a permanent cure, while spraying medicine as is just a measure of coping with symptoms or temporarily with emergency.
- (5) Some of the Dengue Fever symptoms are not evident; in case of suspected infection, one should receive a physical examination (especially tourists from a foreign country)
- (6) Knowledge of the previous symptoms how dengue fever causes hemorrhage, shock and the related a serious illness, and the timing to visit hospital urgently.
- (7) Strengthening of health education among employers who hire foreign labor.

[2]. Mobilization of community organizations, overall elimination of breeding sources and maintenance of clean homesteads.

- (1) Collecting information on all sorts of community organizations which can be mobilized (including schools, governmental units, companies, religious and private groups, markets, women's and elderly clubs, and volunteer groups)
- (2) Building a mechanism for organization mobilization in communities
 1. Integrating the related works of all communities of ministries, councils and bureaus (for example, health, environmental protection, culture etc.) of the central government . The municipal city and county(city) governments are responsible for requesting each of their country(town, district and city)offices' responsibilities on mobilization and check. Each of neighborhood(or village) is the unit of mobilization. The head of neighborhood(or village) or head of basic community is responsible for coordination among inhabitants and concerning groups in the community, who improves environment and sanitary, cleanses the breeding places and checks(if necessary, does cross checks).
 2. The municipal city government, county(city) government and each unit of village(town, city, district) should direct the groups and companies to cooperate under jurisdiction .
- (3) Tasks of the organization mobilization
 1. To list the main areas of breeding sources such as unused land, houses or a public facilities (i.e. activity centers in a community, markets, basements, factories)

2. To participate in sanitation education and to enlarge training of seed personnel

3. To remove the breeding sources from indoor and outdoor thoroughly:

Indoor breeding sources: any school, family, working place

Outdoor breeding sources: any unoccupied land, park, public place;

4. To check ,at least monthly, on the result of removal of breeding sources and index of worms of infectant mosquitoes through the co-working of environmental protection and public health offices of government and report to the Center for Disease Control, Department of Health, Executive Yuan.

(3) Implementation procedures

1. From municipal city or county(city) government to direct each of their village(town, city, district) office to unify a " Cleaning Day Weekly" (i.e. match a cycle of people's daily lives and a prolific cycle of the infectant mosquitoes from laying eggs to the grown insect. Keep on the removal of breeding sources and maintain environmental cleanness.

2. From each public health clinic of each of country(town, city, district) to provide training to volunteers, heads of neighborhood(village) and head of basic community who will direct community citizens to eliminating the breeding sources overall.

3. The instructors should visit families, offices, groups and companies of neighborhoods or basic communities. to illustrate the recognition of breeding sources and the methods of removal, with on the site practice and lead the participant to check breeding source from indoor and outdoor

4 If necessary, according to suggestion of using insecticide from the Center for Disease Control, Department of Health, Executive Yuan, to spray the insecticide overall or partly to reduce the density of the grown mosquitoes or destroy it.

5 The central and local governments should enact the laws concerning to the rewarding and punishment regulations and to check the performance of each country(town, city, district) in order to make sure of implementation

[3] To enact and amend the related laws/regulations and an autonomic acts

(1) To enact an autonomous act on management of unused land and houses

To instruct each of county(city) government to enact an autonomous act on management of unused land and houses, to order each county(city) to integrate a check team with members from different bureaus and departments such as city development, traffic, construction management, usage management, park, environmental protection, police, land administration.

If the check team find out the owner of unused land and houses is not well managed, or not improved after notice period. the bureau/department should fine the owner.

The enforced act should be executed by teams of unused land and houses in this city after re-notice and non-observed

(2) Review of current construction laws/regulations and the matching norm of public sanitation.

The current laws and regulations considers the problems of public health- in an anti-firing lane, a ditch, a basement, a pond for fire fighting, a balcony of roof, and so on, the place easily accumulated water. The Department of Health shall consult with the concerning ministries and councils for that a need to evaluate the concerning laws and regulations of Guarding against an epidemic in Taiwan, as well as, to reconsider the necessity of installation of the pond for fire fighting and the like public facilities. To intensify the management of building site, a building being delayed or reached the time limit, the government shall study improvement via power of civil rights to ensure and maintain public health, avoiding proper management without the right person or maintenance, that causes the breeding places for the contagious mosquitoes.

[4] To enforce the implementation of laws and regulations

(1) Daily classified and check- report work

All units of each of county, city(country, town) shall be complete in tune with once a month to clearly investigate its magistracy-any of unoccupied household, unoccupied land, a park, a market, an anti-firing lane, a flower shop, a deserted building site, a basement with accumulated water, a resources recycle site and the like breeding places. The concerning responsible units shall enlist and manage, together with inform the head of neighborhood/a a basic community unit of asking them investigate enlisted area how the breeding resources eliminating. The local public health and

environmental protection units shall investigate the enlisted area periodically about how the mosquitoes' breeding resources and eliminating situations.

(2) A mechanism of fulfilling the check-report and immediate process

Upon a unit of environmental protection and the related units receiving reports on discovering concrete breeding places, e.x. any of the tire, deserted furniture, unoccupied household, unoccupied land, a basement with accumulated water e.c.t., the units shall intensify to ban, eliminate before the time limit, enlist and trace.

(3) Set up the united investigating group

Public large-sized buildings, land, public facilities of central and local government shall investigate periodically. And the Environmental Protection Administration and the Department of Health, the local environmental protection and public health units shall send one person each in principal, or the county and city together cross-investigate the outcomes of cleansing the contagious resources to break through local limits on relations, organize investigation group.

[5] To strengthen the education and training on personnel of Public health and environmental protection

(1) Understandings of dengue fever and contagious mosquitoes, trainings of solving the breeding resources mechanism Understandings of dengue fever and the mosquitoes for volunteers' trainings, teaching people's behaviors of creating the breeding resources

(2) Density investigation trainings of the mosquitoes of dengue fever

Intensification on knowledge of laws and regulations and trainings on enforcing laws

(3) Trainings on the insecticide spraying

1. Trainings for workers of the medicine spraying: the division Bureaus of the Center for Disease Control and local Bureaus of Public Health, recommended personnel and the volunteers shall take including laws/orders and practical operation courses, to intensify their ability on the medicine spraying to killed the mosquitoes.

2. Trainings for leaders of the medicine spraying: The leaders are responsible for supervising workers of the insecticide spraying and leadership. The Center for Disease Control is responsible for recruiting personnel and the Environmental Protection

Administration helps training-including laws /regulations, practical operation, examinations courses for their responsibilities of the scene of supervision for the medicine spraying and filling out documents and the like works.

[6] To create a monitoring mechanism of the breeding resources, the larva, the contagious mosquitoes

(1) The monitoring of the breeding resources, the larva

Any survey showing that the density of the contagious mosquitoes surpassed third degree, the country and neighborhood except mobilizes to eliminate the breeding resources; the Bureau of Public Health is going to hold a double checks, and posts warning flags. At first or second degree of the density , the concerning units will mobilize to eliminate the resources, and the Bureau of Public Health will hold a double check. If Breteau index is zero degree, the responsible unit will use a machine of seducing the mosquitoes to lay eggs in order to monitor.

Red Area: Any of country, town and city is individual unit-a area where there is the case of contagious disease and a widespread *Aedes aegypti*. The focus area shall be renewed data each week, be completed the mosquitoes monitoring one time in two week.

Yellow Area: Any of country, town and city is individual unit-a area where there is none case of contagious disease but a widespread *Aedes aegypti*. The focus area shall be renewed data each month, be completed the mosquitoes monitoring one time in two month.

Blue Area: Any of country, town and city is individual unit-where there is none *Aedes aegypti*. The suspected area shall be renewed data each season, be completed the mosquitoes monitoring one time in each season.

(2) The monitoring plan of inside bacteria of dengue fever mosquitoes

Visit the area of focus or people traveling frequently, collect the grown mosquitoes, and proceed to RT-PCR on the viruses and detaching inspection.

(3) The monitoring of resistance to the action of the medicine and test of effect of medicine.

[7] Preventative insecticide spraying

(1) Spraying insecticide

When collecting *Aedes aegypti* with viruses, spray the insecticide in the scope of a radius of 50 meters and then 7 days later spray the second time, following next 7 days spray the third time. Proceeding to Large –scale of spraying or changing new insecticide, we shall take insecticide evaluation

the scene.

(2) Buying the medicine

Before the rampant season each year, the Center for Disease Control will make an announcement the data of the mosquitoes' resistance to the action of the medicine; based that, a local governments evaluates, in accordance with medicine items approved by Department of Health, and buy the proper medicines to be used.

{2} Secondary prevention(i.e. to construct monitoring number of cases of the disease and a mechanism to solve the plague emergently; and to stop the local dengue fever.)

[I] to construct a monitoring mechanism on number of cases of the disease

In case , the doctors and the related personnel in this country discover suspected cases, should report within 24 hours; and to control non-dominance infection and the unidentified fever which has been failed to report, the Center for Disease Control, via the following monitoring system, would rather "To take all than leak any one" by intensifying to monitor and report the fever. It is requested that to control the suspected cases at the first time to prevent viruses of the fever via the mosquitoes to spread pervasively, to intensify the plague monitoring, and to judge by current information.

1. Fix point doctors monitoring report: Due to the difficulty in diagnosis of non-dominance infection and atypical cases of the dengue fever , the blood test for patients of "unidentified fever syndrome" should be added to the doctor monitoring mechanism; (weekly in usual time, and to increase frequency in current period as from March to October.)
2. The plague of monitoring and reporting in school: the unidentified fever shall be included in the plague monitoring and reporting in school. If discovers any suspected fever case and the pupils are absent for identified fever, it shall report to the public health unit that then proceed to widely investigate and collect samples
3. Monitoring and reporting on new contagious cases: intensify monitoring in prevalent season. We have an acute hemorrhagic report system, shall add viruses of dengue fever to general inspection item.
4. Self-awareness reporting for people: anyone who is suspected

of being infected with the fever, shall visit local public health bureau for blood test .

5." Communicable Diseases Survey Form": a residence going abroad for business or travel when returning back, shall fill out the " Communicable Diseases Survey Form", the public health unit shall trace the suspected patient afterwards.

6. To take body temperature in the airport: inbound travelers shall take body temperature in the airport, the fever case shall take blood test.

[2] The epidemic emergency-handling mechanism

(1) The epidemic investigation

The central and local Department of Health establish the epidemic research group. If there is a suspected case, the local department proceed to epidemic investigation; if there is a need of personnel ,or special research skills, or not sufficiency of tools, the central will coordinate and help.

1. To create the name list of the central and local investigation group.
2. To train the members of investigation group professional trainings on the characteristics of dengue fever
3. To train the members of investigation group professional trainings on the visiting skills of dengue fever
4. To train the members of investigation group professional trainings on the investigation and epidemic resources analysis of dengue fever
5. To train the members of investigation group practical investigation &analysis drills of the fever

(2) Medicine spraying

According to data of sensitivity of medicine, the authority sets forth medicine items, machines, scope of medicine spraying, pictures, diaries, records of the household, to get a complete plan.

- 1 The timing of medicine spraying and effectiveness: where there is suspected dengue fever, the authority shall spray the medicine within radius of 50 meters, 7 days later spray the second time, then the following 7 days the third time(If that period regarded as negative, then stop spraying). If there are many cases being proofed, it is necessary to broaden medicine spraying to the area or country/neighborhood. If needs a larger scale of medicine spraying or changes medicine, it is necessary to evaluate the medicine in

scene.

2. Man power structure of medicine spraying: local man power structure of medicine spraying-each of municipal city and county(city) shall at least reserve 40 medicine spraying workers, 20 medicine spraying leaders; according to land size and population, at least, equipped 10 medicine spraying machines. Beside, the Center of Disease Control shall organize and train for 30 professional medicine spraying group who equipped with car carried ultra low-volume two units of sprayer and foggers. The group will assist and monitor solving of the epidemic and who meets requirements of large-scale medicine spraying.

3. Implement monitoring:

Before operation of medicine spraying, the authority shall negotiate with chiefs of village, neighborhood, basic community, to increase the cooperation of citizen. Implementing emergent medicine spraying, except controlling the timing, whether completely implementing the job is key point for prevention either success or failure. Once operating the medicine spraying, it is enforcing to fine the uncooperative citizen and to open lock to the occupied household in fixed time. To kill the mosquitoes completely can be prevented the epidemic. Besides, to promote the effectiveness of the spraying, the entomologists shall participate in monitoring training and cooperate with the local research institutions.

- (3) Investigating the epidemic:

After receiving report of the cases of disease, the authority shall investigate the nearby area of the household and possible epidemic area to proceed to investigation of density of the larva and grown mosquitoes.

- (4) Intensify cleanout of the breeding sources in time: until the case of disease is being proofed, head of neighborhood and basic community shall mobilize volunteers of the community to divide their responsibility area, to eradicate the resources completely and watch out any possible dead angel where the nearby area of the patient or any staying place of the disease occurrence in the scope of 50 household or radius of 50 meters.

[3] To upgrade the effectiveness of laboratory diagnosis :

- (1)To install dengue fever laboratory diagnosis center in the south on island.
- (2) To increase automatic laboratory diagnosis facilities.

- (3) To upgrade the ability in inspection of dengue hemorrhagic via .international cooperation
- (4) To send personnel to international laboratory to study new ways of laboratory diagnosis.
- (5) To hold the dengue fever laboratory diagnosis seminars and proceed to exchanges of research field to promote the standards
- (6) To develop and improve reagent, and to promote that of the specificity and sensitivity.

{3} Tertiary prevention (to prevent advanced case causing death rate)

The target is to reduce the death rate of dengue hemorrhagic fever to less than 5%

- [1] To set medical treatment procedures of dengue hemorrhagic fever
- [2] To enforce the personnel of medical treatment for continued reeducation of the dengue hemorrhagic fever
- [3] To hold dengue fever/ dengue hemorrhagic fever medical treatment international seminars
- [4] To set selective standards for the medical treatment personnel of dengue hemorrhagic fever who to be sent to abroad for training
- [5] To train the medical treatment personnel of dengue hemorrhagic fever
- [6] To amend assigned standards of the hospitals for fatal dengue hemorrhagic fever in an emergencies
- [7] To assigned the hospital for dengue hemorrhagic fever in an emergencies
- [8] To create a mechanism of sickbeds dispatching in an emergencies

{4} Operation of organization

Regulations of prevention works division for dengue fever, see chart I.

And according to a law of contagious prevention, the local responsible unit is the government of municipal city and county(city) government, its public health, environment and the related bureaus(departments, offices) shall be under the command by the head of the government. The works division model, see chart II and III.

Any related ministry, department, administration shall take its responsibility to monitor and instruct any of the local bureau (department, office) respectively. Besides, if the infection extend endlessly across counties and cities, the Department of Health will report and initiate a mechanism of diseases prevention, "National disasters Prevention and Protection Commission, R. O. C. ", to coordinate mobilization of all concerning units in government.

{5} International cooperation

In order to exchange dengue fever prevention experiences, share information together, control information of current plague, to prevent inbound cases of the fever, to promote prevention/medical treatment more internationally, especially, in asia-pacific area. This project of international cooperation is divided into three directions:

[1] To share and exchange information on dengue fever prevention in Asia –pacific area

(1) To cooperate with US on bacteria laboratory diagnosis training courses of dengue fever

(2) To create internet connection among Asia-pacific area via APEC channels(including study of the epidemic disease and information from the laboratory)

(3) To manage the epidemic area of dengue fever cooperation and research camp in APEC

(4) The exchange and mutual visits of personnel of dengue fever prevention

[2]. To cooperate with US disease control bureau and Belgium AW tropical medical research center on planning of dengue fever prevention

[3].To promote mutual or multilateral cooperation on planning of dengue fever prevention

To cooperate with high-risking area such as Panama in central America, Malaysia/Vietnam in Asia for mutual cooperations on dengue fever

[4] Actively participating in international seminars in order to promote knowledges of the specialists at least twice per year.

[5] To invite the domestic and foreign specialists and scholars to visit the epidemic area and investigate the prevention of the mosquitos.

[6] To arrange a “Summit of dengue fever prevention strategie”

To invite ministers of health in Asia-Pacific area to manage a summit of dengue fever prevention strategy and consult with prevention strategy and cooperation project of dengue fever in Asia –Pacific area.

Chart I :

Job Classification of Central Government on Dengue fever prevention

Convener : Minister of Department of Health

Executive Secretary

Director of Disease Control Center

Deputy Executive Secretary;

Director General of environmental Protection Administration

8. International Cooperation Group-CDC

7. Medical Care Group-CDC

6. Laboratory Group-CDC

5. Epidemic Monitoring Group-CDC

4. Insecticide Spraying Group-CDC & EPB

3. The Epidemic Mosquitos Research Group-CDC

2. The Breeding Resource Cleaning Group-EPB, Health bureau and the related

1. Health Education Group-CDC ,EPB and other related depart.

CDC:Center for Disease Control

EPB:Environment Protection Administration & Center for Disease Control

8. Arrange information exchange and International seminars on Dengue fever; Promote mutual and multilateral cooperation projects on dengue fever prevention

7. Arrange reeducation of the medical personnel; Manage medical facility in need and the related reaction measures; Collect medical history of the fever completely

6. Take samples of the suspected patients for inspecting; Monitor the epidemic and take the samples
5. Intensify connections with doctors; Magnify the epidemic investigation; To Investigate serology of the epidemic
4. Implement emergent insecticide spraying after the suspected cases of the fever, in order to destroy the *Aedes aegypti* with viruses
3. Investigate the density of the mosquitos; Inform the related units of cleansing the breeding resouces; Double-evaluate the effectiveness of the prevention
2. Examine and manage the breeding sources; Cleanse environment and the breeding resources
1. Education & training; Create the health education guide; Guide for understanding vie different ways; Arrange health education guiding activities

Charet II:

Suggested Job Division of Dengue fever prevention in government of municipal cities and counties

Convener: chief of a county /city

Executive Secretary;

assigned by chief of a county /city

Deputy Executive Secretary

assigned by chief of a county /city

7. Medical Care Group

6. Laboratory Group

5. Epidemic Monitoring Group

4. Insecticide Spraying Group

3. The Epidemic Mosquitos Research Group

2. The Breeding Resource Cleaning Group

1. Health Education Group

7. Bureau of Public Health & the subordinate; Hospitals: the Medical Associations; Blood Donation Centers

6. Bureau of Public Health & the subordinate

5. Bureau of Public Health & the subordinate; Doctors of Public Hospitals; the Medical Associations; Western Medicines Associations
4. Bureau of Public Health & the subordinate; Bureau of Environmental Protection; Bureau of civil Affairs; Bureau of Education; District Offices; Police Department
3. Bureau of Public Health & the subordinate;
2. Bureau of Public Health ; Bureau of Environmental Protection; Bureau of civil Affairs; Bureau of Education; Bureau of Public Works; Locally Stationed Army
1. Bureau of Public Health ; Bureau of Environmental Protection; Bureau of civil Affairs; Bureau of Education; Bureau of Social Affairs; Department of Information

7. Arrange reeducation of the medical personnel; Manage medical facility in need and the related reaction measures; Collect medical history of the fever completely
6. Take samples of the suspected patients for inspecting; Monitor the epidemic and take the samples
5. Intensify connections with doctors; Magnify the epidemic investigation ; Investigate serology of the epidemic
4. Implement emergent insecticide spraying after the suspected cases of the fever, in order to destroy the *Aedes aegypti* with viruses
3. Investigate the density of the mosquitoes ; Inform the related units of cleansing the breeding sources; Double-evaluate the effectiveness of the prevention
2. Examine and manage the breeding sources; Cleanse environment and the breeding resources
1. Education & training; Create the health education guide ; Guide for understanding via different ways; Arrange health education guiding activities

Chart III :

Suggested job division division of Dengue fever prevention in government of municipal cities and counties

Units: _____ work items

Bureau of civil Affairs: 1. Instruct all country, town, city and district offices, as well as, temples and churches to

remove the breeding sources completely

**2. Bureau of Social Affairs: Instruct all
civil organizations and nursery schools to
remove the breeding resources**

**Bureau of Education: Instruct all schools and kindergartens improving
environmental sanitation and cleaning the breeding
resources**

**Department of Military Service: Coordinate and instruct all army to help
automatically**

**Bureau of Environmental Protection: Construct the personnel of environmental
protection devoted to cleanse waste
material, the breeding resources,
accumulated water in basement, and
Help insecticide spraying**

**Bureau of Agriculture: To remove the breeding sources in farming area and
arrange biology control such as feeding
of environmental protection fish**

**Department of Land Administration: Construct unoccupied land and the
basement with accumulated water
controlled lists**

Bureau of Public Works/Bureau of Construction:

**To instruct and manage environment of
markets and parks, management of building
sites and the cleansing of the breeding resources**

**Police station /firefighting unit: To check environment shakedown, fire lanes
management , to cooperate with
united inspection and to remove the
breeding sources**

News Office: To issue news and magnify guiding messages

**Bureau of Public Health: The main jobs include public health education,
monitoring of epidemic ,researches on density
of the mosquitoes, magnifying the researches
of the epidemic and blood test, removal of the
bleeding sources, helping the hospitalization.**

