

## Original Article

# Operation Status and Experience of Running Central Epidemic Command Center for Dengue Fever in 2010

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### Abstract

The dengue fever epidemic in 2009 lasted until February followed by only a few sporadic cases in March with no large scale epidemics occurring until August of 2010. After August, the number of dengue fever cases continually increased. Significant dengue fever epidemics occurred in Tainan County and Kaohsiung City which later spread to further epidemics in Tainan City and Kaohsiung County. Due to the continuous spread of the epidemic, the Department of Health applied and was granted the permission from Executive Yuan to establish the “Central Epidemic Command Center for Dengue Fever” on October 21 to coordinate and monitor preventive measures, establish a First Line Command Post in Southern Taiwan, and supervise the implementation of the first line works of disease control.

During the operation of the Central Epidemic Command Center for Dengue Fever, various Ministries and Agencies of the Executive Yuan provided resources and preventive manpower in cooperating with the local government facilities leading to significant decrease in the epidemic and were able to effectively control it as of the end of December, 2010, lowering the social impact to a minimum. Overall, the establishment of the Central Epidemic Command Center for Dengue Fever has been a great benefit in its function of integrating preventive measures and greatly influencing in controlling dengue fever epidemics.

**Key words:** dengue fever, epidemic, command center, mobile epidemic prevention team

## Introduction

Although dengue fever is not an endemic disease in Taiwan, large and small scaled epidemics have occurred in the recent years [1-2]. In the years of 1915, 1931, and 1942, the whole island was inflicted with an epidemic; in 1987, 1988, and 2002, epidemics broke out in the Tainan, Kaohsiung, and Pingtung areas. In coordinating resources, supervision, and communications, the Department of Health issued "Enforcement Regulations Governing the Central Epidemics Command Center" according to the Communicable Disease Control Act as of December 20, 2004. At the start of the summer in 2006, due to the cross county epidemics of dengue fever and the increasing number of infected cases, the Executive Yuan established the "Central Epidemic Command Center for Dengue Fever (CECCDF)" on October 2, 2006 to execute the prevention of dengue fever using a "integration of command, mobilization of classification" method in effectively pooling resources and assisting local units, stimulating military and civilian cooperation and community participation in deactivating the dengue fever epidemic crisis. CECCDF established in 2006 is the first legalized epidemic command center after the announcement of the "Enforcement Regulations Governing the Central Epidemics Command Center" [3].

Another Department of Health's emergency response to disasters caused by biological pathogens, is to strengthen the preparedness and prevention measures and reinforce the national response staff training and disaster prevention advocacy, in constructing a complete response system, improving response capabilities, effectively implementing disaster rescue measures, and reducing the impact of disaster and proceeding reconstruction of post-disaster recovery. In April, 2009, a "Biological Disaster Prevention and Response Plan" was set to be a redevelopment basis for prevention against possible disasters caused by various biological pathogens, emergency response measures, and reconstruction of post-disaster recovery. Dengue fever is listed as one of the biological pathogen caused disasters in the "Biological Disaster Prevention and Response Plan".

Serious global epidemic of dengue fever in 2010, especially in Southeast Asia where the number of cases reported were six times those of last year in the Philippines, showing an increase of nearly 100 thousand cases. The numbers increased by 2-fold in Thailand, 1.5 times in Vietnam, and a slight increase of approximately 10 - 20% in Singapore and Malaysia [4]. As Taiwanese people travel more frequently in Southeast Asia, with dengue fever epidemic more severe than in previous years in Southeast Asia, a total of 74 imported cases were reported in August 2010, becoming a record high in a single month. After August, the local dengue fever cases continued to increase, with the epidemic most significantly occurrence in Tainan County and Kaohsiung City, where the epidemic continued to spread to other counties and cities such as Tainan City and Kaohsiung County. As the local spread of dengue fever has continued, the Executive Yuan agreed with Department of Health to establish CECCDF on October 21, in order to co-ordinate and supervise various preventive measures, set up a First Line Command Post in Southern Taiwan, and supervise the

implementation of the first line of prevention. In 2010, CECCDF was activated the second time.

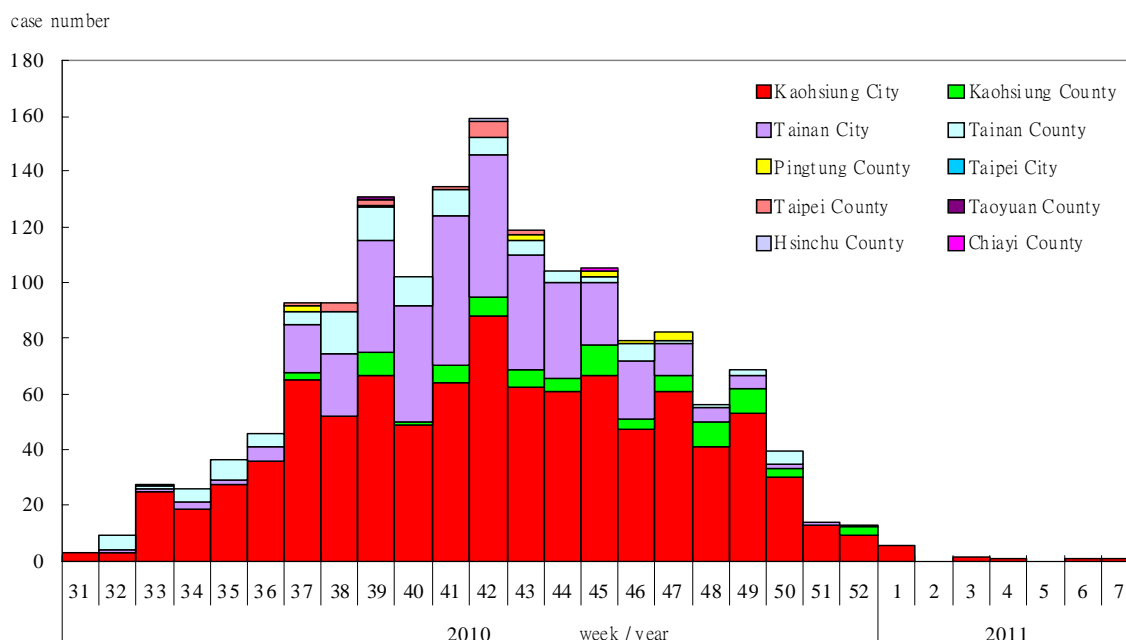
With the full injection of resources and preventive manpower of various ministries and agencies of the Executive Yuan and with close cooperation with local government units, the overall dengue fever epidemic showed significant decrease after three weeks since the activation of CECCDF. Due to the fact that the local government units had stocked up sufficient preventive energy to control the epidemics within their jurisdictions, the mission of the CECCDF was deactivated on December 31 and the work of dengue fever prevention was returned to its normal state where the Department of Health and Environmental Protection Administration would continue to supervise the local government units in related preventive measures. This article will describe the establishment and operation status of CECCDF in 2010 for future preventive work reference.

### **Overall View of 2010 Dengue Fever Epidemic**

On December 25, 2010, the five main cities in Taiwan were restructured; in this article, in order to reflect on the effects of preventive measures in each city and county, the case numbers are calculated separately as of before the merging of city and county. In the 2010 dengue fever epidemic, a total of 1,896 confirmed cases were documented including 304 imported cases and 1,592 local cases. Among the local cases, 38 cases came from 2009; 12 sporadic cases appeared in Kaohsiung City between the months of March and July and accumulated to 50 cases by July of the same year. After August 1, an epidemic occurred with a total of 1,542 cases. Among the local cases, a total of 18 dengue hemorrhagic fever (DHF) cases occurred resulting in 2 deaths; in city/county distribution, 7 of DHF cases occurred in Tainan City (1 death), 6 in Kaohsiung City (1 death), 4 in Tainan County, and 1 in Kaohsiung County.

Of the 2010 local dengue fever epidemic, the first confirmed case of the season was identified in March (the onset date: March 20, the 11<sup>th</sup> week) and accumulated to 1,554 confirmed cases by the end of the year. The epidemic can be more or less categorized into the following two stages:

- A. The first stage started at the 11<sup>th</sup> week and lasted until the 28<sup>th</sup> week with a total of 12 sporadic cases, mainly within the Gushan district and Lingya district of Kaohsiung City.
  - B. The second stages started at the 31<sup>st</sup> week and lasted until the 53<sup>rd</sup> week with a total of 1,542 cases (Figure1).
1. Early August (the 31<sup>st</sup> week), an epidemic appeared in the Gushan district of Kaohsiung City. The epidemic started to spread toward the Sanming district from the Gushan district and further towards the Lingya district, Cianjhen district, Zuoying district, and Nanzih district. As of the 37<sup>th</sup> week, the epidemic quickly escalated to more than 65 cases report a week. Small clusters of cases also started to appear in the Fongshan City by the 37<sup>th</sup> week (middle September).



**Figure 1. The Epidemic Curve of Local Dengue Fever Epidemics (After August), 2010**

2. As of the 32<sup>nd</sup> week (early August), the first case in Tainan County appeared in Guanmiao Village which later became an epidemic that spread to the nearby townships. Sporadic cases appeared in 6 nearby townships such as Yongkang City and Gueiren Village. The first case in Tainan City also appeared in the 32<sup>nd</sup> week (middle August) in the Mid-western district; after sporadic cases in the following 3 weeks, a cluster of epidemics occurred and spread to the North, East, South, Anping, and Annan districts where sporadic cases appeared. The epidemic in the Tainan area (Tainan City) quickly escalated as of the 39<sup>th</sup> week to as many as 40 cases reported each week.
3. After the first case appeared in Pingtung City, Pingtung County in the 37<sup>th</sup> week, the following cases were sporadic cases; the epidemic ended on the 47<sup>th</sup> week. In Taipei County, local epidemics appeared in the Wugu Village on the 38<sup>th</sup> week and lasted a month before ending.
4. By the end of September, the number of cases quickly increased; as of the 39<sup>th</sup> week to the following three weeks, more than 100 cases were reported. When the epidemic reached its peak at the 42<sup>nd</sup> week, a total of 861 cases were documented, and 159 cases were reported in the 42<sup>nd</sup> week alone. Apart from Pingtung County and Taipei County where sporadic cases appeared, most of the cases were located in Tainan City, Tainan County, Kaohsiung City, and Kaohsiung County. Among these, cases appeared in 11 of Kaohsiung City's districts, 6 in Tainan City's districts, most were focused in Guanmiao Village in Tainan County, Fongshan City in Kaohsiung County, Pingtung City in Pingtung County, and Wugu Village in Taipei County.
5. Overall, the epidemic started to decline at the 50<sup>th</sup> week (middle December) and started to slow afterward with lower cases reported each week. As of the 47<sup>th</sup> week, no new cases were reported in Pingtung County and no new cases were reported in Tainan County as of the 50<sup>th</sup> week. The 2010 epidemic continued until February of 2011. The onset date of the last case in

Tainan City (Rende district) was reported on February 14; the last reported in Kaohsiung City was on February 16.

### **Preparation Work for CECCDF**

Before the establishment of CECCDF, the Department of Health held a “dengue epidemic process coordination meeting” according to the 16<sup>th</sup> article of the Communicable Disease Control Act with related ministries, agencies, and local government units in April, August, and September to discuss measures needed for the dengue epidemic. Important resolutions include: both central and local governments own the right to manage the old buildings and campuses for dengue fever prevention and control and enhancing communication and coordination; various ministries and agencies will list and manage housing and lands and clean periodically in eradicating breeding sites for infected mosquitoes; various ministries and agencies can use the Environmental Protection Administration’s Green Network to manage housing and lands with the people monitoring and managing. In addition, assistance to local governments in prevention measures is required. The Centers for Disease Control (CDC) set up a mobile epidemic prevention team on July 19, 2010 which is sent on an irregular basis to check and supervise the prevention work done by local government units in southern Taiwan. Afterwards, due to the rapid escalation to more than 100 cases reported a week, and the inability of the local governments to continue eradicating and monitoring the epidemic, on October 12, the Executive Yuan agreed to establish CECCDF according to activation conditions: (1) local dengue fever confirmed cases accumulated to 600 after August; (2) the epidemic has spread between county/city; (3) the epidemic continues escalation with no sign of decline, and preventive measures have been taken. As of October 21, the Premier of the Executive Yuan agreed to the establishment of CECCDF with the Ministers of the Department of Health and Environmental Protection Administration as main commanders, in charge of coordination and supervision of all preventive measures and setting up a command post in southern Taiwan in supervising the first line of epidemic defense.

Apart from the Department of Health, the Environmental Protection Administration, Ministry of Education, Ministry of the Interior, Government Information Office, and Directorate-General Budget, Accounting, and Statistics also participated and started the operation of CECCDF according to the articles in “Biological Disaster Prevention and Response Plan” and “Enforcement Regulations Governing the Central Epidemics Command Center”.

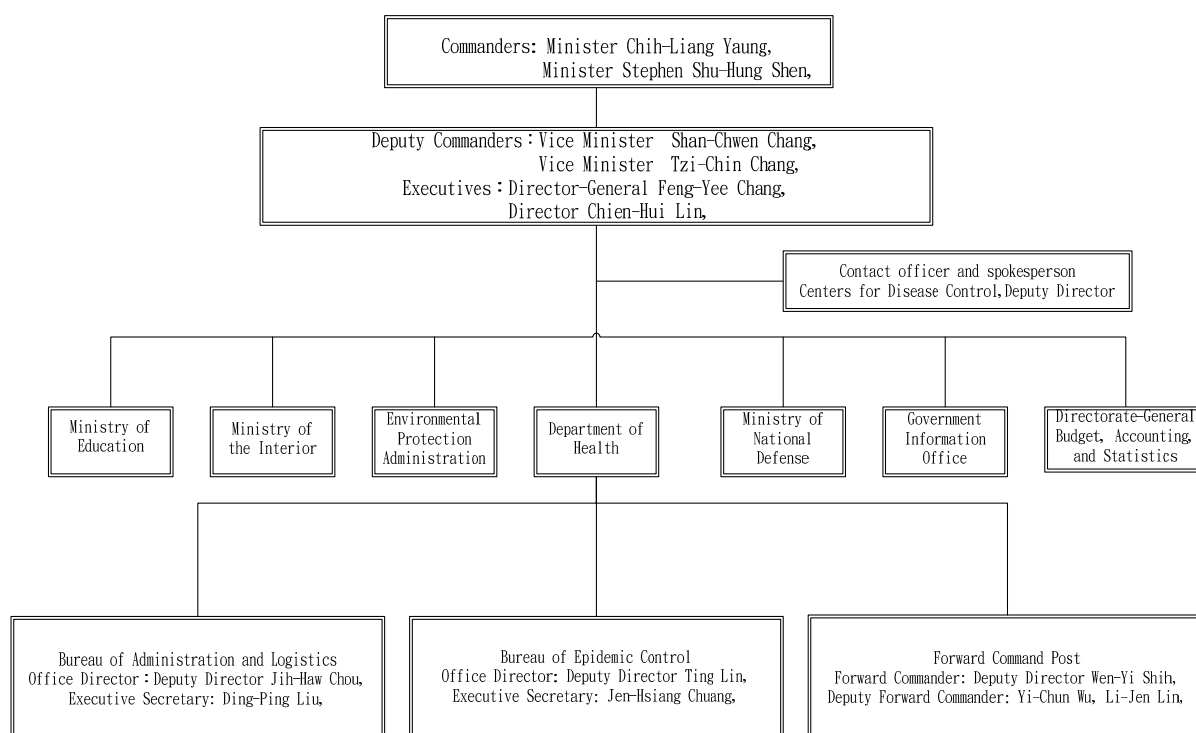
### **Structure of CECCDF**

The CECCDF is an Executive Yuan-level organization, and the first commander of the dual mode of operation adopted by directors of the Department of Health and Environmental Protection Administration as the two commanders, but the operation still needs to consider the nature of the administrative structure of the appropriate and corresponding law, including

regulations and interpretation of the relevant administrative procedures. The CECCDF also comprises of the Department of Health and Environmental Protection Administration of members of various units and their duties, term of the streamlining, to the best play of administrative efficiency. Under CECCDF are the following three units: Bureau of Administration and Logistics, Bureau of Epidemic Control, and First Line Command Post, all lead by the deputy directors of CDC, Department of Health. To effectively control the communication from CECCDF as the ministries and agencies linked windows; and to closely grasp the supervision of local government-related information and prevention by the First Line Command Post as the link window, the fourth and fifth branch of CDC are responsible for their administration operations.

The first work report was held on October 21, 2010 with the establishment of the CECCDF. In addition, the establishment of CECCDF and the First Line Command Post was announced. The purpose, basis, organizational structure (Figure 2), and the responsible division of ministries of CECCDF were confirmed, so that the benefit with the implementation of the various units to understand issues, to facilitate full cooperation and integration.

A total of 26 staff members make up the Bureau of Administration and Logistics, Bureau of Epidemic Control, and First Line Command Post which were stationed in CDC Epidemic Command Center, in charge of communications and handling emergency situations. In addition, they would notify personnel from other units or facilities to become stationed if the situation requires and has been approved by higher officers. A section of the members is responsible for stationing in other locations (such as laboratories or Public Relations Office) to achieve highest efficiency with the lowest number of personnel required.



**Figure 2. Structure of Central Epidemic Command Center for Dengue Fever**

To effectively execute dengue fever epidemic prevention measures, depending on the development and prevention of epidemic strain of need, commanders need to adjust the center grouping, group tasks, and stationed in staff size. Tasks of each CECCDF division are described as follows:

#### A. Department of Health

1. Responsible for processing operations and the consolidated state control, coordination and resources allocation.
2. Dengue fever epidemic surveillance and early warning systems and analysis of real-time information exchange throughout.
3. Supervise and monitor local government health facilities in deducing container numbers, eradicating breeding sites and infected mosquitoes, and other related preventive measures; see lack of immediate response should be improved.
4. Sending suspected DHF case files for assessment and medical advice.
5. Other general control measures.

#### B. Environmental Protection Administration

1. Supervise local governments in eradicating breeding sites near case homes and neighborhoods.
2. Supervise local governments in eradicating breeding sites in empty lots and dirty areas within jurisdictions.
3. Supervise local governments in leading community clean ups and aggressively emptying water containers in the environment.
4. Supervise local governments in clearing gutters and other prevention measures against dengue fever infected mosquito larvae.
5. Assist Department of Health to evaluate local government implementation of the container for the breeding source reduction and prevention and control of the checks cleared, etc., see lack of immediate response should be improved.

#### C. Ministry of Education

1. Supervision of schools at all levels to implement the campus cleanup vector mosquito breeding sources.
2. Strengthen school prevention work, to understand students' reasons for sick leave, infectious disease surveillance reporting system with the school informed as to speed the adoption of control measures.
3. Supervision of schools at all levels to help promote school health education and prevention of dengue fever advocacy activities to enhance students' and parents on the dengue disease awareness and prevention measures.

#### D. Ministry of the Interior

1. Urge local governments to use the village adjacent units long pipeline to help prevention of dengue fever emergency operations performed, including health education, household refuse, empty households and families of vector mosquito

breeding sources are not clear and check operations exclude other related disorders (Department of Civil Affairs, Ministry of the Interior).

2. Mobilize communities in promoting dengue fever prevention activities (Department of Civil Affairs, Ministry of the Interior).
3. Instruct local government police units in assisting with emergency dengue fever situations by keeping order and maintenance (National Police Agency, Ministry of Interior).

#### E. Ministry of National Defense

1. Controlling and managing camps, housing (including villages), and lands for eradication of breeding vectors and management.
2. Mobilizing the military in assisting with dengue fever prevention work.

#### F. Government Information Office

1. Coordinating media resources in promoting public health education on dengue fever prevention.
2. Announcing epidemic news, reporting epidemic information both national and international, and handling possible coordination situations.

### **CECCDF Operations**

Personnel stationed in CECCDF, the daily shift starts from 8:30 to 18:00; the commander may, depending on the development and prevention of epidemic strain of need, make motor adjustments. In view of prevention is no holiday, rotating holidays in Bureau of Administration and Logistics, Bureau of Epidemic Control, and First Line Command Post are arranged, and the remaining units of the window when necessary to staff mobile phone on standby. First Line Command Post holds a off-site video conference session every day to 5 p.m. to discuss the immediate status of control, analysis, and feedback; participating units include CECCDF (Bureau of Administration and Logistics, Bureau of Epidemic Control, and Environmental Protection Administration), First Line Command Post (CDC and Southern Branch, Bureau of Environmental Inspection of Environmental Protection Agency), and Health Bureaus and Environmental Protection Bureaus of Kaohsiung City/County and Tainan City/County, district level (townships) command center to review and understand the needs of the time control at any time as to provide support.

CECCDF work report is held each Monday morning at 10:00 a.m. (the time was adjusted to each Friday starting from November 5<sup>th</sup>), chaired by the commander or deputy commander, respectively, by Bureau of Epidemic Control at the monitoring report, First Line Command Post at Prevention report, and ministries and agencies will report their possession of premises, prevention and management of land and other circumstances, after full discussion of the relevant information to form decisions. On the fourth work report meeting on November 12, the chair instructions were: as the ministries and agencies already established an effective communication platform and work together to implement relevant



control, the work report will be temporarily held once every two weeks, but in exceptional cases for emergency notification meeting. On December 24 (the 7<sup>th</sup> work report), the chair instructions were: the southern region in response to slowing the epidemic of dengue fever, local governments have been able to dispose of the epidemic without further assistance; thus it is to be submitted to the Executive Yuan agreed to dissolve CECCDF; a total of seven work report meeting had been held. CECCDF and First Line Command Post were established on October 21, 2010 and operated until deactivation on December 31, totaling up to 72 days.

For more precise analysis of the possible spread of the disease causes and prevention effectiveness, Bureau of Epidemic Control at CECCDF used intensive video connection methods, with First Line Command Post staff to convene to discuss the epidemic control, assess, and analyze the epidemic situations in different areas, community epidemic control diagnosis, to set a "First Line Command Post Assessment for County and City Governments Dengue Fever Prevention Guidelines" and "Common Risk Management Areas" and build "Community Mobilization Evaluation Index", "Epidemic Evaluation Index", "Risk Map" and other related qualitative, quantitative data supplemented by scientific methods to quickly find of the methods and strategies in controlling epidemics.

As dengue fever prevention and control at different stages have different control strategies, taking into consideration the different circumstances and changes in situations, First Line Command Post commander can change work contents or team formation as suitable to the situation; reviewing post at daily meetings, rate settings, and then each unit with the implementation, in order to quickly respond to the epidemic. For CECCDF to allow all units to quickly receive epidemic status and prevention information on a daily basis, "Dengue Daily Post" is distributed daily; through email, both central and local units may receive the latest information. In addition, a "Dengue Fever Battle Report" is issued each week and posted on the Taiwan CDC Global Information Website; it provides sufficient dengue fever related information including the results for vector mosquito density, analysis of imported cases and international epidemics, medical advice for the public and physicians, and suggestions for local governments, for the reference of related units; a total of 16 posts were made during its operation [5]. In addition, the work logs written every day and the daily meetings all leave important records regarding the operation status of CECCDF during activation which are later collected and stored after the dismissal of CECCDF.

## **Preventive Strategies**

### **A. Execution of Public Authority**

In response to the development of dengue fever epidemic, the Department of Health sent a letter on August 31 to five southern counties and cities. A public notice or announcement according to the Communicable Disease Control Act are made for the public to take the initiative in clearing the area of dengue vector mosquito breeding sources; if necessary, violators are penalized by the Department of Health. Another letter was

dispatched to inform the Ministry of the Interior, Ministry of National Defense, Ministry of Education, Ministry of Economic Affairs, and Ministry of Education. The mobile epidemic prevention team was to inspect irregularly their possession of premises about the situations of eradicating breeding sites, ticketing was issued upon discovery of any breeding vectors. Statistics from July 19 to December 24, 2010, mobile epidemic prevention teams supported the Tainan and Kaohsiung areas in inspecting breeding vectors for approximately 3,000 persons per day, with a total of 1,320 inspection record tickets issued. During this time, 132 central and local government facilities, housing, and lands were inspected and a total of 246 positive containers were discovered where 23 cases were given notice under the violation of Article 25 of the Communicable Disease Control Act and 16 administrative tickets were issued.

To concentrate the energy for dengue fever prevention and control, to optimize the operation of the medical personnel, both Department of Health and Environmental Protection Administration sent inspectors to conduct joint inspection for the dengue vector mosquito breeding sources as of October 12, 2010. If inspectors found dengue vector mosquito larvae breeding sites when inspecting public and private locations, penalties were issued according to violation of the Communicable Disease Prevention Act or the Waste Disposal Act. The purpose of joint inspection is in hope that the public will take the initiative to remove breeding sources both indoors and outdoors. In the meantime, the Environmental Protection Administration implemented a "Clear dengue breeding vectors in 7 southern counties/cities three-level mobilization plan", using three double-checking methods through mutual inspection in villages, follow-up inspections done by either city and county environmental/health units or central government environmental/health units; thus continuing to strengthen promotion for the concept of regular "patrol, dump, brush, and clean" to the public. Those facilities, organizations, or public who do not cooperate in taking the initiative to clear breeding vectors, the penalty shall be open to the implementation of public authority.

### **B. Container Reduction Plan**

In order to control the epidemic as soon as possible, the First Line Command Post started to promote the "CECCDF Container Reduction Plan" as of October 27, 2010 in Tainan and Kaohsiung areas. The contents of the Container Reduction Plan include the training of participants, public health advocacy, reducing indoor containers, and promotion of communities and outdoors container reduction in schools. The change in method from clearing water-filled containers to directly reducing the number of containers can reduce the locations for breeding sites and therefore reach the purpose of controlling dengue fever epidemic. Simultaneously, the local government of civil affairs, education, environmental protection, public health units and community efforts are integrated to strengthen the promotion of community residents, elementary and junior high school students to actively participate in the work of container reduction, allowing effective removal of vector mosquito breeding sources.

To effectively promote the active participation of schools in the Container Reduction Plan and to elevate the level of participation of schools, the container reduction plan provided hefty rewards and resources. Through the elementary and junior high school student's contact notebooks or slips, the importance of water-accumulating container reduction is sent forward to parents, and under the assent of parents and leadership of the teachers, students are taught how to clear water-accumulating containers around school grounds and are enhanced in the importance of container reduction. After the operation of the Container Reduction Plan for a month, a total of 107 elementary and junior high schools in 4 counties/cities with 27,113 teachers and students participating in the reduction of containers to prevent dengue fever; a total of 222,354 containers in all were cleared, showing considerable results and greatly reducing the risk of dengue fever spread in the southern areas. CECCDF also held a "School Containers Reduction Award Presentation Ceremony and Press Conference" on December 22, 2010 in Kaohsiung City, publicly recognizing those schools with superb container reduction results and the students that cleared the most containers.

In addition, the work of reducing indoor containers aimed at Kaohsiung City and Tainan City where the dengue fever epidemic is most prominent. According to neighborhoods, it was announced that the goal of the plan is to clear 5 containers per house; the results cleared more than 240 thousand containers. As to outdoor container reduction, with a reduction goal set, lead by the county/city government environmental bureaus and cleaning squads in mainly Kaohsiung City, Tainan City, and Fongshan City in Kaohsiung County. The results cleared approximately 550 thousand kilograms "1 Ping and 13 Chi" containers (1 category of bottles/cans and 13 types of containers), and approximately 260 thousand other containers, showing significant results. In the future, we hope county/city governments can use the experience of the Container Reduction Plan and integrate it into the daily reduction of containers in effectively preventing epidemics.

### **C. Assessment of Prevention Measures**

In response to the emergency large dengue fever area chemical spraying measures taken in several villages and neighborhoods in the Mid-west and South districts of Tainan City from October 28 to 29, 2010, CECCDF sent vector specialists down south to instruct and assist the local government in completing the preventive measures. In addition, the Kaohsiung City government, in hopes of preventing the epidemic to last throughout the winter season, started to execute the "Dengue Fever Winter Termination Plan" in December, 2010. The mission of the mobile epidemic prevention team was changed to assessing the results of the operation of this plan on December 13, 2010. Also, on December 18-19 and December 21-22 of 2010, in participation with the procedures of Kaohsiung City government's plan, personnel were sent to Kaohsiung City's Cianjhen district and Fongshan City for result comparison assessment after chemical spraying, in assessing the implementation of the plan of the full degree of chemical control.

#### **D. Multi-dimensional Health Education**

In order to quickly and effectively advocate dengue fever information to different demographic groups, CECCDF planned multi-dimensional health education promotion. For example, for medical professionals: the Bureau of National Health Insurance was asked to post dengue fever epidemic information and public health promotion information on its "National Health Insurance Newsletter". As for medical personnel around the nation, information was passed on by a "Letter to the Medical Community." The weekly journal "Dengue Fever Battle Report" that started publishing in mid-September enhanced the public's health education and communication. The "Combat Manual for Dengue Fever" was updated and posted on the Department of Health's World Wide Website.

As for the public, the measures taken include: advertisements were posted in four national editions and local editions in Tainan and Kaohsiung newspapers, United Daily News evening newspaper, Commons Daily News newspaper, China Daily News newspaper, Taiwan Times newspaper, and magazines; short television clips aired along with quick new flashes on news channels; radio and outdoor media promotions; 3 dengue fever prevention comics and 1 folding fan made to enhance the public knowledge of dengue fever; promotion of enhancing self-protection when traveling abroad, the production of dengue fever post-its and notes, and other relevant promotional products.

The Department of Health, Environmental Protection Administration, and Government Information Office made a joint cooperation in dengue fever prevention and control related health education to develop and set a "2010 dengue fever prevention and control - the southern population health education programs." The main subject in its prevention promotion is on community "container reduction" and "clearing breeding vectors". Its promotion strategies include: localization of the advocacy, use of propaganda conduit channel (such as TV spots, radio bands, LED, etc.), "container reduction --13 container pithy formulas" propaganda; action-oriented advocacy, such as sending health education through Shortage Message Service, local advocacy cars (including car ads and broadcast); using the Internet media, "1922 Prevention Expert" Facebook, Twitter, Plurk, and other network access information for promotion; campus life education and advocacy, building "Dengue Prevention Zone" on Ministry of Education Web Site home page, to provide schools with information to use to strengthen students' understanding of dengue fever and health education and container reduction plan for the campus.

#### **E. Deactivation of CECCDF Mission and Return to Original Mechanism**

By the middle of December 2010, due to the decrease in the epidemic in Tainan County and City, no other significant cross county/city epidemics appeared. By the end of December 2010, Executive Yuan agreed to deactivate CECCDF and let the dengue fever prevention measures return to the original mechanism with the Department of Health and Environmental Protection Administration continuing in the supervision of preventive measures carries out by the local governments units.

## **Discussion**

### **A. Daily prevention**

Dengue fever is a community disease and also an environmental disease. The most fundamental way of preventing dengue fever is by eradicating breeding vectors of infectious mosquitoes; thus not a task to be taken on by only one unit. Since the dengue fever epidemic in southern Taiwan 2002, both large and small-scaled local dengue fever epidemics have been occurring within the nation almost every year. Among these, CECCDF has been activated twice to successfully coordinate various ministries and agencies, local government facilities, and the community to deactivate the epidemic crisis. To avoid further spread of epidemics, incalculable social cost is needed; thus various units need to aggressively manage all housing and empty lots. In addition, local governments should gather various units to participate in prevention measures, using “cross-bureau offices cooperation mechanism”, which is an important factor in the success of dengue fever epidemic prevention.

### **B. Relevant ministries and agencies should establish self-management mechanisms during the norm**

After the establishment of CECCDF, under the command of the commanders, each unit fully engaged in dengue prevention and control operations located in the southern region, active for their respective agencies and institutions of possession of premises, self-management of land. To avoid similar fiscal, as in 1999 where controversial issues regarding abandoned buildings management of state property in Gushan district and the Kaohsiung City Government, the relevant ministries and agencies should be active in pre-season epidemics of dengue, make self-management for breeding source removal work for the lands and buildings located in the south. CDC also managed breeding sources clear and relevant education and training, to enhance their professional capacity, to avoid causing the epidemic prevention work of the burden on local governments as a public example.

### **C. Implementation of public authority**

CECCDF set up a mobile epidemic prevention team according to law, whose main mission is to inspect the status of eradication of breeding vectors in public and private locations; those found to have positive vectors or breed sites are fined. During the activation of the mobile epidemic prevention team in 2010, citizen's homes and lands were inspected and a total of 1,320 tickets were issued for local governments to fine. The mobile epidemic prevention team also enhanced inspections on central government owned lands and housing for possible breeding vectors; any positive vectors were ticketed according to Article 25 Paragraph 2 of the Communicable Disease Control Act. During the operation, 16 tickets were issued to units or facilities under the central government jurisdiction.

When encountering breeding vectors, government units usually advise and give public health education to the public; only after an epidemic has occurred, with the request for active participation of the community in eradication breeding vectors, local governments can consider using public authority in pushing the public to actively eradicate possible breeding vectors, in

reaching the goal of controlling the epidemic. It is true that the speed of eradication can never keep up with the speed of breeding, and if government units waste large amounts of manpower in clearing breeding vectors, using drugs, and clearing water containers for the public, and not pushing the public to change their living habits or action, the effect of prevention is less effective.

In the future, the government should continue to strengthen public advocacy to establish a "people should take the initiative to clear the breeding source" concept. In accordance with Article 25 of the Communicable Disease Control Act, local governments should inform the public or private premises with the relevant prevention measures. Public or private premises, if discovery of breeding vectors and causing a risk of dengue fever by the health or environmental units, the local government should actively enforce the law, move to open up a notice and following executions.

#### **D. The flaws of the mobile epidemic prevention team was not properly reviewed**

The mission of the mobile epidemic prevention team was to inspect the prevention measures situations in local governments, and when inspecting community breeding vectors, issuing a "mobile epidemic prevention team inspection record ticket" upon discovery of any positive vectors in homes or locations, and sent it to local government units for further inspection and ticketing. However, because of the severe epidemic and human resource constraints, local governments only oversee the inspected locations for the improvement of eradication of cleaning breeding sources. If the reasons to why the inspected location was unable to complete eradication of breeding vectors can be found, further expansion of the epidemic can be avoided and doubly effective results can be achieved. In the future, how to supervise local governments in reviewing how to improve the implementation of breeding source cleanup work is still a major challenge for the mobile epidemic prevention team.

#### **E. Execution of container reduction plan**

In 2010, CECCDF aggressively promoted the Container Reduction Plan and successfully brought the city governments of civil affairs, education, environmental protection, public health units, and community strength together to quickly diminish the number of water containers and breeding vectors. It also encouraged elementary and junior high school students to participate in contests to reduce the number of containers, which lead to the participation of the parents and community residents to change their behavior regarding containers. Therefore, the promotion of the reduction of containers has been incorporated into the "Guidelines for Dengue Control", as pre-season precaution 3-6 months before epidemic season each year which is an important measure to be taken and strategy after the occurrence of epidemic as a "firewall" of prevention.

#### **Conclusion**

The 2010 dengue fever epidemic, with the full injection of resources and prevention manpower by various ministries and agencies and the cooperation of local government units,

the overall epidemic significantly decreased and was effectively controlled by the end of December 2010. The establishment of CECCDF built a platform for the prevention of dengue fever in compliance with central and local resources, conforming, and supervising related dengue fever prevention work, all as quickly as possible to cross the peak of the epidemic in diverting the dengue fever epidemic crisis in ensuring public health. In the process, we have come to the deep understanding that “complete eradication of the origin-infected mosquitoes” is the most fundamental way of preventing dengue fever. Future goals for prevention team are to combine the various central government ministries, local governments, and community volunteers in eradicating breeding sites, elevating community awareness towards eliminating possible breeding vectors in allowing preventive measures to achieve its fullest effect.

### **Acknowledgments**

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## **Do We Really Need to Detect *Legionella pneumophila*: An Issue Worth to Be Debated**

( After a speech of American Pittsburgh University Dr. Victor L. Yu )

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## Abstract

The source of *Legionella* to cause infection is controversial. One group has observed that hospital water was identified as the source of *Legionella* pneumonia in hospital acquired infection, while other group has focused more on the water cooling system. Thus, the necessity to detect *Legionella* from water supplies system (drinking water or shower water) or plumbing system (cooling tower) becomes undetermined.

## Text

Whether *Legionella* causing pneumonia is underestimated or under recognized is debatable due to difficulty of bacterial culture, urinary antigen test detecting only *Legionella pneumophila* serogroup 1, and PCR not yet commonly used for confirmation of infection. In fact, culture for *Legionella* will not be specifically requested for all patients with pneumonia and this makes it difficult to assess the proportion of *Legionella* infection in unknown cause of pneumonia. In addition to the identification of *Legionella*, the source to cause infection is controversial. Two different opinions have been proposed and yet to be confirmed. One group from Pittsburgh has observed that the hospital water was identified as the source of *Legionella* pneumonia in hospital acquired infection while USCDC has focused more on the water cooling system as the source of infection.

Use of epidemiological postulation by Henle-Koch postulates [1] has been fulfilled the linkage between *Legionella* pneumonia and hospital water supplies system [2-3]. On the contrary, USCDC has observed that there were evidences for long term colonization of plumbing system were the source of infection [4]. Thus, the necessity to detect *Legionella* from water supplies system (drinking water or shower water) or plumbing system (cooling tower) becomes undetermined.

Although USCDC spokesmen announced that *Legionella* can colonize water distribution systems without causing diseases [5], my personal consideration is that there are more evidences showing the water supplies system as the cause of infection after the publication from Pittsburgh's group [6-7] while cooling tower seems to be less reported. One of the interesting observations in many countries, many hotels will send their water samples from cooling tower but not drinking water or shower water to the laboratory for confirming the presence of *Legionella*. This action seems to become meaningless if cooling tower is not the cause of *Legionella* pneumonia and disinfectant in cooling tower may not be able to control the possibility of infection. So the result obtained from special laboratory may not represent the safety of hotel from *Legionella* infection but a symbol of cleaning. However, proactive surveillance in patients may be necessary in hospital system. Guidelines for the proactive surveillance should apply under the circumstance that colonization of *Legionella* is demonstrated in sputum culture and urinary antigen. Then, water detection for *Legionella pneumophila* serogroup 1 should be considered.



**Editorial note:** Nowadays, environmental water samples from both water supplies system and cooling tower system are both recommended for control and prevention of *Legionella* infection in Taiwan, USCDC, and WHO.

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## Outbreak Investigation Express

### A Cluster of Travel Acquired Dengue Fever among Employees of a Company in Taipei City

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#### Abstract

A medical center in Taipei City notified a suspected case of dengue fever on March 29, 2012, affecting a 33-year-old man. Preliminary investigation revealed that he was one member of a tour group from a company, and was infected when traveled in Bali, Indonesia. The health authorities immediately obtained the list of the tour group, and collected blood samples from

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who developed suspected symptoms of dengue fever. A total of six travelers were confirmed by laboratory as dengue fever. Since receiving the notification, Centers for Disease Control in Taiwan (Taiwan CDC) has supervised the local health authorities to mobilize the manpower and other resources for epidemic prevention, and has taken integrated control strategy, including environment management, source reduction, removed breeding grounds of the vector mosquito sources, chemical control for mosquitoes, strengthening health education, reinforcing notification of suspected dengue fever cases by physicians, and sustaining syndromic surveillance for other members of the tour group. As of April 29 (the end of the longest incubation period), no further case was detected. This outbreak demonstrates a cluster of travel associated dengue fever infection among company employees in Taipei City. To continuously enhance health education on disease prevention since Taiwan citizens frequently visit Southeast Asian countries, and to implement control and prevention such as removing mosquito breeding sources, can avoid local transmission following communicable diseases imported.

**Keywords:** dengue fever, imported case, cluster

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