



2012
Annual Report
Centers for Disease Control

DC

Timeline 2011

Jan. 7

Implemented the "Construction of the New Immune Horse Ranch Project", a joint venture project with the National Pingtung University of Science and Technology



Apr. 19

Co-hosted the "Food Poisoning Outbreaks Emergency Response Drills" with the Food and Drug Administration to enhance the overall action and response capacity of the epidemic control and food safety authorities.

Aug. 18 - 19

Hosted the "APEC Conference on Harm Reduction Approach to HIV/AIDS Control". Delegates of 13 APEC economies attending the conference discussed and shared experiences concerning the development and challenges of the harm reduction program, as well as epidemiology, treatment and prevention of drug dependents and high-risk groups.

Mar. 6 - 8

Attended the 2011 APEC (Asia Pacific Economic Cooperation) 1st Health Working Group (HWG) Meeting and proposed the "APEC Workshop on Influenza Vaccine Policies and Strategies in Post-pandemic Era of Taiwan." Upon the support of five economies, namely Korea, China, Thailand, Peru, and Vietnam, the proposal was officially presented to the APEC Secretariat.

Jun. 27 - Jul. 1

Invited the US CDC expert on tuberculosis to give a keynote address about "The Role of Contact Investigation in TB Control" and conducted a four-day "practical orientation and training program on the tracking of persons exposed to tuberculosis", which was attended by 217 people.

Aug. 17 - 24

Invited Japan's National Institute of Infectious Diseases (NIID) expert to assist in the preliminary assessment of the core capacity requirements at the IHR designated airports, ports and ground crossings.



Mar. 26

Co-hosted the "2011 National Communicable Disease Control Expert Meeting" with Taiwan Urbani Foundation. Nearly a hundred experts, scholars, civic organization representatives, and members of the press and broadcast media were invited to join the discussion of the following matters: "evaluation of the vaccination policy", "evaluation of the vaccination implementation procedure", "Influenza-Like Illness (ILI) outpatient clinic activation system and normalization", and "epidemic prevention dialogue system for the media and the general public".

Jul. 1

Held CDC 12th anniversary celebration as well as the CDC review and outlook seminar pledging a future of operations upholding humanitarian, professional, pioneering, mutual communication, and team cooperation policies in ensuring the health and well-being of the general public.

Oct. 15

In response to the UN Global Handwashing Day, major businesses and corporations were urged to implement the National Handwashing Campaign calling for "individuals to regularly wash hands with soap and drying hands properly before leaving" to maintain health and safety in homes and strengthen the epidemic prevention work.

Apr. 7

In response to the WHO "2011 World Health Day", we co-hosted the "Strategies and Actions to Tackle Multi-Drug Resistant Microorganisms" public health forum with the Infectious Diseases Society of Taiwan, the Nosocomial Infection Control Society of Taiwan, and the Mackay Memorial Hospital. The forum aimed to raise the awareness of different domestic sectors on the potential risks of multi-drug resistant microorganisms.

Jul. 28

In response to the WHO hand hygiene activities, Taiwan CDC held "SAVE LIVES: Clean Your Hands - 2011 Hand Hygiene International Conference" to present the preliminary results of the hand hygiene campaign implemented in Taiwan, and will continue the implementation of the Four Fives Hand Hygiene Campaign.



Nov. 29

On the eve of the World AIDS Day (Dec. 1), for the first time ever, the Executive Yuan, the Legislative Yuan, and various sectors of the society held a press conference presenting a hundred celebrities pledging their support to the AIDS prevention and control campaign on this 100th year of the Republic. The press conference pledged to reduce population of new AIDS infected individuals by half and to gradually foster the reduction of cases of new AIDS infection, cases of prejudice against AIDS sufferers, and cases of AIDS related deaths to zero.

Apr. 14 - 15

Hosted the "2011 National Communicable Disease Control Meeting" in Penghu County. 160 public health officers who attended the meeting discussed issues regarding and shared experiences on the implementation of flu epidemic and tuberculosis epidemic prevention and control.



Aug. 11 - 12

Donated portable water purification tablets to aid the cholera epidemic control in Haiti.

Dec. 27

Co-hosted the "Care-free Youth, AIDS Get out- AIDS Control Information Video, Slogan, and Article Solicitation Campaign" with the Ministry of Education and related civic organizations for enhancement of the AIDS prevention and control campaign among youths.



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Message from the Director-General

Welcome to the 2012 annual report of the Taiwan Centers for Disease Control (Taiwan CDC). This report aims to provide the reader with an overview of Taiwan CDC's major events and achievements in 2011.

Taiwan CDC is a leading public health agency in Taiwan that plays a key role in protecting all people in this country from the threats of communicable diseases. In this report, you will see how Taiwan CDC's employees work effectively together to ensure a healthier environment for the people in Taiwan and a safer place for people all around the world.

In order to tackle the threat posed by a potential influenza pandemic, Taiwan CDC has formulated the National Influenza Pandemic Preparedness Plan. Moreover, Taiwan CDC participated in conducting the EU FP7 project called "Health system analysis to support capacity development to respond to pandemic influenza in Asia" from 2008-2011, and conducted the analysis of stakeholders among different countries. The completed research and final report were presented at the "Stakeholder Analysis on the Response to the 2009 H1N1 Influenza Pandemic in Six Asian Countries" held in Thailand and Netherlands in 2011. This project allowed Taiwan CDC to cooperate with 8 different countries in Asia and Europe and gain invaluable experiences through working with them. Further, this project highlighted the importance of cross-national cooperation through learning great lessons from individual country as well as sharing our own experience with other countries. I believe that each country's capacity can be further enhanced through regional or international collaboration to tackle the emerging infectious diseases more efficiently.



In the meantime, we actively seek ways to tackle many new challenges posed by infectious diseases such as dengue fever, tuberculosis, HIV/AIDS and enteroviruses.

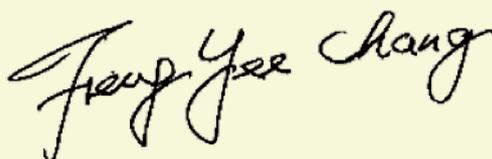
For years, tuberculosis (TB) has had the highest incidence and mortality rate among all communicable diseases in Taiwan. In order to bring TB under effective control, Taiwan CDC has launched the “Mobilization Plan to Halve Tuberculosis in Decade” (2006-2015). The plan includes strengthening case-finding, upgrading the capacity of laboratory testing, conducting the Directly Observed Treatment Short-Course (DOTS) as well as setting up the Multi-Drug Resistant TB Medicare System (DOTS Plus). In addition, in order to bring TB under further control, the “Latent Tuberculosis Infection Treatment Program”, which focuses on treating latent infections in children under 13 years old in contact with tuberculosis, was initiated in 2008 and more than 4 thousand children were enrolled in this program in 2011.

Since the launch of the harm reduction program, the reported number of HIV infections dropped in 2006, reversing a 20-year upward trend. Toward the end of 2010, Taiwan saw an effective reduction in the number of HIV infections, with the largest decline among injecting drug users (IDUs). However, as the HIV infections declined in IDUs, newly reported cases among men having sex with men (MSM) reemerged as a major threat in curbing this epidemic. Therefore, to increase the rate of condom usage by homosexual, Taiwan CDC authorized the Light of Friendship Association of Taiwan to develop a “pilot project of promoting MSM to use condoms in special settings in 2011.” The project requires the manager of a venue such as saunas or commercial bathhouses to deploy their staff to act as “Sex Police” and promote safe sex for MSM, including distributing condoms, providing safe sex consultations, and assisting customers who have overdosed on recreational drugs to leave the venue. From this pilot study, we learned that distributing condoms actively can increase the accessibility of condoms for targeted groups. Hence, we could establish strategies to combat HIV/AIDS in the future based on this study.

On the other hand, Taiwan CDC has hosted several activities and international conferences that are in line with the international policy. Taiwan CDC held the “APEC Conference on Harm Reduction Approach to HIV/AIDS Control” and focused on “the Development in Harm Reduction,” “The Challenges of Harm Reduction,” as well as “The Epidemiology, Treatment and Prevention of IDUs and other High Risk Groups”. In addition, we also hosted an international conference in support of the “SAVE LIVES : Clean Your Hands” campaign initiated by the World Health Organization. Through these activities, Taiwan CDC can not only share our own experiences, but also share our accomplishments with the rest of the world.

Taiwan CDC’s employees form our national frontline in the battle against epidemics, and they devote every effort to helping our people cope with infectious diseases.

Therefore, I would like to dedicate this CDC annual report, detailing our endeavors and accomplishments during 2011, to our partners and supporters. I sincerely hope you will enjoy reading this report and continue to support us.



Feng-Yee Chang, MD, PhD
Director-General
Taiwan Centers for Disease Control

About Taiwan

CDC



About Taiwan CDC

In 1999, the Taiwan Centers for Disease Control (Taiwan CDC) was established under the Organization Law of the Centers for Disease Control. The mission of Taiwan CDC is to protect people from the threats of communicable diseases. Taiwan CDC strives to accomplish its mission by:

1. Formulating policies, strategies and plans for the prevention and control of communicable diseases;
2. Guiding and assessing local authorities in the execution of matters concerning communicable disease control;
3. Establishing relief funds for compensating vaccine victims and related activities;
4. Conducting quarantines of international and specifically designated ports;
5. Organizing international collaborative projects and exchanges on communicable disease control.

Taiwan CDC is under the command of the director-general, who is assisted by two deputy directors and a chief secretary. It is composed of seven divisions, eight offices and seven branches (Figure 1). The jurisdictions of the seven branches are shown in Figure 2.

Figure 1. Organization chart



About Taiwan CDC



Figure 2. Branch Jurisdictions

Taiwan CDC has 793 employees and a male to female ratio of 1:4. The average age of the employees is 43.4 years old, with 72% younger than 49. In terms of educational background, 46% of the staff have received a college or university education and 41% hold an advanced degree (see Figure 3 and 4). The total budget of Taiwan CDC was NT\$6 billion (US\$200 million) in 2011.

Figure 3. Age Distribution of Taiwan CDC Employees

| Under 29 years | 30-39 years | 40-49 years | 50-59 years | 60-65 years |
|----------------|-------------|-------------|-------------|-------------|
| 8% | 26% | 38% | 25% | 3% |

Figure 4. Education Level of Taiwan CDC Employees

| Graduate School | University | College | High School or Under |
|-----------------|------------|---------|----------------------|
| 41% | 30% | 16% | 13% |

2011 Focus—Rapid System Analyses of the Health System and Pandemic Influenza Preparedness and Response



2011 Focus—Rapid System Analyses of the Health System and Pandemic Influenza Preparedness and Response

Background

Since the outbreak of SARS in the year 2003 as well as the continuous reported human cases of H5N1 avian influenza, Asia-Pacific, particularly Southeast Asia, has received substantial attention because of the anticipation that it could be the epicentre of the next pandemic. Therefore, the AsiaFluCap project was initiated by Dr. Richard Coker from London School of Hygiene and Tropical Medicine (LSHTM) of United Kingdom in 2008 to evaluate the response mechanisms and operational capacity of health systems to respond to pandemic infections among Asian countries. This project is a 3-year international collaborative research project which was funded by European Commission. Taiwan CDC was invited to work with experts from LSHTM of UK, Hamburg University of Applied Science (HAW) of Germany, National Institute for Public Health and Environment (RIVM) of Netherland, International Health Policy Program (IHPP) and Faculty of Tropical Medicine of Mahidol University of Thailand, Department of Health Policy, Faculty of Public Health of University of Indonesia (FKM UI), Ministry of Science and Technology (MOST) of Vietnam, National Institute of Public Health (NIPH) of Cambodia, as well as National Avian and Human Influenza Coordination Office (NAHICO) from Lao PDR.

Taiwan CDC Leads the Research of *Stakeholder Analysis on the Response to the 2009 H1N1 Influenza Pandemic in Six Asian Countries*

There were 8 sub-plans within AsiaFluCap project, and Taiwan CDC was in charge of the 4th sub-plan—stakeholder analysis. The aim of this analysis was to identify capacity strengths, gaps, and constraints of the national health systems in response to the 2009 H1N1 influenza pandemic. Various stakeholders were interviewed to assess their viewpoints and opinions on national response activities. Taiwan team developed a stakeholder analysis toolkit and trained all the country research teams to use the toolkit. Each country selected their interview partners, conducted the interviews and formulated a report.



Through the analysis, we obtained the following results regarding the governance and budgets, vaccine policy and public compliance with vaccination, and antiviral drugs. 50% of the analyzed countries had a command center or mechanism set up for pandemic influenza, and 33% were supported by international health organizations in their pandemic control efforts, 67% arranged budgets specifically allocated for epidemic control. During the pandemic period, 67% of the targeted countries launched an H1N1 vaccination campaign. 33% received H1N1 vaccines



from World Health Organization (WHO), another 33% used vaccines produced domestically or purchased from international vaccine companies. We also discovered that 50% of the countries reported problems with risk communication and risk management, especially in terms of vaccine safety as well as vaccine distrust among the public and public health professionals. From the report we discovered that international organizations supported 33% of the targeted countries to stockpile antivirals while 50% had government budgets to purchase sufficient amount of antivirals. Also, 33% of the investigated countries were able to produce Tamiflu. Finally, we concluded that 33% of the analyzed countries reported resource shortcomings and limitation in their pandemic response capacities while all countries identified capacity constraints include the application of control measures on large population groups, bureaucracy obstacles and rigidity in regulations. From the analysis, there were several areas for improvement as well. First of all, we need to strengthen information exchange, capacity building and collaboration within and among countries to improve preparedness planning and response implementation. Second, the distribution of financial, human, technological and health care resources in an equitable and timely way, especially at district and local levels is vital. Third, promote transparency in governmental decision-making processes to enhance public trust and public acceptance of pandemic response measures is also important. Fourth, we should be prepared for the unexpected and initiate timely research activities to close information gaps.

The AsiaFluCap Project

Stakeholder Analysis on the response to the 2009 H1N1 Influenza Pandemic in six Asian Countries

Yu-Chen Hsu, Yi-Fu Yang, Yu-Min Chen, Chang-Hsun Chen, Ying-Huei Chai, Shan-Chuen Chang, Chung-Nai Ding

The project is sponsored by

Project collaborators:

Background

AsiaFluCap is an international collaborative research project aiming to evaluate the operational capacity of health systems to respond to pandemic influenza. Within the project, different studies were conducted to evaluate response mechanisms and the response capacity in Cambodia, Indonesia, Lao PDR, Taiwan, Thailand, and Vietnam. The aim of the stakeholder analysis was to identify capacity strengths, gaps, and constraints of the national health systems in response to the 2009 H1N1 influenza pandemic. Various stakeholders in the six project countries were interviewed to assess their strengths and optimize an national response activities.

Methods

• In-depth interviews were conducted to collect stakeholders' responses and opinions on the response to the 2009 H1N1 influenza pandemic in six countries.

• The Taiwan project team developed a stakeholder analysis tool and trained the country research teams in June/July 2010.

• Each project country collected their interview findings, conducted the interviews, and wrote a report according to this template. Table 1 shows the background of the interviewed stakeholders from the 6 project countries.

• The Taiwan team synthesized the results from the six countries for a cross-country analysis.

Main Findings:

Government and Budgets

- Taiwan's Central Epidemic Command Centre (CECC) was activated to organize pandemic response. Indonesia's National HPAI and Lao's NERDC initially established to control Avian Flu, were leading H1N1 response mechanisms. Indonesia had better organizations supported Cambodia and Laos in their pandemic control activities.
- Indonesia, Thailand, and Vietnam had government and budget specifically allocated to epidemic control.

Vaccine Policy and Public Concerns with Vaccination

- During the pandemic period, Cambodia, Laos, Taiwan, and Thailand launched a H1N1 vaccination campaign. Cambodia and Laos received H1N1 vaccines from WHO. Thailand purchased H1N1 vaccines from international pharmaceutical companies, and Taiwan had domestically produced as well as purchased vaccines.
- Cambodia, Taiwan, and Thailand reported problems with risk communication and risk management, especially in the field of vaccine safety, and reported an distrust among the public and among health health professionals.

Antiviral Drugs

- International organizations supported Cambodia and Laos to stockpile antivirals. Taiwan, Thailand, and Vietnam had government budgets to purchase sufficient amounts of antivirals from international pharmaceutical companies. In contrast, Thailand and Vietnam were able to produce Tamiflu domestically.
- Cambodia and Laos reported resource shortcomings and limitations in their pandemic response capacities.
- Capacity constraints identified by all countries include the application of control measures on large population groups, bureaucracy's obstacles, and rigidity in regulations.

Areas for improvement identified in the analysis:

- Strengthen information exchange, capacity building, and collaboration within and among countries to improve preparedness planning and response implementation.
- Distribute financial, human, technological, and health care resources in an equitable and timely way, especially at district and local levels.
- Promote transparency in governmental decision-making processes to enhance public trust and public acceptance of pandemic response measures.
- Prepare for the unexpected, and
- Initiate timely research activities to close information gaps.

Lessons learnt from AsiaFluCap

From the experience of H5N1 avian influenza and the recent 2009 H1N1 pandemic, we're all aware of the importance of preparedness and response plan towards these emerging infectious diseases. This is the first time for Taiwan CDC to have such an opportunity to join an international research project with 8 different countries from Asia and Europe. Through the meetings and field work with all the country partners, we have gained precious experience and learned a lot from each partner, for example, how to develop, conduct and follow up on an international cooperative project, especially rapid analysis field study; how to work with different country partners to develop a model for estimation of resource needs. We also learned the skills to negotiate, compromise and reach a consensus when making questionnaires to collect data for resource characterization. To tackle these emerging infectious diseases, not only each country has to strengthen its own capacity but also through cooperation with other countries could reach the best result.

National Communicable Disease Surveillance Systems



Current Status

Ever since Taiwan CDC was reorganized in July 1999, responsibility for infectious disease surveillance was handed to the National Communicable Disease Surveillance Systems. The systems began with surveillance of notifiable diseases plus sentinel surveillance to detect epidemics, and later on several systems were built to collect timely, complete and precise information on infectious diseases. Taiwan CDC's vision of these systems is to monitor the nation's health status and detect outbreaks rapidly by integrating various infectious disease surveillance networks. The work Taiwan CDC carried out included: (1) Constructing diversified disease surveillance systems; (2) Collecting and monitoring data for disease trend analysis, predictions and alerts; and (3) Providing regular analysis and assessments of global and indigenous infectious diseases.

Accomplishments

Notifiable Diseases Surveillance System

If a doctor treats a suspected patient who has come down with a notifiable infectious disease, the doctor must report the case within a certain time. Taiwan CDC established the Notifiable Disease Surveillance System to give medical personnel across the country and provide a platform for reporting diseases and grasping information related to communicable disease occurrences immediately. By using the system, the medical personnel can make early informed decisions on assigning the appropriate amount of manpower and resources to carrying out disease prevention, thereby keeping diseases from spreading.

The first stage of the Notifiable Diseases Surveillance System was to establish a web-based version. This was finished in July 2001, enabling easier and more detailed transmission of reported information. The second stage, completed in September 2004, was to strengthen the surveillance system. In September 2006 the third stage, integrated the Notifiable Disease Surveillance System, was accomplished. Syndrome Surveillance System and Symptom Surveillance System. The fourth stage, finished in June 2008, built a single reporting gateway and increased user-friendliness of the systems. In 2010-2011, Taiwan CDC maintaining these systems and increasing their user-friendly functions. The following table shows the five categories of notifiable diseases in Taiwan.

Table. List of Notifiable Diseases in Taiwan.

| Category | Disease | |
|---------------------------|--|---|
| I | SARS | Rabies |
| | Anthrax | H5N1 Influenza |
| | Anthrax | H5N1 Influenza |
| II | Diphtheria | Typhoid Fever |
| | Paratyphoid Fever | Dengue Fever |
| | Meningococcal Meningitis | Acute Flaccid Paralysis and Poliomyelitis |
| | Shigellosis | Amoebiasis |
| | Malaria | Measles |
| | Acute Hepatitis A | Enterohemorrhagic E. coli Infection |
| | Hantavirus Syndrome | Cholera |
| | Rubella | Multi-drug Resistant Tuberculosis |
| | Chikungunya Fever | West Nile Fever |
| | Epidemic Typhus Fever | |
| III | Pertussis | Tetanus |
| | Neonatal Tetanus | Japanese Encephalitis |
| | Tuberculosis | Hansen's Disease |
| | Congenital Rubella Syndrome | Acute Hepatitis B |
| | Acute Hepatitis C | Acute Hepatitis D |
| | Acute Hepatitis E | Acute Hepatitis Unspecified |
| | Mumps | Legionellosis |
| | Invasive Haemophilus Influenzae Type B Infection | Syphilis |
| | Gonorrhoea | Enteroviruses Infection with Severe Complications |
| HIV Infection | AIDS | |
| IV | Herpesvirus B Infection | Leptospirosis |
| | Melioidosis | Botulism |
| | Invasive Pneumococcal Disease | Q Fever |
| | Endemic Typhus Fever | Lyme Disease |
| | Tularemia | Scrub Typhus |
| | Varicella | Cat-Scratch Disease |
| | Toxoplasmosis | Complicated Influenza |
| | Brucellosis | New Delhi metallo-lactamase 1 Enterobacteriaceae* |
| Creutzfeldt-Jakob Disease | | |
| V | Rift Valley Fever | Marburg Fever |
| | Yellow Fever | Ebola Fever |
| | Lassa Fever | |

National Communicable Disease Surveillance Systems

School-Based Surveillance System

Taiwan CDC implemented the School-Based Surveillance System in 2001. As of 2011, 661 elementary schools (25% of the country's total) had joined the program, covering students from kindergarten to grade 6 in 97% of cities and towns. Medical issues monitored under the system include ILI, HFMD, herpangina, diarrhea, fevers and acute hemorrhagic conjunctivitis (AHC). Through the system, Taiwan CDC collects information from schools weekly, analyzes trends at the regional level and in each school, and regularly provides reports to participating schools as well as educational and public health authorities.

The School-Based Surveillance System enables Taiwan CDC to understand epidemic trends at schools and predict possible outbreaks. Through early surveillance of communicable diseases and epidemics, appropriate epidemic prevention measures can be adopted promptly to prevent the spread of communicable diseases on campus.

Symptom Surveillance System

International contact and travel by Taiwan nationals are on the rise, easing transmission of communicable diseases across borders and challenging disease prevention workers. For example, in the summer of 2008, 10 out of 11 people in a religious group were shown to have come down with dengue fever on a trip to Myanmar. To prevent the entry of emerging communicable diseases like dengue fever, and to facilitate early public health monitoring and implement epidemic prevention measures, Taiwan CDC established the Symptom Surveillance System. In addition, in 2006 Taiwan CDC integrated several active surveillance systems to enhance the monitoring of the travelers at airports and harbors for diseases contracted abroad. These steps strengthened the efforts to battle communicable diseases from the outside while controlled cluster incidents and launched prompt disease prevention mechanisms.

Disease categories under surveillance include persons under investigation for H5N1 influenza, clusters of influenza-like illness cases, fevers of unknown etiology, diarrhea, coughing persisting for more than three weeks, upper respiratory tract infections, and clusters of enterovirus infection cases.

The Symptom Surveillance System monitors inbound passengers at airports and seaports to prevent entry of communicable diseases. It enables Taiwan CDC to effectively control epidemic events and quickly launch epidemic prevention measures.

Surveillance System for Populous Institutions

The Surveillance System for Populous Institutions is aimed at early cluster detection of infectious diseases among institution inhabitants or workers. It applies to elderly homes, long-term care facilities, apartments for the elderly, facilities for the disabled, juvenile protectories, veterans' homes, prisons, nursing homes and outpatient centers for mental rehabilitation. If an individual or a cluster respiratory disease case is found among inhabitants or workers, the facility must file weekly online reports, confirm the data reported and report the number of people under its care.



Real-time Outbreak and Disease Surveillance (RODS)

The ICD-9-CM diagnosis codes from over 170 emergency rooms in the country are forwarded on a daily basis to enable the early and immediate analysis of aberrations for the various syndromes. The ROD also enables routine monitoring of specific disease trends such as influenza-like illness, enterovirus infection, diarrhea, and conjunctivitis.

Syndromic surveillance using the National Health Insurance data

Daily aggregate number of outpatient clinic, hospitalization, and emergency room cases of specific diseases from IC card information of the National Health Insurance Bureau are used to monitor trends of influenza-like illness, enterovirus infection, and diarrhea since April 2009. In year 2011, scarlet fever was included in the disease watch list.

Pneumonia and Influenza Mortality Surveillance

The daily updated death certification reports to the Statistics Office of the Department of Health were used to identify cases indicative of pneumonia and influenza death, so as to monitor trends of pneumonia and influenza mortality. Data thereby provides a reference for future prevention and control of influenza.

Establishing Support Systems for Management and Analysis

1. Taiwan CDC used the Geographical Information System (GIS) in conjunction with the Notifiable Diseases Surveillance System and Syndrome Surveillance System to analyze epidemic data and develop a disease prediction model for estimating the distribution of predicted diseases.
2. Taiwan CDC installed multifaceted surveillance systems for data acquisition and analysis.
3. On February 24, 2004, Taiwan CDC outsourced the establishment of the Disease Reporting and Consulting Center to the telecom industry. The public can dial 1922 to report communicable diseases and obtain consultation and information on communicable disease policies. Taiwan CDC assigned full-time personnel to answer calls and take caller messages, developing the center into a communication platform.

Reporting via the Internet

To make operations of surveillance more effective, Taiwan CDC established several web pages on its systems for users to upload information.

National Communicable Disease Surveillance Systems

Systems Integration

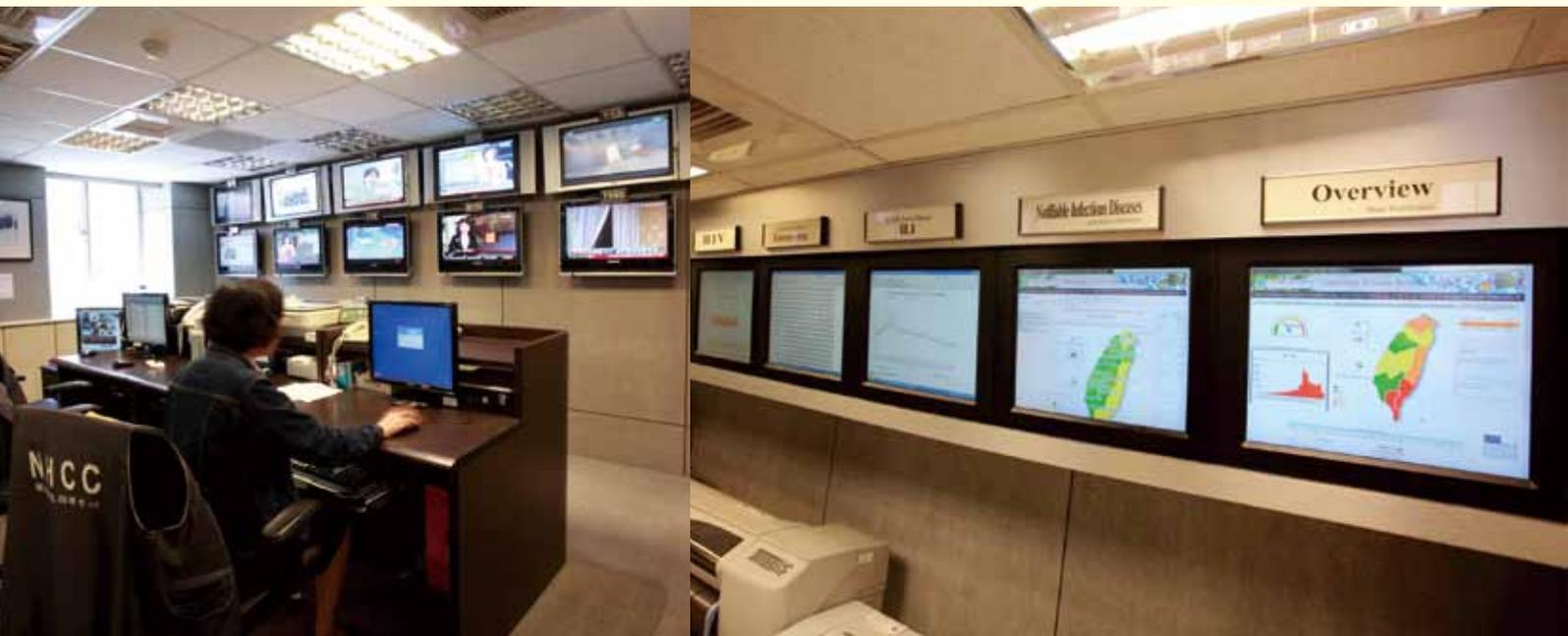
To enhance presentation and application, Taiwan CDC combined information and analysis and improved integration of its surveillance systems, including the Notifiable Disease Surveillance System, the Symptom Surveillance System and the Syndrome Surveillance System. This task was completed in September 2006.

Information Sharing

Taiwan CDC weekly generates the School-based Surveillance Weekly Report and the Influenza Express which are available online. In addition, daily updated reports on international epidemics are generated and forwarded to related authorities. Taiwan CDC regularly collaborates with academics to conduct surveillance evaluation and develop new systems/methods. The collection, evaluation and dissemination of information to the public, local health departments and governing authorities, along with information sharing, are keys to completing this task.

Training and Education

Taiwan CDC offers training to system users so they keep remain informed of new epidemic surveillance information.



Important Communicable Diseases and Control



Tuberculosis

Tuberculosis has always been Taiwan's most dangerous communicable disease. Taiwan's per capita GDP has reached US\$20,000, but there are still about 13,000 new cases of tuberculosis every year, making it a greater threat than all other communicable diseases combined.

Tuberculosis is not only damaging to people's lives and productivity, but can also adversely affect a nation's image and competitiveness. Health workers in Taiwan have been working hard to control tuberculosis for over half a century, and the prevalence of the disease has been reduced. However, when compared with other advanced countries, Taiwan is still decades behind and needs to make more efforts to catch up. Taiwan has a dense and mobile population. The highly developed nature has caused estranged personal relationships, and the abundance of medical resources let patients have too many options when it comes to medical services. These two factors make detection and management of patients more difficult compared to rural societies. Recently, tuberculosis has again begun to rise globally, and factors such as, foreign labor, international travel and HIV-related complications make dealing with the disease more difficult locally. Therefore, to protect the health of the general public, Taiwan needs to use more active and aggressive methods when faced with new challenges in tuberculosis control.

Current Status

(1) Incidence

There were 16,472 and 12,634 tuberculosis cases in 2005 and 2011, respectively. The incidence rate went from 72.5 to 54.5 persons per 100,000 over this time period. This indicates that the number of tuberculosis cases is gradually decreasing with more active control measures, such as directly observed treatment (Table 1). In 2010, the proportion of smear-positive and laboratory confirmed new TB cases were 38% and 78%, respectively. On average, a new tuberculosis patient in Taiwan is detected every 39 minutes.

Table 1. Taiwan Tuberculosis Incidence and Mortality , 2005 - 2011

| Year | Cases | Incidence | Death | Mortality |
|------|--------|-----------|-------|-----------|
| 2005 | 16,472 | 72.5 | 970 | 4.3 |
| 2006 | 15,378 | 67.4 | 832 | 3.6 |
| 2007 | 14,480 | 63.2 | 783 | 3.4 |
| 2008 | 14,265 | 62.0 | 762 | 3.3 |
| 2009 | 13,336 | 57.8 | 748 | 3.2 |
| 2010 | 13,237 | 57.2 | 645 | 2.8 |
| 2011 | 12,634 | 54.5 | 638 | 2.8 |

A tuberculosis patient registry was implemented in 1957, but was limited to bacteriological positive patients. The scope of the program eventually expanded, and from 1991, all active tuberculosis patients were required to register. However, reports from medical institutions did not reflect the true number of patients. It was only after the Bureau of National Health Insurance introduced the “No-notification, no-reimbursement” and “the notification fee” policies in July 1997, and Taiwan CDC started to review tuberculosis-related deaths in 2001, that the number of tuberculosis patients reported by medical institutions dramatically increased. The data showed that the incidence rate of tuberculosis rose with age. Among new patients, 52% were over 65 years old. New tuberculosis cases tended to appear in urban areas. In 2011, the cities or counties with the highest number of new tuberculosis patients were New Taipei City (2,009 cases, 15.9%) and Kaohsiung City (1,949, 8.2%). Also, the incidence rate in eastern Taiwan was higher than the west, and the south higher than the north. The incidence rate was the highest in Pingtung County (97.5 per 100,000 population) and followed by Taitung County (97.2 per 100,000 population). In mountainous regions, the incidence rate of tuberculosis was 205.6 per 100,000 population, which was 3.8 times higher than all regions.

Taiwan’s incidence rate in 2010 of 54.5 per 100,000 population was 16.0 times higher than the United States and 3.0 times higher than Japan (rate of 2010). The main goals of Taiwan’s TB policies are to lower the incidence rate of tuberculosis and protect residents’ health, thereby improving quality of life.



(2) Mortality Rate

Tuberculosis claimed 638 lives in Taiwan in 2011, giving a mortality rate of 2.8 per 100,000 population. The disease also caused 0.42% of total deaths. The mortality rate of tuberculosis dropped by 36% from 2005 to 2011.

Among tuberculosis-related deaths, the number of deaths among males was 479, 3.0 times higher than that of females, which was 159. The mortality rate of tuberculosis also rose with age, with 83.4% of deaths in people aged 65 years and above. This shows that in Taiwan, the population group threatened most by tuberculosis is the elderly. Geographically speaking, mortality rates in eastern Taiwan were higher than in the west, while the south was higher than the north. The rates were lower in cities. The mortality rate of tuberculosis was the highest in Lien-chiang County, at 10.0 per 100,000 population. Taitung County followed at 7.4 per 100,000. In mountainous regions, the mortality rate was 14.5 per 100,000, which was 5.3 times higher than all regions (2.8 per 100,000).

Goals

1. To implement active strategies and enhance contact investigation to detect infected persons as early as possible.
2. To provide comprehensive medical treatment for TB patients and individuals with latent TB infection (LTBI). Prevent individuals with LTBI from developing into active TB and halve the number of TB cases.
3. To implement directly observed treatment short-course (DOTS) and directly observed preventative therapy (DOPT) to increase the completion of treatment and cure rate to stop TB from spreading.



Accomplishments

Improving Surveillance and Monitoring

The National Tuberculosis Reporting and Management System collects and documents of information on tuberculosis patients, such as diagnosis, reporting, registration, treatments, examination, management, and contact investigation. It also provides the information required for case management and epidemiological analysis. The system has strengthened tuberculosis monitoring among high-risk groups, such as aborigines, teachers, students, medical workers, draftees and soldiers, and people in high-risk areas such as prisons and other institutions with a high population density.

Establishing a High Quality and Rapid TB Testing Network

The tuberculosis laboratory testing network was established in October 2001. In the early stages, its main goals were to establish a laboratory testing network, and create a testing procedure. Currently, the emphasis of the network is on the certification and improvement of quality of laboratories, monitoring and training of staff members, and organization of reports on susceptibilities of drugs.

Directly Observed Treatment Short-Course (DOTS) Improving

After the “Mobilization Plan to Reduce Tuberculosis by Half in Ten Years” was implemented in April 2006, the DOTS coverage rate was at 100% in Taiwan, and the quality of treatment has greatly improved, with constant supervision and reviews. In addition, treatment success rates for smear positive TB cases increased gradually (Table 2).

The execution of a TB control program requires corresponding strategies. These strategies, especially the five key factors suggested by the WHO, require constant evaluation to improve the quality and effect of program implementation.

Quality of TB Diagnosis and Treatment; Nosocomial Infection Control

To maintain and improve the quality of diagnosis and treatment, Taiwan CDC worked with medical associations. It also worked with the Bureau of National Health Insurance on the prescription drug inspection system to strengthen the evaluation of nosocomial infection control. The program included regular X-ray screening, education and training, contact investigation, quarantine of smear or culture positive patients whose, and monitoring of coughs. Furthermore, in 2005, tuberculosis examination became an item in the yearly nosocomial infection control evaluation program.

Table 2. Treatment Success Rate for Smear Positive TB in Taiwan

| Year | DOTS coverage | Smear positive treatment success rate (12 months) |
|------|---------------|---|
| 2005 | 0 | 64% |
| 2006 | 100% | 67% |
| 2007 | 100% | 67% |
| 2008 | 100% | 67% |
| 2009 | 100% | 70% |

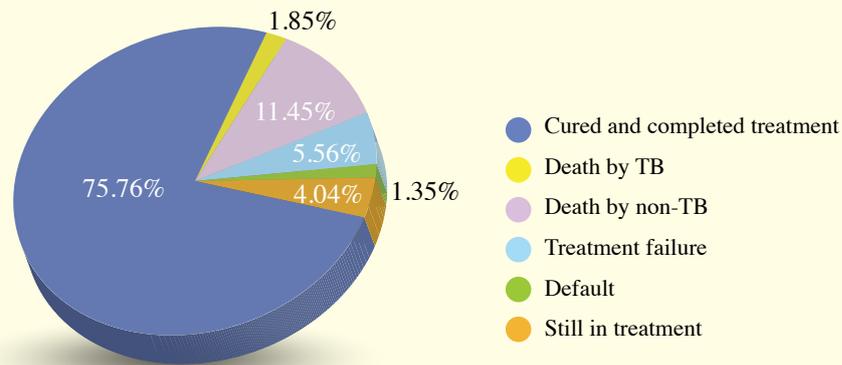
Establishing the Multi-Drug Resistant TB (MDR-TB) Medicare System

The Multi-Drug Resistant TB (MDR-TB) Medicare System was established in May 2007. It consists of five different medical teams which specialize in treating MDR-TB patients. The responsibilities of Taiwan CDC are to provide resources and the designated teams are to offer treatment according to the WHO clinical guide. After admission, the teams actively treat each patient for two years, and community health workers provide personal care via the DOTS Plus program. The goal of the system is to provide continuous and comprehensive care. A total of 272 (88%) cases were managed under the medical MDR-TB system through the end of December 2011, leading to a steady decrease in the number of MDR-TB cases and a favorable outcome of about 81% at 24 months for patients who received treatment (Figure 1). In addition, the number of MDR-TB cases in registry decreased from 440 in May 2007 to 272 in December 2011. Moreover, cooperation between Taiwan CDC and the Bureau of National Health Insurance on



fluoroquinolone control and random clinical treatment prescription inspection has decreased the drug-resistant rate of fluoroquinolone from 50% before 2008 to 10% in 2010 and lowered the occurrences of XDR-TB cases. Taiwan CDC works hard at controlling and improving laboratory quality and introducing second line tuberculosis drugs. Its advanced medical team gives difficult-to-treat MDR-TB patients a chance at full recovery.

Figure 1. Treatment Outcome of Second Line Anti-TB Drugs at 24 months

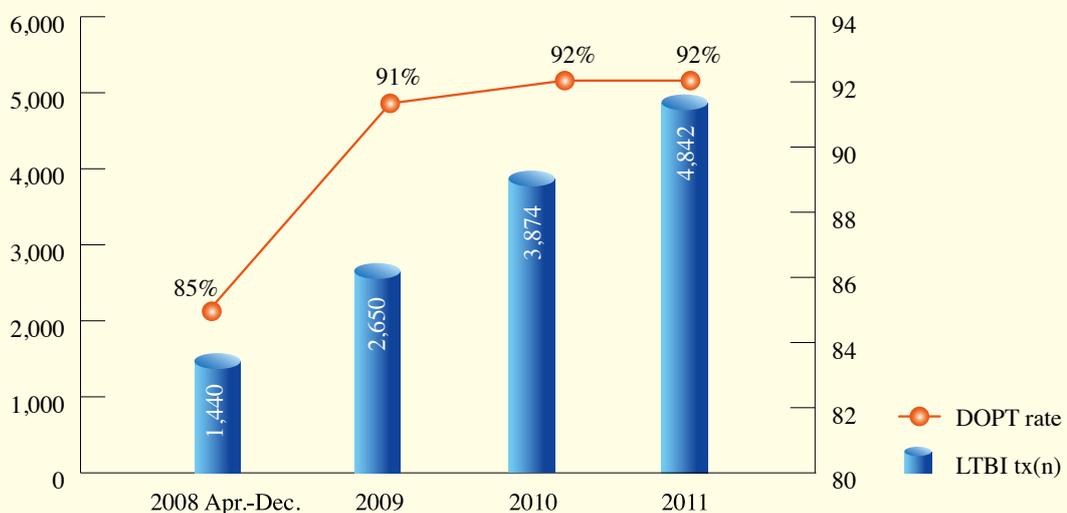


There were 594 cases under analysis, in which 24 patients had no clinical outcome and all of them achieved sputum conversion. The favorable outcome was 80%

Latent TB Infection (LTBI) Treatment Program

The Latent Tuberculosis Infection Treatment Program was initiated on April 1, 2008, and has focused on treating latent infections in the population while inducing the least drug side-effects. The target population were children under 13 years old in contact with transmitted tuberculosis cases. The LTBI treatment is carried out in conjunction with DOPT, or directly observed preventive therapy. In 2011, a total of 4,842 persons were enrolled in the program, of which 92% received DOPT service. LTBI treatment and DOPT rates from 2008 to 2010 increased gradually (Figure 2).

Figure 2. LTBI treatment and DOPT Rates in Taiwan



Important Communicable Diseases and Control

Mandatory isolation of Infectious Pulmonary TB Patients

By regulations of the Communicable Disease Control Act, patients with infectious tuberculosis (especially patients whose sputum smear positive or patients of MDR-TB) will be placed under mandatory isolation care if the physician determines it is the most favorable way preventing transmission or if the patient does not take his or her medicine regularly and refuses the recommendation of hospital care.

Training, Research and International Cooperation

Taiwan CDC has worked with other government agencies, such as the Ministry of Foreign Affairs, to plan various international projects. The goals of these projects are to upgrade tuberculosis control quality of countries needing help and promote diplomatic relations. Taiwan CDC has also sent representatives overseas to participate in conferences and acquire knowledge and experience to improve its own ability in the fight against tuberculosis. In addition, Taiwan CDC has invited foreign experts to Taiwan for academic conferences, facilitating the exchange of knowledge and experience.



Contact Investigation Training, 2011

Future Prospects

Achieve annual reduction of new tuberculosis cases and lower the incidence rate to 36 per 100,000 population by year 2015.



HIV/AIDS

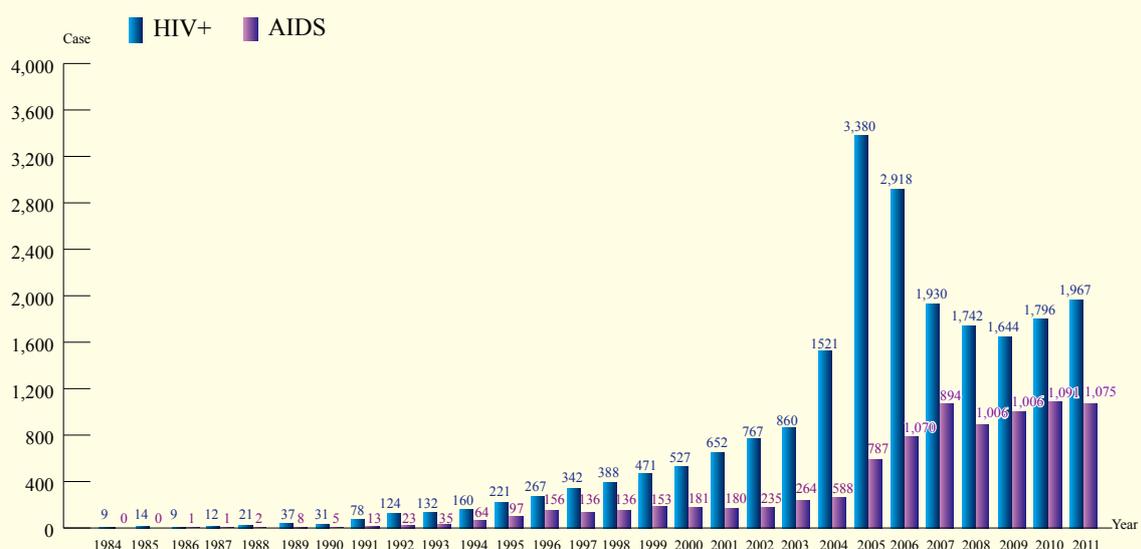
Current Status

HIV destroys the normal functions of the immune system and is transmitted from an infected person's blood, semen or vaginal fluid through broken skin or mucus membranes. It can be passed from an infected woman to her child during pregnancy, birth or breast feeding.

The loss of immune functions can lead to AIDS (acquired immunodeficiency syndrome), which is expected to be one of the largest human catastrophes of the 21st century. The first HIV case in Taiwan was reported in 1984. By 2011, the number of HIV patients had risen to 22,020 (8,413 of whom had developed full-blown AIDS with 3,360 deaths). The number of HIV infections surged in 2005 due to a major increase in infections among injecting drug users (IDUs). Faced with this serious situation, Taiwan CDC dedicated a tremendous amount of effort and resources to harm reduction programs. Total reported cases dropped in 2006, which was the first trend reversal since 1984. (see Figure 1). (Men who have sex with men, MSM) In 2008 and thereafter, the epidemic took a turn; infections were mainly noted among men who have sex with men (MSM). In face of the rising AIDS epidemic, the most pressing course of action is the reinforcement of the health education campaign and intervention programs for the MSM group.

In terms of age, the largest number of infections in 2011 was in the 20 to 29 age group, accounting for 972, or 49.4%, of all cases. The second largest group was the 30 to 39 age group, numbering 543, or 27.6%, of all cases (see Table 1). An analysis of risk factors showed that in 2011, the

Figure 1. Reported Cases of HIV/AIDS by Year of Diagnosis in Taiwan, 1984-2011



HIV(+): The number of newly reported HIV cases.

AIDS: The number of newly reported AIDS cases may include HIV cases reported in previous years.

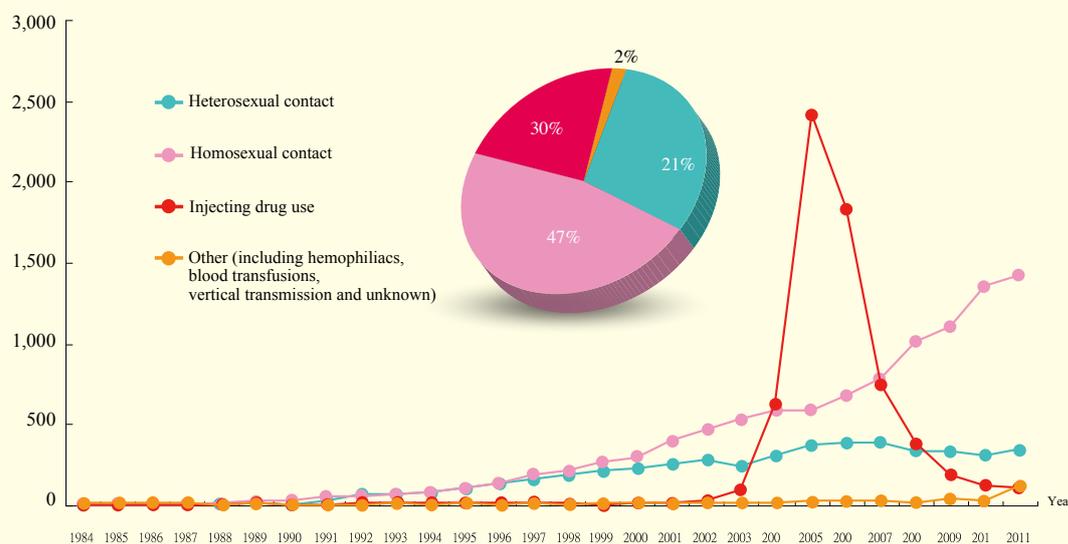
Important Communicable Diseases and Control

highest proportion of HIV infections was a result of unsafe sexual transmission, with men who have sex with men (MSM) accounting for 72.2% of all cases. The second largest proportion of infections was heterosexual contact, accounting for 17% (see Figure 2). MSM, IDUs & heterosexual. In total three major transmission route for infection are the MSMs, IDUs, and heterosexuals. Of Taiwanese nationals infected by HIV in 2011, 1,902, or 97%, were males and 65, or 3%, were females. The ratio of infected males to females was 29:1.

Table 1. Age Distribution of HIV patients in Taiwan

| Age | 2010 | | 2011 | | 1984-2011 | |
|---------|-------|------------|-------|------------|-----------|------------|
| | Cases | Percentabe | Cases | Percentabe | Cases | Percentabe |
| 0-9 | 0 | 0.0% | 1 | 0.1% | 39 | 0.18% |
| 10-19 | 55 | 3.1% | 63 | 3.2% | 550 | 2.50% |
| 20-29 | 847 | 47.2% | 972 | 49.4% | 8,652 | 39.29% |
| 30-39 | 543 | 30.2% | 543 | 27.6% | 7,581 | 34.43% |
| 40-49 | 224 | 12.5% | 258 | 13.1% | 3,438 | 15.61% |
| 50-59 | 78 | 4.3% | 93 | 4.7% | 1,194 | 5.42% |
| 60-69 | 36 | 2.0% | 22 | 1.1% | 381 | 1.73% |
| 70-79 | 9 | 0.5% | 13 | 0.7% | 161 | 0.73% |
| Over 80 | 4 | 0.2% | 2 | 0.1% | 24 | 0.11% |
| Total | 1796 | 100.0% | 1967 | 100.0% | 22,020 | 100.00% |

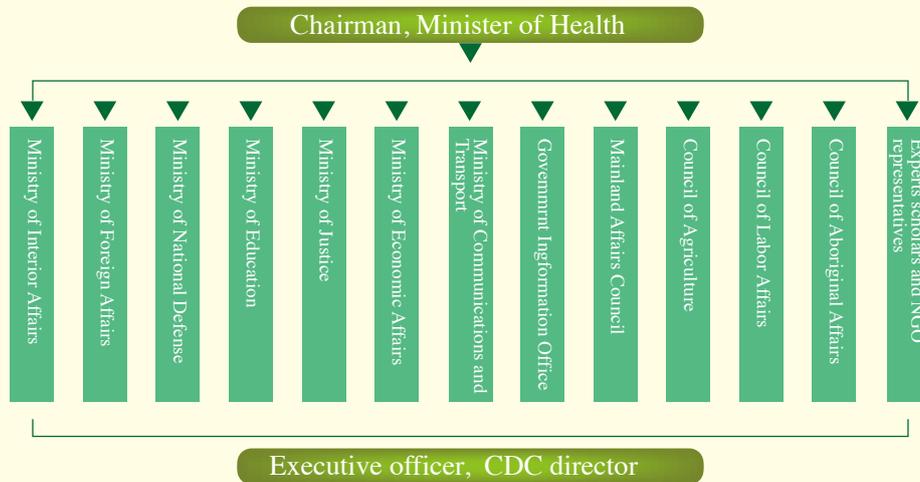
Figure 2. Statistics on Risk Factors of HIV Infections in Taiwan, 1984-2011



Heterosexual contact 17% Homosexual contact 72.2% Injecting drug use 5% Other (including hemophiliacs, blood transfusions, vertical transmission and unknown) 5.7%



Figure 3. Committee for HIV Infection Control and Patient Rights Protection, DOH, Executive Yuan



Accomplishments

1. The Committee for HIV Infection Control and Patient Rights Protection (see Figure 3) held two cross-ministerial meetings in 2011.
2. To ensure the dignity and rights of people living with HIV/AIDS (PLWHA), the AIDS Prevention and Control Act was amended in 2007. Regulations were also amended and announced.
3. The harm reduction program has made significant progress. The reported number of HIV infections dropped in 2006, reversing a 20-year growth trend. Toward the end of 2010, Taiwan saw an effective reduction in the number of HIV infections, with the largest decline among IDUs. In addition, the percentage of all newly reported cases attributable to IDU fell from a high of 72% in 2005 to only 5% in 2011.
4. Taiwan CDC promotes a diversified prevention project for homosexuals to confront the epidemic among MSM. The project includes : (1) Establishment of the MSM Community Health Center for providing friendly and diversified services to MSM. (2) Implementation of health education and intervention services, such as the internet opinion leader and internet monitor. (3) Providing voluntary HIV counseling and testing services at sauna centers and pubs via NGOs' cooperation. (4) Implementation of the friendly, healthy, and safe label for MSM sauna and the installation of automatic condom vending machines in venues generally frequented by the gay population. (5) Establishment of a free health information hotline for MSM to provide them with immediate and accurate health information and counselling on HIV related matters.



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5. To increase disease surveillance, Taiwan began to screen blood donors in 1988, draftees in 1989, prison inmates in 1990, and foreign laborers in 1991. Ten hospitals have provided anonymous HIV blood-screening services since 1997. To increase accessibility of HIV screening services, 32 hospitals provided anonymous HIV testing in 2011. They screened 23,219 people, with 510 found to be HIV positive, accounting for 2.2% of the total. Furthermore, to cope with the increase in female HIV patients and the issue of mother-to-child transmission of HIV/AIDS, an HIV screening plan was established for pregnant women. Thus far, it has detected 79 positive cases (21 were foreign nationals).
6. In coordination with World AIDS Day, a project for universal HIV screening was conducted from Nov. 21 to Dec. 4, 2011. A total of 630 service stations were set up throughout the country to provide screening and counseling for HIV and syphilis, with the cooperation of government agencies, anonymous screening hospitals, and NGOs. Positive cases were referred to care systems for treatment with follow-up contact.
7. The Taiwan government has provided HIV/AIDS patients with free medical treatment since 1988 and free highly active antiretroviral therapies (HAART) since 1997. At the end of 2011, 45 designated hospitals provided treatment to HIV/AIDS patients. Nations around the world encourage HIV patients to return to their homes and communities. If HIV patients take their medication according to the prescribed schedule, their immune systems can be maintained at a certain level, allowing them to avoid coming down with AIDS. They will be able to lead a nearly normal life. The government subsidizes private institutions to take care of HIV patients who are rejected by their families. These institutions, which include the Garden of Mercy Foundation, the Harmony Home Association, and the Lourdes Association, provide care and compassion to HIV patients.
8. In the area of scientific research and development, Taiwan CDC conducted nine projects in 2011 and continued to commission National Taiwan University Hospital to establish an AIDS treatment center. The center trains physicians to build a specialist medical corps for bringing HIV/AIDS under control.

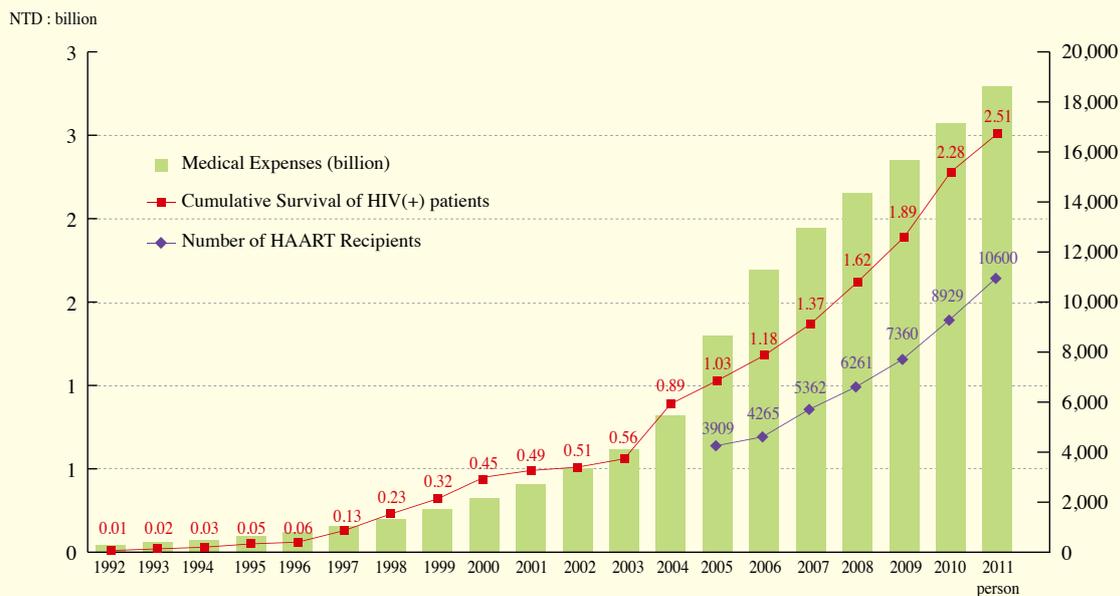
Future Prospects

According to statistics from the Bureau of National Health Insurance (NHI), medical expenses for HIV patients in 2011 totaled about NT\$2.51 billion (figure 4). Furthermore, other AIDS-related costs, such as popular education and screenings plus other medical costs (clinical examinations and psychological consultations) also increased immensely. The loss to labor and technology, freezes on foreign investment, reduction in exports, and decline in revenues are inestimable.



At the onset of the world AIDS epidemic, the Department of Health rallied medical and health experts and private institutions in an effort to prevent and control the disease. After years of hard work, it has achieved remarkable results but has been unable to bring the number of new cases under control. Taiwan CDC hopes that in the future, the cross-ministerial Committee for HIV Infection Control and Patient Rights Protection will make prevention the thrust of its efforts to stop the spread of HIV/AIDS.

Figure 4. Annual AIDS Related Medical Expenses of Taiwan (1984 – 2011)



Influenza

Current status

Subsequent to the influenza A(H1N1) 2009 pandemic, excessive numbers of complicated influenza confirmed cases were reported in the peak of 2010-2011 influenza season; fatality rate was around 7.15%. Confirmed and death cases were mainly infected with the H1N1 novel influenza virus. However, in the influenza season of 2011-2012, there are a total of 1,252 complicated influenza confirmed cases and 78 fatalities, placing the fatality rate at around 6.24%. Confirmed and death cases were mainly infected with the type B influenza virus.

Although the confirmed/death cases and fatality rate of complicated influenza during this influenza season were averagely lower than those of the previous season (2010-2011), Taiwan CDC still enhanced the healthcare capacity for the influenza patients surge in the forthcoming Chinese New Year holidays and held “National Influenza Prevention and Control Coordination Meetings” in the peak of influenza season, as the circulating type B influenza virus was not matched with the composition of the vaccine composition of this influenza season. Moreover in early 2012, the weather had been colder than the previous years and the Chinese New Year holiday started early on January 21; these conditions had been conducive to influenza virus activity.

Accomplishments

1. Renamed “Influenza Severe Case” as “Complicated Influenza cases” on Sep 16, 2011.
2. Implemented the vaccination program on October 1, 2011.
3. Provision of antivirals for treatment and prophylaxis.
4. Implemented health education through multiple media channels.
5. Immediate grasp of epidemic related updates.
6. Invited experts and scholars to deliberate important policies.
7. Implemented six principle response actions for seasonal influenza in year 2011-2012 :
 - (1) Activation of the emergency response system.
 - (2) Installation of additional government-subsidized influenza antivirals administration sites.
 - (3) Designation setting up of outpatient clinics for influenza-like illness.
 - (4) Intensification of the Communicable Disease Control Medical Network coordinators duties.
 - (5) Response action during the Chinese New Year holiday.
 - (6) Intensification of the health education information and risk dissemination.



Government-subsidized influenza antivirals administration sites.

Future Prospects

A full-scale inspection of the overall response actions was conducted to ensure the efficiency of the seasonal influenza control operations and proper control and distribution of medical resources and capacity during the Chinese New Year holiday; inspection data shall serve as reference for future planning work. Moreover, considering that personal hygiene intensification and establishment infection control constituted the most fundamental and important influenza prevention strategies, a full-scale personal hygiene information dissemination campaign was regularly implemented, and intensified preventive measures were taken during the peak of influenza season.

Dengue Fever

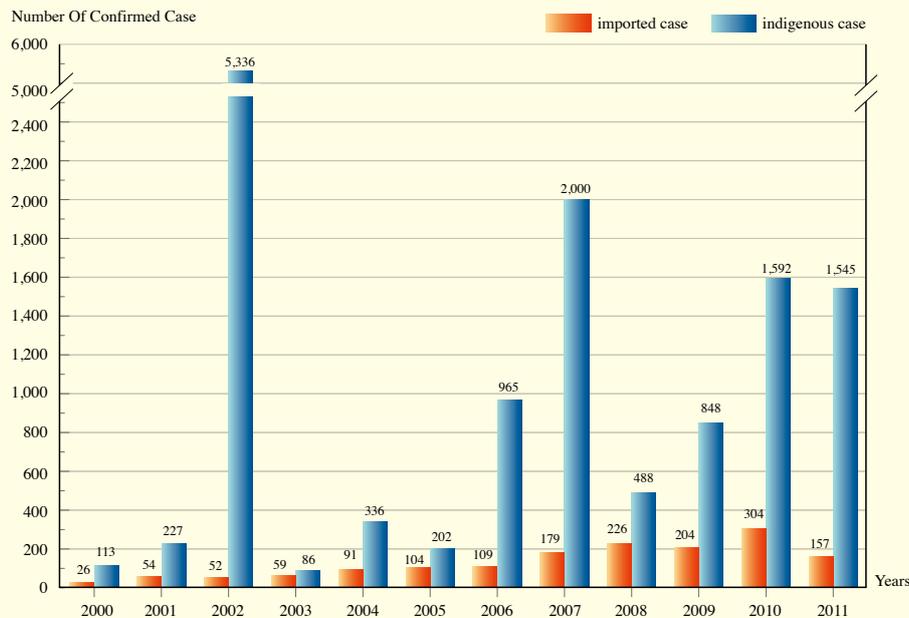
Current Status

The WHO has declared global warming and climate change to be new challenges of public health, and these threats are becoming more serious. Climate change endangers people's health through natural disasters, such as heat waves and floods, which foster communicable diseases and raise the prevalence of dengue fever. The severity of dengue fever in Southeast Asia in recent years has led to an increase in imported cases in Taiwan, with a record high of 304 in 2010, though a slightly decrease with 157 in 2011. The situation still has made it more difficult to control dengue fever locally.



There were 1,545 indigenous cases of dengue fever in 2011 in Taiwan, including 20 dengue hemorrhagic fever (DHF) cases and five deaths. The cases were concentrated mainly in southern Taiwan, including Kaohsiung City, Pingtung County, Tainan City, however Penghu County and Taipei City also occurred an local outbreak in 2011.

Figure 1. Number of dengue fever confirmed cases from 2000 to 2011



Control dengue fever in Taiwan by thoroughly eliminating vector breeding sources and effectively lowering vector (mosquito) density.

Taiwan CDC has devised a three-stage prevention strategy for controlling the dengue fever epidemic. Primary prevention measures include source reduction and control of the vector population. Secondary prevention measures cover disease surveillance and an emergency/contingency mechanism. Tertiary prevention involves controlling the number of deaths from the illness.

Primary Prevention

1. Implementing health education through various communication channels to promote dengue fever awareness.
2. Involving the community in improving environmental and household sanitation along with reducing vector sources through volunteer training.
3. Encouraging regular inspection and eliminating vector breeding sources by cleaning empty houses, vacant lots, and other potential vector breeding sources. Keeping a record of these places for future inspections.
4. Strengthening the education and training to disease prevention workers and volunteers.
5. Setting up a vector surveillance mechanism to check places with a high mosquito density probability and promptly wipe out vector sources.

Important Communicable Diseases and Control



Secondary Prevention

1. Constructing a disease surveillance mechanism for prompt control of suspected cases. Strengthening disease surveillance and disease trend evaluation through official epidemic reporting systems and emerging disease surveillance, as well as public reporting and symptom declaration forms.
2. Setting up an emergency/contingency mechanism to promptly investigate suspected transmission sources and spray insecticide to eliminate those sources. Furthermore, educating on the importance of eliminating vector-breeding sites to prevent possible infection.

Tertiary Prevention

Establishing guidelines for DHF diagnosis and treatment. Organizing continuing education workshop for medical personnel to raise health care quality and lower mortality rates.

Accomplishments

In Taiwan, 1545 people were infected with dengue fever in 2011. As a result of the coordination between the central and local governments, as well as medical institutions and environmental/health organizations, and the cooperation of villages, schools and community members, effectively stopped further spreading of the disease. Through the prevention and control measures, Taiwan has got more success in bringing dengue fever under control than other Southeast Asian nations. Below is the list of major achievements.

Primary Prevention

1. Continuing body-temperature monitoring at international airports. In 2011, 80 cases of imported dengue fever were detected, accounting for 50.96% of the total number of 157 imported cases (see Table 1). This measure effectively limited importation.
2. Distributing materials of health education and promotion, including leaflets, posters, banners, the Combat Manual for Dengue Fever and VCDs.



3. Producing promotional materials with mass media, such as recordings, epidemic control programming and newspaper ads. These include TV commercials and short films for screening in TV slots reserved for the Government Information Office to make public service announcements. These materials call on the public to eliminate dengue fever vector breeding sources.
4. Publishing the Guidelines for Dengue Control to assist the health organizations in their fight against the epidemic.
5. Formulating the Community Mobilization Plan for Cleaning Up the Breeding Sources of Dengue Fever Vectors. Taiwan CDC encouraged community organizations in counties and cities in southern Taiwan to propose plans to CDC units, and further organized volunteer teams to exterminate mosquitoes.
6. Inviting scholars and experts in insecticide efficiency and resistance studies of dengue fever vectors. The findings were referenced in the procurement of insecticides.
7. Promoting dengue fever vector mosquito surveys and the Dengue Fever Control Plan. Implementation was entrusted to the health bureaus of high-risk counties and cities in southern Taiwan (areas infested with *Aedes aegypti* mosquitos). The frequency of dengue fever vector density surveys and investigations was increased to one per month for every village in and around the areas in southern Taiwan where dengue fever was prevalent.

Secondary Prevention

1. Establishing an incentive system to encourage physicians and the public to report cases, which facilitates early detection of disease transmission. NT\$2,500 to NT\$4,000 was awarded to the physician or other medical worker who reports the year's first indigenous case of dengue fever and to individuals who found an imported case. If an individual volunteers for dengue fever testing and the case is subsequently determined to be an imported case or the first indigenous case in the village or township of residence, the individual is awarded NT\$2,500.
2. To understand the shifts in insecticide resistance of vectors, Taiwan CDC sent vector experts to areas where emergency spraying was conducted to evaluate the insecticide resistance of dengue fever vectors.

Future Prospects

To strengthen dengue fever control, Taiwan CDC proposes a five-year program (starting in 2011) for eliminating vector-breeding sources and eliminating indigenous dengue fever. Taiwan CDC, the Environmental Protection Administration (EPA), local governments and NGOs will jointly implement it. Efforts will be made to popularize health education and encourage the general public to get involved in maintaining environmental and household sanitation. Taiwan CDC and the EPA will construct a realtime disease surveillance and response mechanism in an attempt to wipe out vector sources, thereby eliminating indigenous dengue fever.

Important Communicable Diseases and Control

Table 1. Serotypes and Origins of Imported Dengue Fever Cases, 2011

| Country of Infection | Serotype | | | | | Total |
|----------------------|----------|------|------|------|----|-------|
| | DF-1 | DF-2 | DF-3 | DF-4 | ND | |
| Vietnam | 10 | 7 | 1 | 1 | 15 | 34 |
| Philippines | 8 | 9 | 4 | 5 | 8 | 34 |
| Indonesia | 3 | 6 | 5 | 3 | 8 | 25 |
| Thailand | 1 | 9 | 0 | 1 | 10 | 21 |
| Malaysia | 2 | 2 | 1 | 2 | 6 | 13 |
| Cambodia | 5 | 0 | 0 | 0 | 3 | 8 |
| India | 2 | 1 | 3 | 0 | 2 | 8 |
| Bangladesh | 1 | 0 | 1 | 0 | 4 | 6 |
| Singapore | 1 | 3 | 0 | 0 | 0 | 4 |
| Myanmar | 4 | 0 | 0 | 1 | 2 | 4 |
| Total | 34 | 37 | 15 | 13 | 58 | 157 |

Enteroviruses

Enteroviruses belong to a group of small RNA viruses, including polioviruses, Coxsackie A viruses, Coxsackie B viruses, echoviruses, and other enteroviruses (EV68~). EV71 has a significantly higher pathogenicity among known enteroviruses, especially regarding neurological complications. Enteroviruses are found in the gastrointestinal tract (the stool of infected persons, mouth) and respiratory tract (such as saliva, sputum, or nasal mucus). Infections can be produced by direct contact with the secretions of infected persons or with contaminated surfaces or objects.

Current Status

According to survey data from several years provided by Taiwan CDC, the weekly consultation rate of enterovirus infection cases collected by the real-time outbreak and disease surveillance system (RODS) increases in late March every year and peaks around mid-June. It decreases after mid-June. There is usually another smaller outbreak of enterovirus infection when schools reopen in September (see Figure 1). Many types of enteroviruses exist around the world and they live inside humans. Humans appear to be the only known host and source of transmission. There are currently no preventive vaccines for non-polio enteroviruses and no known highly efficacious medicine to eliminate the virus that lives inside the human body. Therefore, enteroviruses will continue to exist and pose a threat to human health for the foreseeable future.





The peak season for enterovirus infections in temperate regions is summer. According to various surveys, trends in enterovirus infections suggest that children under the age of 5 are more prone to critical complications and death from enterovirus infections. The major symptoms of enterovirus infection are herpangina and hand-foot-and-mouth disease (HFMD). EV71 is the most commonly seen serotype of cases of enterovirus infection with severe complications in Taiwan.

In 2011, the EV71 epidemic was more serious than the previous two year (see Figure 2). The number of severe cases increased from late autumn and lasted in winter. There were 59 confirmed cases of enterovirus infection with severe complications and 4 deaths resulted .

Figure 1. RODS Weekly Consultation Rate of Enterovirus Infections in Taiwan, 2007-2011

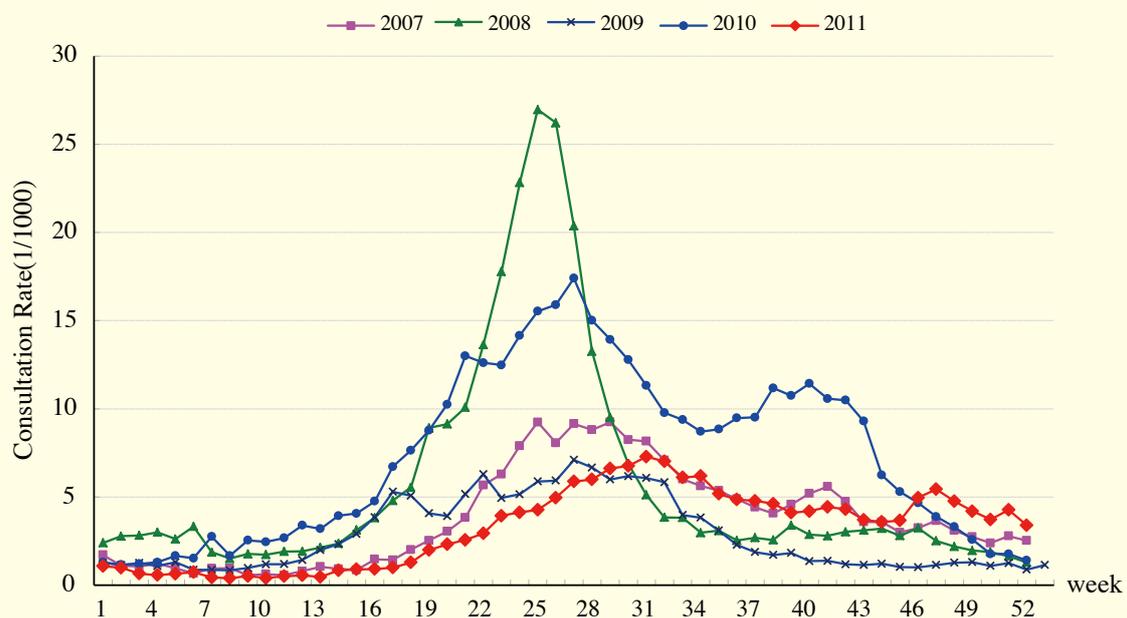
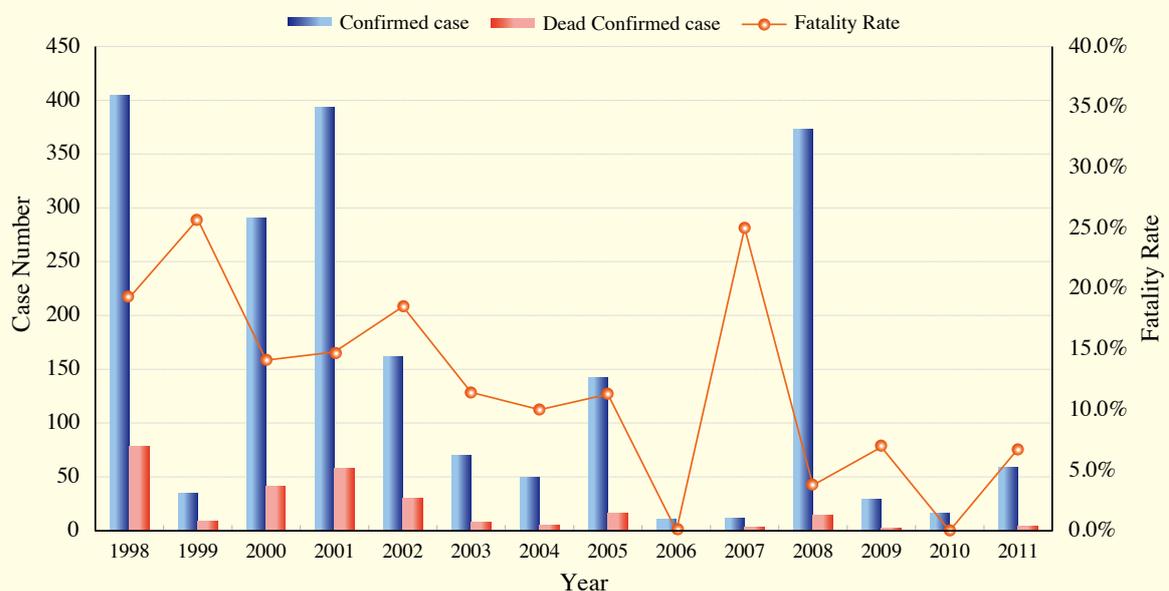


Figure 2. Cases and Annual Mortality Rate from Enterovirus Infections with Severe Complications in Taiwan



Accomplishments

1. Taiwan CDC established multiple and real-time surveillance systems for enterovirus infections, covering HFMD and herpangina, severe cases, clustering, virus isolation and typing
2. It constructed a medical service network, including six regional chiefs, 71 responsible hospitals and 12 contract laboratories.
3. Progress for an EV71 vaccine entered phase one clinical trials in 2010.
4. Health Education
 - a. Local organizations work with the community to promote enterovirus education and prevention.
 - b. Restaurants, schools, hospitals, clinics and other public gathering places must conduct regular inspections for environmental sanitation and provide facilities for washing hands.
5. Taiwan CDC has established consultation channels by recruiting clinical professionals. The professionals provide clinical health care consultation and construct guidelines for treating enterovirus complications. Providing primary care to patients with complications can effectively lower the mortality rate.
6. The Manual for Enterovirus Prevention and The Handbook for Enterovirus Prevention for Child Care Workers list all necessary precautions. Taiwan CDC provides these materials on its website and updates them annually.
7. Workshops are held on the clinical treatment of critical enterovirus complications to enhance doctors' skills in treating the disease, raising treatment quality and reducing mortality rates and sequelae.

Future Prospects

1. Enterovirus Prevention Enhancement
 - a. Intensify the Household Hand-Washing Activity Drive by asking adults to wash their hands before interacting with children.
 - b. Encourage people not to go to school or work when they are sick.
 - c. Augment caregiver awareness of prodromal complications for enterovirus infections with severe complication.
2. Assessment of Current Prevention Policies
 - a. Assess consequences resulting from suspending classes.
 - b. Conduct research on the integrity of medical facilities throughout the area to assess treatment criteria of severe enterovirus cases.
3. Accelerate Development of the EV71 Rapid Test Kit and Vaccines
 - a. Complete the development of an EV71 rapid test kit and provide first line medical staff to shorten diagnosis time of EV71 infections.
 - b. Finish the Investigational New Drug (IND) process for the EV71 vaccine to move closer to getting the vaccine license.

Emergency Preparedness & Response



Current Status

At the end of 2003 when avian influenza epidemic emerged, Taiwan began to prepare for a potential pandemic influenza. Because the country had recently passed through the SARS epidemic, government agencies gave strong support to the effort, appropriating necessary funding for each aspect of preparations.

Currently, two documents are used to guide preparedness planning: National Influenza Pandemic Preparedness Plan and the Influenza Pandemic Strategic Plan. These include four major strategies: epidemic surveillance and assessment, interruption of transmission, antivirals, and influenza vaccine; and five lines of defense: containment abroad, border control, community epidemic control, maintaining medical system functions, and individual and family protection. These measures minimize the death toll, economic losses and impact of new influenza viruses.

Accomplishments

1. In year 2005, the government organized the pandemic influenza preparedness operations pursuant to the five-year National Influenza Pandemic Preparedness Plan (hereafter referred to as the Preparedness Plan). Thereafter, on May 23, 2010, the Executive Yuan approved the Phase II plan for the continuation of the five-year plan. The Phase I plan continued upholding the 'four major strategies' and 'five lines of defense' to outline the preparedness operations. The four major strategies implemented were surveillance and assessment, interruption of transmission, antivirals, and influenza vaccine. The five defense lines were containment abroad, border control, community epidemic control, maintenance of medical system functions, and individual and family protection.
2. The government has established three hierarchy levels of control plans/guidelines to foster the influenza epidemic preparedness. In addition to the Preparedness Plan, the Influenza Pandemic Strategic Plan and the Influenza Control Guidelines were established to formulate the preparation and management of stockpile, pharmaceutical intervention, consolidation of the healthcare resources, mobilization of the volunteer workers, exercise of epidemic response action, risk communication and international cooperation.
3. In review of the experience of influenza pandemic response, the novel H1N1 influenza pandemic of 2009-2010 was the first pandemic in the 21st Century. Every sector of the nation rapidly established operations networks and immediate response actions to effectively mitigate the impact of the pandemic. It was a significant battle in the annals of public health. Taiwan CDC, especially on the eve of the first anniversary of the WHO announcement of the end of the H1N1 pandemic (August 9, 2011), published the First Pandemic of the 21st Century – Taiwan's Response to the H1N1 Influenza. It was a record of the response to influenza A(H1N1) 2009 pandemic of the CDC in the 303 days during the pandemic period.
4. In maintenance and improvement of Taiwan's influenza pandemic control capacity and in reduction of the health, economic, and social losses that the nation may incur upon a pandemic, the CDC held the 2011 Influenza Pandemic Table-Top Exercise on November 15, 2011. Set scenarios of serious pandemic situations of the H5N1 influenza with high fatality, the simultaneous audio-visual exercise of the 28 participating units.
5. Surveillance and Response of the Avian influenza
 - (1) Establishment of cross sectoral system.
 - (2) Monitoring of international epidemic conditions.
 - (3) Intensification of border control.
 - (4) Implementation of the A/H5N1 influenza vaccination.
 - (5) Implementation of health education.





Future Prospects

To cope with the concepts of “whole-of-society approach” and “instantaneous mobilization and early logistic preparation” for the National Influenza Pandemic Preparedness Plan, related-department of central government were placed under readiness alert to obtain accurate grasp of epidemic development conditions and institute immediate effective response actions. Furthermore, liaison with the press media and the public were intensified. In short, the preventive actions of this influenza season were effectiveness.

Stockpiling and Use of Antiviral Agents

Current status

Flu antivirals constitute one of the four primary strategies employed to combat the influenza pandemic in the country. Health authorities currently maintain an inventory of antivirals in preparation, mainly neuraminidase inhibitors such as the orally ingested Tamiflu®, the Relenza™ by orally inhalation, and the intravenous medicine Rapiacta®. Tamiflu are available in capsule and its Active Pharmaceutical Ingredient (API). Tamiflu capsules and Relenza are drugs with Drug permit license; whereas Tamiflu API and Rapiacta are imported into the country through special procurement orders. The diverse pharmaceutical preparedness strategy is aimed to cope with the possible emergence of drug-resistant viruses and also to bring medication within reach of patients suffering special adaptation syndromes. Moreover, the flu antiviral medication subsystem of the Epidemic Prevention Material Management Information System (MIS) provides computerized management which helps timely grasp the information about the use and dispatch of the antivirals.

Accomplishment

The antiviral stockpile of the government had been raised to 25% of the total population in 2010. Pursuant to the recommended guidance of the WHO and the consideration of possible increased demand for antivirals during the peak of the annual influenza season, the target population for the use of the government stockpiled antivirals has been expanded to enable the timely treatment of patients and containment of an outbreak. The target population was expanded from January 25, 2011 to April 10, 2011.

Future Prospects

In sustenance and maintenance of the reserve inventory of antivirals, reserve inventory of antivirals shall be updated and upgraded in line with new research and developments achieved in worldwide pharmaceutical studies; moreover, regular assessment and evaluation of the rational reserve inventory level shall be conducted. Distribution and administration of antivirals shall be properly assessed according to the epidemic outbreak conditions to conserve on reserve inventory budget and to enhance cost efficiency.

Preparation and Administration of Vaccines

Current status

Flu vaccination is another of the four primary strategies employed to combat the influenza pandemic in the country. Human H5N1 vaccines have been stockpiled since 2006, aimed to vaccinate first-line medical and epidemic control personnel.

The seasonal influenza vaccination campaign has been implemented since 1998, and the target population included in the program has been gradually increasing. In addition to senior citizens aging 65 years and above, medical and epidemic control personnel, livestock and poultry farm operators, infants aging between six months and two years (inclusive), since 2007, scope of the priority vaccination beneficiaries has been gradually expanded to include primary school children, persons with serious injuries and diseases, pre-school toddlers between three and six years (inclusive). Moreover, through Influenza Vaccine Information System (IVIS), timely supply and distribution of vaccines had been implemented. Through the sustained implementation of the vaccination campaign, the health care system gradually established a capacity for conducting large-scale vaccination program.

Accomplishment

In response to the existing threat of an international H5N1 avian influenza epidemic, in the period between March and August, a voluntary human H5N1 vaccination program is implemented to provide for the inoculation needs of first-line medical and epidemic control workers and high-risk group individuals visiting avian influenza epidemic areas.

The seasonal influenza vaccination program to be launched from October 1 shall grant priority inoculations to senior citizens aging 65 years and above, nursing home residents with chronic disease and employees, infants and schoolchildren between six months and fourth grade, rare disease sufferers and serious injury and disease sufferers, health care and epidemic control workers, livestock and poultry farm operators, and animal epidemic control workers; inoculations shall be provided until available vaccines have been consumed.

Future Prospects

We shall continue implementation of the seasonal influenza vaccination program, maintain the vaccination volume and capacity, and enhance the proper knowledge and information of related medical personnel on flu and flu vaccines. Furthermore, the stockpile of pre-pandemic vaccines shall be updated and upgraded in line with new vaccine research and developments achievement.



Personal Protective Equipment (PPE) Management

Current Status

The subsequent surge in demand for masks and respirators in the wake of the emergence of H1N1 pandemic in 2009 and 2010 affirmed the need for a PPE stockpile. To protect front-line health care workers and the public during flu pandemic, a hierarchical framework with three tiers of PPE stockpile was established. The central government stockpile is for nationwide epidemic control and emergency dispatch, the local government stockpiles fulfill local public health and epidemic control needs, and the medical institution stockpiles are for coping with nosocomial infections.

Accomplishment

To optimize the inventory of the three tiers of stockpiles and prepare for a potential flu pandemic, Taiwan CDC assessed PPE demand on a national scale. The balance between expected surge demand and PPE supply was calibrated according to experiences from the SARS and H1N1 pandemics plus the results of a survey on domestic PPE manufacturing capacity.

To improve the efficiency of stockpile management and contribute to stabilize the domestic supply chain, Taiwan CDC launched a five-year procurement project which entrust business unit to create a platform with cooperative logistics to serve multilateral consumers, which allow the central stockpile to have turnover of certain quantity during peacetime, and secure steady and quality PPE supply with the massive inventory of the central government as a buffer, to satisfy the need for disease prevention and control.

Future Prospects

Taiwan CDC will continue conducting policy evaluation to devise KPI for PPE management and distribution, to identify risk sources, and to inspect inventory management efficiency. In addition, it will develop educational materials and training programs to assist hospitals in preparing for the pandemics, particularly providing planning guidance for pandemic flu preparedness and response.



Management of PPE stockpile

Table 1. Three-tier PPE stockpiles, 2011

| Levels Items | Safety stock (unit:10,000) | | | |
|--|----------------------------|-------------------|----------------------|-------|
| | Central govern- ment | Local governments | Medical institutions | Total |
| N95 respirators | 90 | 10 | 50 | 150 |
| Surgical masks | 300 | 100 | 600 | 1,000 |
| Protective Apparel | 14 | 20 | 16 | 32 |
| Flat masks (for the general public) | 3,400 | - | - | 3,400 |

Communicable Disease Control Medical Network

Current Status

The communicable disease control medical network has brought together the medical and public health systems to provide safer, more effective treatments for communicable disease patients and strengthen Taiwan's capacity to handle contingencies in the prevention and control of communicable diseases.

1. 137 hospitals with designated isolation wards, 25 responding hospitals are assigned from them, can provide 428 negative pressure isolation wards.
2. 19 support hospitals, provide professional consulting and human resources support for response hospitals.
3. Regional commanding officers assist sub-bureaus with communicable disease control.
4. Regional commanding offices shall review, supervise and evaluate plans connected to the communicable disease control medical network of each region.
5. During pandemics, regional command officers assist with case analysis plus investigation of expropriation, requisition, and allocation of medical resources in the region.

There are six sub-regional medical networks nationwide that coordinate and support one another with medical resource allocation. When necessary, responding hospitals activate these networks.

1. Enhance operation mechanisms and cooperation between the sub-regions to prevent diseases. Regions in the network hold regular meetings and establish support mechanisms.
2. Strengthen response capabilities and preparations of responding hospitals to handle emergencies: Personnel education and training/drills, maintenance and inspections of facilities and equipment, formation of an emergency response plan.

Accomplishments

1. Provided assistance and inspected designated negative isolation wards. In the first stage hospitals conducted their own inspections, and in the second stage e-evaluation was conducted at 11 hospitals.
2. Held 145 training and 33 drills for responding hospitals to enhance capacity of preparedness and response.
3. Set up workshops to help responding hospitals to develop preparedness and response plans.
4. Allowance 5 responding hospitals purchased Mobile Negative Pressure Isolation Chamber to facilitate patient transported, and 2 response hospitals purchased HEPA filter box redundant system.
5. 17 Responding hospitals and support hospitals signed a cooperation agreement to strengthen the partnership.

Future Prospects

1. Improve the communicable disease control medical network performance.
2. Enhance the emergency response capacity of the communicable disease control medical network.
3. Strengthen inspections and drills of the communicable disease control medical network.



Geographical distribution of 25 responding hospitals

| Taipei infectious disease responding hospitals | Cooperating hospitals |
|--|-------------------------------------|
| Taipei city hospital (Heping-Fuyou branch) | National Taiwan University Hospital |
| DOH Kee-Lung Hospital | |
| New Taipei City Hospital (San-Chung branch) | Tri-service general Hospital |
| Lienchiang County Hospital | |
| National Yang-Ming University Hospital DOH Kin-Men Hospital | Taipei Veterans General Hospital |

| Northern infectious disease responding hospitals | Cooperating hospitals |
|---|-------------------------------------|
| DOH Tao-Yuan Hospital (Sin-Wu branch) | DOH Tao-Yuan Hospital |
| National Taiwan University Hospital (Hsin-Chu branch) | Linkou Chang-Gung Memorial Hospital |
| National Taiwan University Hospital (Chu-Tung branch) | |
| DOH Miao-Li Hospital | Hsin-Chu Mackay Memorial Hospital |

| Central infectious disease responding hospitals | Cooperating hospitals |
|---|--|
| DOH Tai-Chung Hospital | China Medical University Hospital |
| DOH Nantou Hospital | Chung Shan Medical University Hospital |
| DOH Fong-Yuan Hospital | Tai-Chung Veterans General Hospital |
| DOH Chang-Hua Hospital | Chang-Hua Christian General Hospital |

| Southern infectious disease responding hospitals | Cooperating hospitals |
|--|---|
| National Taiwan University Hospital (Yun-Lin branch) | National Cheng Kung University Hospital |
| DOH Tainan Hospital | |
| DOH Chia-Yi Hospital | Chia-Yi Christian Hospital |
| Chia-Yi Chang-Gung Memorial Hospital | Chi Mei Hospital |
| DOH Sinying Hospital (Bei-Men branch) | |

| Eastern infectious disease responding hospitals | Cooperating hospitals |
|---|-----------------------------------|
| DOH Hua-Lien hospital | Buddhist Tzu Chi General Hospital |
| DOH Tai-Tung Hospital | Taitung Mackay Memorial Hospital |

| Kaoping infectious disease responding hospitals | Cooperating hospitals |
|---|---|
| Kaohsiung Municipal Min-Sheng Hospital | Kaohsiung Medical University Chung-Ho Memorial Hospital |
| DOH Ci-Shan Hospital | Kaohsiung Chang-Gung Memorial Hospital |
| DOH Pingtung Hospital | Pingtung Christian Hospital |
| Tri-Service General Hospital (Penghu branch) | Kaohsiung Veterans General Hospital |

Infection Control

Antimicrobial Resistance and its Global Spread

2011 公衛論壇 Public Health Forum

全球抗菌



台灣行動



Nosocomial Infection Control

Current Status

The SARS outbreak highlighted the importance of infection control in hospitals. To improve patient safety, protect against infections in hospitals and strengthen measures to control nosocomial infections, Taiwan CDC coordinates annual inspection programs, gathers surveillance data on the occurrence of nosocomial infections and antimicrobial resistance, and formulates nosocomial infection control guidelines.

Our current goals are:

1. To plan effective interventions and formulate infection control guidelines for reducing nosocomial infections and to fulfill WHO patient safety principles.
2. To boost the quality of the nosocomial infection control inspection program and share experiences on nosocomial infection control practices through on-site audits. These audits improve the performance of infection control programs in hospitals.
3. To promote international collaboration in hand hygiene and implement WHO hand hygiene toolkits for reducing nosocomial infections.
4. Continue promoting hospital participation and to strengthen data quality in Taiwan Nosocomial Surveillance System.
5. To monitor carbapenem-resistance gene variation and trend in Enterobacteriaceae in Taiwan.

Accomplishments

1. Compilation of Infection Control Guidelines and Publication of the Infection Control Journal

- In 2011, Taiwan CDC compiled and revised guidelines for environmental sampling strategies and control measures of legionella in health care facilities, health care personnel vaccination recommendations and guidelines for infection control in psychiatric facilities and populous institutions.
- Taiwan CDC commissioned the Infection Control Society of Taiwan to publish the bimonthly Infection Control Journal, which provides healthcare workers a lot of information about the trends and research related in the prevention and control of healthcare-associated infections.

2. Nosocomial Infection Control Inspections

- To protect patient safety and guard against nosocomial infections, Taiwan CDC promoted strengthening regulations through amendment of the Communicable Disease Control Act. An amendment to the act was announced in July 2007. Moreover, in accordance with Paragraph 2, Article 32 of the act, the Regulations Governing Inspection of the Implementation of Infection Control Measures in Medical Care Institutions were formulated. The regulations, which were promulgated in January 2008, explicitly state infection control measures to be implemented by medical institutions and criteria for inspections by competent authorities.
- Starting in 2008, Taiwan CDC commissioned the Taiwan Joint Commission on Hospital Accreditation to implement an infection control inspection quality improvement project. On-site inspection work was conducted by experienced infection control practitioners and medical officers, together with local health authorities. In 2011, 490 hospitals were inspected 5 of them were below standard. Follow-up inspection was conducted by local health department to trace their improvement.

3. Hand Hygiene Promotion

- Taiwan CDC popularized the WHO's Save Lives: Clean Your Hands initiative by publicizing the "My 5 Moments for Hand Hygiene" approach and promoting the use of alcohol-based hand rubs by health care workers.
- To implement its Second Phase to Strengthen Infection Control Project—Hand Hygiene Improvement Program, Taiwan CDC has funded three medical centers to establish as the center of excellence for hand hygiene. Furthermore, 325 hospitals have applied for the hand hygiene certification program, and 311 of them were certified.

4. Nosocomial Infection Surveillance and Reporting

- In 2011, 440 hospitals reported data to the Taiwan Nosocomial Infection Surveillance System (TNIS), 32 of which reported by electronic data interchange modules. Taiwan CDC also produced a nationwide nosocomial infection quarterly report to provide periodic data feedback and strengthen communication with hospitals.

5. Surveillance of carbapenem-resistance in Enterobacteriaceae

- Mechanisms and epidemiology of carbapenem resistance in Enterobacteriaceae in Taiwan.
- Genome variation and clinical information of multi-drug resistant microorganisms in Taiwan, 2011.

Future Prospects

1. Taiwan CDC will continue to draft and implement nosocomial infection control regulations and revise infection control guidelines based on recommendations announced by WHO or leading countries. In addition, it will gather information from around the world on policies, laws, regulations and implementation results to serve as a reference for policy making.
2. To improve nosocomial infection control inspections, Taiwan CDC will draft the 2012 nosocomial infection control inspection quality improvement project based on its implementation experiences from 2008 to 2011 and recommendations from various organizations. Moreover, an inspection schedule will be arranged according to the DOH's 2011 medical investigation consolidation policy.
3. Taiwan CDC will continue promoting hand hygiene programs to achieve its aim of establishing a hand hygiene culture in the health care system. External assessment of hand hygiene infrastructure and compliance plus a wide range of information will be used for evaluation.
4. Taiwan CDC will continue to promote hospital participation in the Taiwan Nosocomial Infection Surveillance System while strengthening surveillance of nosocomial infections and antimicrobial resistance.

Laboratory Biosafety Management

After a SARS laboratory infection occurred in Taiwan in December 2003, laboratory biosafety became a major area of concern. Taiwan CDC created laws to regulate infectious materials. In addition, these new laws strengthened the inspection of biosafety level 3 (BSL-3) laboratories, improved the training and drills for accidents, and established an autonomous biosafety management system. These measures helped to build a more complete oversight mechanism for laboratory biosafety. Taiwan CDC believes that laboratory biosafety record in Taiwan can reach its goal of zero infections if industry, government and academia work together; moreover, a first-rate biosafety culture, which is on par with advanced European and North American countries, can be fostered.

Current Status

Legislative and Regulatory Changes

To meet regulatory needs for infectious materials, Taiwan CDC drafted an amendment to Article 4 of the Communicable Disease Control Act. The draft amendment aimed to revise the legal definition of "infectious materials" to include Risk group 1(RG1) infectious materials. The draft amendment process for this derived law has been accomplished in 2011.

Taiwan CDC undertook a review to revise the Regulations Governing Management of Infectious Biological Materials and Collection of Specimens starting in 2009. The changes included adding a some RG1 infectious materials, strengthening biosecurity measures among units holding infectious materials, establishing a laboratory biosafety training system with a time component, and introducing a laboratory biosafety oversight and information system. After amendment is made to the Communicable Disease Control Act, these revisions can be jointly announced.



Registration of Organizations Practicing Biosafety

To implement an autonomous management mechanism for biosafety, any organization that holds or uses infectious materials belonging to Risk group 2 (RG2) or above and installs five or more laboratory personnel to handle the materials must establish a biosafety committee. Laboratories with fewer than five laboratory personnel handling the materials need to designate a specific person to be responsible for laboratory biosafety management. By March 2012, 525 organizations registered biosafety mechanisms to Taiwan CDC, of which 357 set up biosafety committees and 168 designated a specific person. The units that applied included 87 government organizations, 195 medical institutions, 49 academic research institutions and 194 other groups.

Biosafety Inspections of High-Containment Laboratories

Since 2005, Taiwan CDC began to inspect BSL-3 laboratories, to ensure operation and safety of high-containment biosafety laboratories. Through on-site inspection, knows well about the functioning and managing situation of those laboratories as well as protect clinical laboratory technicians' safety. In 2011, 44 BSL-3 laboratories that stored and/or use RG3 biological materials were inspected.

Laboratory Biosafety Education and Training

Since 2005, Taiwan CDC has held professional training courses and conferences for staff in BSL-2 and above laboratories. In order to assist managing laboratories and processing trainings for lab staff, Taiwan CDC set up 26 hours of laboratory biosafety digital coursework in secession since 2010. The coursework has already been uploaded on Taiwan CDC e-learning website for reviewing.

Management of Infectious Materials

Organizations have reported a total of 138 types of RG2 infectious materials and 19 types of RG3 infectious materials to Taiwan CDC authorities.

For export and import of infectious materials, Taiwan CDC established the Infectious Materials Customs Approval System in 2007, in line with the Ministry of Economic Affairs' policy of making trade faster and more convenient.

Organizations that transact infectious materials belonging to RG-3 or above must first receive permits from their own biosafety committee and then apply for examination from the responsible central government authority. Taiwan CDC altered the application way of verification and approval of infectious biological materials belonging to RG3 or above to apply on the internet since 2012.

Future Prospects

Taiwan's laboratory biosafety management started small but has grown into a stable, robust system. Taiwan CDC hopes that through legal revisions, it can provide regulations that fit the country's needs by 2011. In respect of law amendment, we expect that Communicable Disease Control Act would be amended and promulgated as soon as possible; therefore we can facilitate the announcement of the derived laws and provide the regulations that meet local needs. Organizations that practice biosafety still have room for improvement. Through inspections, discussion and education, Taiwan CDC will effectively raise management functions of these organizations.

Meanwhile, for infectious materials oversight, Taiwan CDC will enhance the function of information systems to raise efficiency of transport inspections and information updates.

Implementation of IHR



WHO International Health Regulations

WHO's International Health Regulations (IHR) are a vital instrument to help the international community prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide. The main purpose of the IHR is to implement a public health response that can prevent, avoid and control the spread of diseases across borders while limiting interference with international transport and trade. The IHR also require that state parties investigate, evaluate and report public health risks and emergencies while reacting promptly to these dangers.

Over the years, international transportation has become more convenient, which leads to frequent movement of people and goods. Diseases can spread far and wide via international travel and trade. A health crisis in one country can impact livelihoods and economies in many parts of the world, such as the severe acute respiratory syndrome (SARS) outbreak in 2003. For these reasons, in 2005 the WHO's World Health Assembly (WHA) revised and passed the new IHR, inviting countries around the world to join. The regulations, which took effect in 2007, cover public health

incidents and emerging or re-emerging diseases, such as SARS, influenza and polio. Meanwhile, the IHR establish a (code of) number of procedures and practices for assessing whether an affected country or region is facing a public health emergency of international concern (PHEIC). The purpose of this model is to prevent the time when an epidemic occurs in a place where it is not yet confirmed to be a communicable disease. The new IHR also strengthen the National Focal Point (NFP) system for each country. The NFP is the state-designated center responsible for communicating with the WHO on public health incidents that have the potential to become an international concern.

Following the IHR, Taiwan CDC works with the WHO and other countries to conduct prevention and control measures for communicable diseases and other major public health events.

Operations of IHR Focal Point in Taiwan

1. Receiving information on epidemics or public health incidents that meet WHO IHR standards for reporting:

WHO established the Event Information Site (EIS) for IHR National Focal Points (NFPs) and granted Taiwan access in 2009. If an epidemic or public health incident occurs that meets IHR standards for reporting, WHO uses IHR channels to alert each country, including Taiwan. Within 2011, Taiwan CDC acquired 23 events with public health risks of international concern, involved 96 reports, through the EIS. The majority (59 reports) referred to the radioactive risk of the Fukushima Daiichi nuclear disaster following the Japan Tohoku earthquake and tsunami disaster on March 11th, 2011.

2. Establishing a national, cross-departmental communication channel for prompt forwarding of IHR information:

A cross-departmental contact point has been established in Taiwan CDC to facilitate timely correspondence with WHO IHR on information regarding major public health incidents. Agencies with available counterparts include bureaus within the Department of Health, the Taiwan Food and Drug Administration (TFDA), the Atomic Energy Council, the Ministry of Foreign Affairs, the Bureau of Animal and Plant Health Inspection and Quarantine, and local health departments. This channel ensures prompt reporting, communication and response to new events.

3. Case referral and reporting diseases or public health events meeting IHR standards:

The Taiwan IHR NFP serves as a point of single contact for international referral of communicable disease cases (each country's IHR NFP is the counterpart of case referral). Through the IHR channel, relevant countries are informed of follow-up investigation results to facilitate attending and monitoring referred cases. If a PHEIC occurs, Taiwan immediately informs WHO IHR contact point. As for PHEIC reporting in 2011, Taiwan informed the WHO IHR contact point of an incident regarding various soft drinks contaminated with illegally added plasticizer DEHP on May 24th.

International Ports Quarantine Activities



Current Status

Situated in a subtropical zone, Taiwan is vulnerable to the invasion of various tropical diseases. This is especially obvious because of its thriving international tourism and trade. To ensure quarantine, the government has set up quarantine offices at airports (Songshan, Taoyuan, Taichung and Kaohsiung-Xiaogang), seaports (Keelung, Suao, Taipei, Taichung, Mailiao, Kaohsiung, and Hualien), and the three terminals (Kinmen, Matsu and Makung) of the “Mini Three Links” with China. This prevents the import of diseases and ensures public health. The planning and supervision of quarantine work at these airports and seaports is the responsibility of the 7th Branch of Taiwan CDC .

To meet WHO’s International Health Regulations (IHR, 2005) and prevent the importation of diseases by aircraft and ships, Taiwan CDC has revised the Regulations Governing Quarantine at Ports. These regulations authorize quarantine units to take all necessary quarantine measures against inbound ships and aircraft together with their crew, passengers, and cargo for national security and public health protection, including:

1. Improving Information Management: Improving the one-stop information system for quarantine operations along with making the quarantine process and information management more efficient.
2. Streamlining and Standardizing Process Operations: Calling for timely revision and standardization of operational procedures by reacting to the latest epidemic information while benefiting from historical precedence.
3. Quarantine Procedure Follow Through: All inbound aircraft and ships, including their crew, passengers and cargo, are subject to quarantine to prevent disease importation. After release from quarantine, follow-up health checks may be performed.
4. Developing IHR Core Capacities at Designated Points of Entry (PoE): Assessing the progress in implementing core capacities at PoE and making efforts to meet IHR (2005) requirements in this field.

Accomplishments

1. **One-Stop Information Service:** Establishing a one-stop information system for all information regarding quarantine operations. This included quarantine operations for aircraft and ships, ship sanitation certificates, vaccinations, fee collection, online checks statistics, and etc.
2. **Maintaining Standard Operational Procedures:** Employing ISO 9001 international quality standards to maintain ship quarantine procedures through reviews at international seaports.
3. **Aircraft and Ship Quarantine:**
 - Any aircraft with crew or passengers exhibiting communicable disease-like symptoms or dead is required to notify Taiwan CDC and document the event. Taiwan CDC will take adequate measures according to the situation.
 - Any ship arriving at a port in Taiwan is required to report the state of its sanitation and the passengers' health before arrival via telegraph, telex, fax, mobile phone, or e-mail to apply for review. Permission to enter the port is granted after reviewing the report and confirming there is no danger of importing a disease. The procedure is intended to shorten the time of quarantine.
 - There are some possible scenarios for on-board quarantine:
 - (a) For aircraft: according to the event and the emergency, Taiwan CDC may decide to execute aircraft on-board quarantine or other control measures.
 - (b) For ships: (1) An inbound ship has not applied for quarantine, (2) It has applied but failed to meet the quarantine requirements, (3) It has reported a passenger/crew member suspected of suffering from a communicable disease, (4) There is abnormal death of animals, and (5) There is a suspected patient or death on the ship.

In these cases, quarantine officers may board the ship or aircraft to implement quarantine measures. The following table shows the state of quarantine in 2011.

| Quarantine Work at International Ports in 2011 | | | | | | | |
|--|-------------------|--------|------------|----------|------------|--------------|------------------|
| Branch | Quarantine Office | Ships | Passengers | Aircraft | Passengers | Cargo Planes | Tonnage of Cargo |
| 1st | Keelung | 5,588 | 174,010 | | | | |
| | Suao | 567 | | | | | |
| | Taipei | 2,476 | 2,120 | | | | |
| | Kinmen | 10,144 | 746,579 | 4 | 12 | | |
| | Matsu | 1,856 | 19,638 | | | | |
| | Songshan | | | 6,821 | 1,170,681 | | |
| 2nd | Taoyuan | | | 69,149 | 11,661,724 | 12,493 | 3,898,859 |
| 3rd | Taichung | 6,396 | 25,790 | 3,710 | 364,692 | | |
| 4th | Mailiao | 2,427 | 54 | | | | |
| | Tainan | | | 6 | 736 | | |
| 5th | Kaohsiung | 15,800 | 18,447 | | | | |
| | Xiaogang | | | 9,628 | 1,442,232 | 1 | 392 |
| | Makung | 334 | 1,521 | | | | |
| 6th | Hualien | 1,205 | 6,369 | 81 | 8,784 | | |
| | Taitung | | | 5 | 510 | | |
| Total | | 46,793 | 994,528 | 89,404 | 14,649,371 | 12,494 | 3,899,251 |

Source: Taiwan CDC Quarantine Information System

4. Crew and Passenger Quarantine: Early detection and prevention of communicable diseases requires all arriving passengers to have their body temperature scanned with infrared thermal apparatus. Only passengers showing symptoms are required to fill out the Communicable Disease Survey Form. Depending on the severity of the symptoms and travel history, those individuals are required to give an on-site specimen and/or submit to follow-up tests by local health authorities.

Of the 15,648,884 passengers who arrived in Taiwan last year, only 14,930 showed symptoms and were put on the local quarantine follow-up list. Arriving passengers who become ill after entry are encouraged to seek medical advice and inform their doctor of recent travel history. Taiwan CDC installed a nationwide toll-free hotline (1922) for consultation. Last year, through body temperature scans, Taiwan CDC found 81 cases of dengue fever, 29 cases of shigellosis, 15 cases of chickenpox, 2 cases of rubella, one case of chikungunya, one case of typhoid fever and one case of malaria. In addition, in the section of communicable diseases not included on the list of notifiable communicable diseases, Taiwan CDC found 5 cases of *Vibrio parahaemolyticus*, 10 cases of salmonella and one case of *Vibrio cholerae* (*Vibrio cholerae* serogroup non-O1, non-O139).

5. Control of Disease Vectors in Ports: The purpose is to control vector density (i.e., any infectious disease carrier such as rats or mosquitoes) at ports to stop the spread of communicable diseases. Taiwan CDC takes the following measures to stop the breeding of vectors.

a. Rat Control:

- (1) Placing anticoagulant bait year round where rats are most active. The bait is replenished every 10 to 15 days to ensure its efficacy.
- (2) Monitoring the parasites and infectious serum of rats in port areas (including Kinmen, Matsu and Makung). The rats caught are examined for parasites to understand the variety and quantity. Furthermore, the rats' blood serum is examined for evidence of *Rickettsia typhi*, plague and hantavirus.

b. Mosquito Control:

Mosquitoes are vectors of several communicable diseases, including yellow fever and dengue fever. The mosquito population density is closely related to the development of an epidemic. Therefore, it is necessary to understand the variety and quantity of mosquitoes because controlling the population can prevent an epidemic. The following methods have been adopted:

- (1) Controlling the Breeding of Dengue Fever Vectors: Empty containers that are prone to retain water (bottles, jars, tires, etc.) are checked monthly to track the breeding of vector mosquitoes. Any larvae are killed.
- (2) Setting Ovitrap: Traps are placed around the port/airport for mosquitoes to lay eggs. They are pieces of coarse cloth moistened with temephos. After the eggs hatch, the larvae are killed with insecticide. The traps are replaced monthly, and the number of eggs laid is used for calculating the mosquito index in the port areas.
- (3) Surveying Mosquitoes: Lamps are hung in selected places for trapping mosquitoes to identify their types and track their activities.



- (4) Organizing International Port Sanitary Groups: The groups are selected by Taiwan CDC's branch offices from personnel of the port authority, the port police, the customs office, the cargo transportation station, and other related organizations. Depending on circumstances, these representatives meet every three to six months to plan, coordinate and implement matters concerning port sanitation.
6. IHR Core Capacities at Designated PoE: The protocol aimed at achieving core capacity requirements at the designated points of entry in Taiwan was granted by the Executive Yuan. A cross-government platform was established in order to facilitate according activities. Taoyuan International Airport and Port of Kaohsiung had conducted the self-assessment and an initial assessment was carried out by the external expert. Through the approach, several gaps were identified and a plan of action was therefore developed for further accommodating the implementation of the IHR 2005.
7. Other Sanitation Control Measures:
- a. Shipboard Sanitation Control: To prevent the spread of disease on ships on international routes, Taiwan CDC imposes control of ships in accordance with the WHO IHR (2005) and the Regulations Governing Quarantine at Ports.
 - (1) IHR (2005) has been entered into force since June 15, 2007, through the required sanitary documents for international shipping, including the Ship Sanitation Control Exemption Certificate/Ship Sanitation Control Certificate. Taiwan CDC gives these documents a six-month period of validity to identify and record all areas of ship-borne public health risks together with any required control measures.
 - (2) To prevent rats from running to shore along the mooring cable, a rat guard must be hung on the cable. Ships that fail to do so will be immediately corrected and put on record for quarantine reference the next time they call on the port.
 - b. In coordination with the "Mini Three Links" between mainland China and Kinmen, Matsu and Makung, Taiwan CDC has installed quarantine units on the three offshore islands.
 - c. Since direct voyage routes were permitted between several authorized fishery ports in Taiwan and China, local health authorities have conducted necessary quarantine work at the ports to prevent transmission of communicable diseases.

Future Prospects

1. Increasing manpower and equipment, strengthen quarantine functions, and conscientiously conducting the quarantine to stop the import of disease.
2. Fostering professional quarantine personnel, encouraging the development of new quarantine techniques, and raising the quality of quarantine officers and their work.
3. Improving the eradication of vectors on ships and the monitoring of rat and mosquito populations in port areas to avoid the spread of communicable diseases.
4. Building core capacities at designated PoE based on the IHR (2005)

Current Immunization Program & Vaccine Injury Compensation Program in Taiwan



Expanded Program on Immunization Surveillance Systems

Current Status

Vaccination is one of the most cost-effective strategies in the fight against communicable diseases. Immunizations have been available since 1948, and now the Taiwan government provides free immunizations to children, including

BCG, 5-in-1 (diphtheria and tetanus toxoid with acellular pertussis, haemophilus influenzae type b, and inactivated polio, DTaP-Hib-IPV), hepatitis B, varicella, measles, mumps, rubella (MMR), Japanese encephalitis, tetanus, diphtheria toxoids, acellular pertussis and inactivated polio vaccine (Tdap-IPV) and influenza. Eight kinds of vaccines are available to children by 6 years of age. The current immunization schedule is shown in table 1.

Taiwan CDC works to enhance the effectiveness of immunization and health care for children. Parents of newborns are given a children's health handbook with a recommended immunization schedule. User-friendly immunization-related materials are included to ensure that information is accessible and clear. Providing convenient immunization services helps to improve the coverage rate. To date, children can receive vaccinations at 372 health stations and more than 1,600 contracted hospitals and clinics across

Current Immunization Program & Vaccine Injury Compensation Program in Taiwan

Taiwan. In 2009, more than 4,000 hospitals and clinics participated in the influenza immunization program, including providing vaccinations for children.

Health stations regularly carry out health promotion programs for improving coverage rate. The programs include mailing reminder postcards, making notification phone calls, scheduling home visits and providing media announcements, all aimed at informing parents of the importance of completing their child's immunization. Moreover, public health nurses at the health stations where children are registered regularly monitor immunization records and follow up on children who have not received up-to-date immunization to ensure those children complete the vaccination series.

Convenient service and policy promotion have helped improve the immunization coverage rate, which is now as high as 95%. (see Figure 1.)

Table 1. Current Immunization Schedule in Taiwan

| | <24 hr | ≥ 24hr | 1 month | 2 months | 4 months | 6 months | 12 months | 15 months | 18 months | 24 months | 27 months | 30 months | 36 months | 6 years | ≥ 65 years |
|---------------------------------|--------|--------|---------|---------------|---------------|---------------|-----------|-----------|---------------|--------------------|-----------|-----------|-----------|------------|------------|
| BCG | BCG | | | | | | | | | | | | | | |
| Hepatitis B | | HepB1 | HepB2 | | | HepB3 | | | | | | | | | |
| Tetanus, Pertussis, Hib, Polio※ | | | | DTaP-Hib-IPV1 | DTaP-Hib-IPV2 | DTaP-Hib-IPV3 | | | DTaP-Hib-IPV4 | | | | | Tdap-IPV © | |
| Varicella* | | | | | | | Var | | | | | | | | |
| Measles, Mumps, Rubella. | | | | | | | MMR1 | | | | | | | | |
| Japanese Encephalitis** | | | | | | | | JE1, JE2 | | | JE3 | | | JE4 | |
| Influenza | | | | | | | | | | Influenza (yearly) | | | | | |
| Hepatitis A# | | | | | | | | | | HepA1 | | | HepA2 | | |

** Two-week interval between dose1 to dose2

In selected aboriginal areas

Accomplishments

1. To ensure vaccine quality and maintain effectiveness of immunizations, Taiwan CDC launched a vaccine fund in 2010 based on Article 27 of the Communicable Disease Control Act.
2. Taiwan CDC will continue to promote immunization policies of various routine vaccines. In 2011, Tdap-IPV was given to new enrollees in primary schools to replace Tdap and OPV.
3. Children under 5 years of age in high-risk groups have been given pneumococcal conjugate vaccine (PCV) since July 2009. In addition, children under 5 who live in mountainous areas and offshore islands or are from low-income families have been given PCV since January 2010. Further, children under 5 years of age from medium-low income family have been given PCV since 2012.
4. The 5-in-1 (DTaP-Hib-IPV) vaccine was launched to replace the traditional DTWP (diphtheria, tetanus toxoid with whole cell pertussis) vaccine in March 2010. The switch reduces the chance of adverse reactions such as fever and local reaction such as redness or swelling where the shot was given.

Current Immunization Program & Vaccine Injury Compensation Program in Taiwan

5. Local health bureaus and health stations received subsidies to renew and replace their cold chain and storage facilities to ensure the quality of vaccines and maintain the effectiveness of immunization. Taiwan CDC held training seminars on the cold chain system, storage management and immunization practices to ensure vaccine quality and professional knowledge of medical personnel.

Future Prospects

1. Build a safe vaccine supply system and increase coverage by implementing immunization services to reach eradication goals.
2. Include new vaccines on the EPI-recommended vaccine list after: (1) Reviewing communicable disease control; (2) Assessing the affect on public health, social economics and medical costs; (3) Updating vaccine R&D, production and supply information; and (4) Allocating the health fiscal budget for vaccine purchase.
3. Promote e-management of immunization programs to strengthen information management and analysis, improve service capabilities, integrate information on immunization, accelerate resource sharing and enhance efficiency, in order to be on par with other advanced nations.
4. Develop and promote an appropriate immunization program for the elderly to reduce mortality and morbidity rates from complications of vaccine-preventable diseases.
5. With a stable source of support from the vaccine fund, Taiwan CDC will gradually add new vaccines to the routine immunization schedule based on cost effectiveness and recommendations of the Advisory Committee on Immunization Practices. In the future, new vaccines to be added include:
 - Pneumococcal conjugate vaccine (PCV) for routine children immunization.
 - Pneumococcal polysaccharide vaccine (PPV) for elderly persons over 65 years of age.

National Immunization Information System

Current Status

To handle a variety of situations, including immunization work demands and the enhancement of data bank efficiency, and to keep pace with rapid advances in information and network technologies, Taiwan CDC established the National Immunization Information System (NIIS). In 2004, Taiwan CDC used the system to consolidate immunization data scattered among various health stations into one database. This has greatly improved work efficiency because authorities can directly manage operations that take place within their jurisdictions.

NIIS, together with household registration authorities and medical institutions, has used functions such as the computerization of case referrals and allocations, along with real-time establishment of databases, to improve the management of immunization operations and the efficiency of storage and retrieval of immunization information.

Household data are obtained from the Department of Civil Affairs, Ministry of the Interior. The information is updated daily and collected for transmission to NIIS. This immunization data distributed throughout the health stations can be consolidated for registration, eliminating the need for separate data storage, lowering referral consolidation expenses and raising cost effectiveness.

Through NIIS, authorities can contact parents by text and e-mail to remind them of their children's immunization time, thereby improving immunization coverage rates.



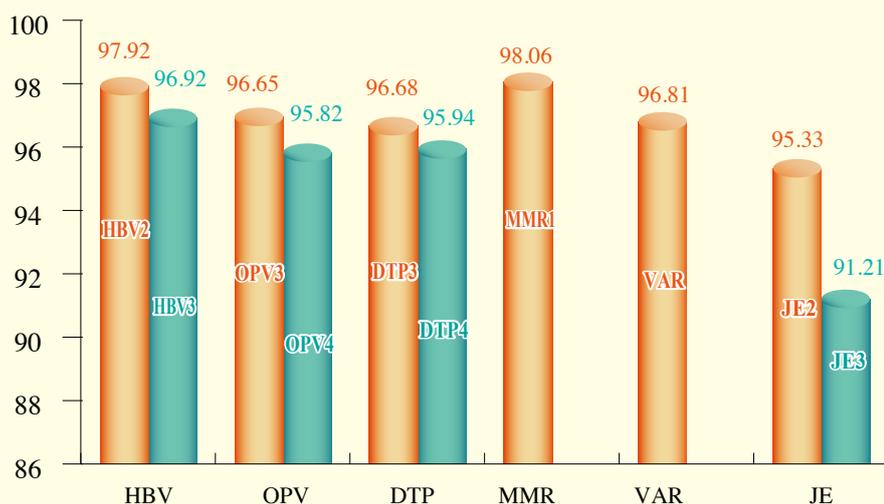
Accomplishments

1. Completion of immunization electronic reporting operations for contracted medical institutions (about 1,600).
2. Progressive replacement of magnetic strip cards with the National Insurance IC cards used by medical institutions to report preventive inoculation data. Approximately 900 contracted medical institutions have completed the changeover.
3. Enhancing the functions and efficiency of the central database to handle yearly increases in data quantities, improving management efficiency.
4. The National Immunization Information System (NIIS) uses different ways to trace and urge the unvaccinated people to get vaccinated, reducing delays and raising the coverage rate. Take the MMR vaccine as an example. Among children born in 2009, 80.4% had been vaccinated by 15 months of age. By December 2011, the coverage was raised to 98.06%. Also, when Taiwan CDC personnel find high-risk household cases, they referred to social welfare agencies to take over.

For children entering the country, Taiwan CDC compared entry information from the National Immigration Agency, Ministry of the Interior with NIIS data on children who had not received the MMR vaccine. It then informed local health agencies to find these children and arrange for vaccination. From February 2009 to May 2010, a total of 9,961 such children were found, with 5,185 having been vaccinated for a coverage rate of above 52%

5. Vaccine operational procedures have been computerized to increase efficiency.

Figure 1. Immunization Coverage



Source : The values was calculated in January 2012 by compiling retrospectively the immunization data of National Immunization Information System.

| Vaccine | HBV2 | HBV3 | OPV3 | OPV4 | DTP3 | DTP4 | MMR | VAR | JE2 | JE3 |
|--------------|------|------|------|------|------|------|------|---------------|------|------|
| Birth Cohort | 2010 | 2010 | 2010 | 2009 | 2010 | 2009 | 2009 | 2009.7~2010.6 | 2009 | 2008 |

Current Immunization Program & Vaccine Injury Compensation Program in Taiwan

Future Prospects

1. Taiwan CDC will continue to enhance real-time online reporting of immunizations administered outside of medical institutions. In addition, it will strengthen the functions of NIIS and classification of information on immunization target groups to improve the accuracy, completeness and timeliness of immunization data.
2. Taiwan CDC will continue to strengthen management of atypical cases, such as foreign spouses of citizens, children who follow their parents working abroad and children who fail to complete their immunizations due to family factors. Taiwan CDC will seek feasible channels for completing immunization of such affected persons.
3. Taiwan CDC will integrate various databases and systems (household registration, foreign spouses, reporting of communicable diseases) to improve the coverage rate, conduct follow-up efficacy assessments, report adverse reactions and monitor the efficacy of vaccines in disease prevention.
4. Diversify NIIS immunization reminders. Through text messages and e-mails, parents are reminded of the immunization time for their children, thus improving immunization coverage rates

Polio, Measles, Congenital Rubella Syndrome, and Neonatal Tetanus Eradication Programs

Current Status

Taiwan launched polio, measles, congenital rubella syndrome (CRS), and neonatal tetanus (NT) eradication programs in 1991. The goal of polio eradication was achieved on October 29, 2000. Currently, the epidemic areas are confined to only four countries worldwide. In Taiwan, more than 95% of infants receive three doses of polio immunization, but 5% still fail to do so in time. This is a deficiency in the polio control network. Although Taiwan has eradicated polio, it has to maintain vigilance. Measles can be eliminated through vaccination and thus, is the primary elimination target after polio. In 2010, three minor cluster events occurred; two of them were due to the imported cases from Vietnam and Philippines. The outbreaks were efficiently controlled. No confirmed NT case has been reported since 1996. The sole exception was in 2001 and was an isolated case involving a child born to a foreign mother. Since 1994, five cases of congenital rubella syndrome (CRS) have been confirmed. Four of five patients' mothers were foreigners. In 2010, three suspected cases were reported but no confirmed case was found. Rubella, commonly known as German measles, occurs worldwide. In 2010, there were 71 reported cases and 20 of them were confirmed cases.

This indicates that the latent danger of communicable diseases cannot be ignored, especially in view of frequent business exchanges, booming tourism, import of foreign labor, and the increasing number of marriages between Taiwanese and foreigners or Mainland Chinese. It is, therefore, necessary to continue the eradication program for polio, measles, CRS, and NT.



Accomplishments

1. In 2010, 49 AFP cases under the age of 15 were reported and investigated. The investigation completion rate within 48 hours was up to 100%. None of the cases were polio or polio compatible.
2. In 2010, three minor cluster events occurred; two of them were due to imported cases that were from Vietnam and the Philippines. However, the outbreak was soon controlled. There were 112 suspected cases reported and 12 of them were confirmed as measles. The investigation rate as well as the sampling rate was 100%.
3. Three suspected CRS cases were reported but no one was confirmed in 2010. All needed investigation and sampling collection have been accomplished.
4. In 2010, no suspected NT case was reported.
5. Since January 1, 2009, all foreigners applying for a residence or settlement are required to submit an antibody positive of measles/ rubella report or immunization certificate. Also, the physical check for foreign laborers before entry has included an item of “an antibody positive report of measles/ rubella or the immunization certificate.”

Future Prospects

1. Prevent the importation of polio to maintain the eradication of the disease and complete strategic planning of the global polio eradication program.
2. Implement active surveillance for measles and identify cases of measles infection and complete measles elimination certification in accordance with the WHO schedule.
3. Complete neonatal tetanus elimination certification.

Hepatitis Immunization Program

Current Status

From 1982 to 2007, five 5-year plans had been completed under the Hepatitis Control Program. The sixth 5-year-plan began in 2008 and will end in 2012. The priorities are: improving the surveillance system for acute cases, severing Hepatitis A infection paths, enhancing health education on liver disease control, improving blood transfusion management, and raising hepatitis examination quality. Taiwan CDC will move in the following directions: early detection and screening of hepatocellular carcinoma and seeking effective hepatitis treatment.

Accomplishments

Hepatitis A

Confirmed cases of acute viral Hepatitis A in aboriginal regions were reduced from 183 in 1995 to 0 in 2010 and the incidence rate was lowered from 90.74 out of 100,000 people in 1995 to 0 in 2010.

Hepatitis B

1. Yearly carrier rates have declined significantly and steadily from 10.5% in 1989 to 0.8% in 2007.
2. The coverage rates of second and third doses of HBV for babies born in 2009 are 97.83% and 96.59%, respectively.
3. Hepatitis B vaccination rates are 99.8% for the second dose and 99.55% for the third dose among elementary school students.

Future Prospects

1. Among infants born to a mother who is e antigen positive, there is a 10% chance that they will become chronic carriers of hepatitis B even after receiving hepatitis B immunoglobulin (HBIG) and three doses of immunoprophylaxis. For these children at a high risk of vertical transmission, Taiwan CDC has begun offering free hepatitis B screenings at age 1 and is working to understand the effectiveness of the vaccination series. It will continue to provide information to parents to raise the percentage of children who are screened.
2. Establish the Platform of Integrated Screening Information for Chronic Hepatitis B and C to promote the surveillance of chronic hepatitis B and vaccine cost-effectiveness assessment, to formulate and operate policies concerning hepatitis and hepatoma, and to minimize expenditures for the repeated screening of high-risk groups.
3. There are approximately 2.5 million Hepatitis B carriers and 700,000 people infected with Hepatitis C in Taiwan. To give appropriate treatment to the infected population and reduce the incidence rate of liver cirrhosis and hepatoma, the Bureau of National Health Insurance continued to promote an Enforce Hepatitis B and C Trial Treatment Program. In addition, it maintained funding for the program so more people could benefit.



Vaccine Injury Compensation Program (VICP)

In response to the case in which, a child received oral poliomyelitis vaccination and subsequently developed polio in 1986, the Department of Health established a Vaccine Injury Compensation Fund in June 1988. The fund enables individuals to claim for compensation with their local health bureaus in the event of death, physical or mental impairments, serious illnesses, or adverse reaction resulting from vaccination. Claims are reviewed by the Vaccine Injury Compensation Working Group to ensure that individuals gain expedited and rational compensation and eliminate public doubt towards vaccination, and thereby raise the general vaccination rate.

As of year 2011, a total of 1,139 applications had been reviewed, with an average review time of 50 days, and compensation disbursement had reached NT\$75.75 million.

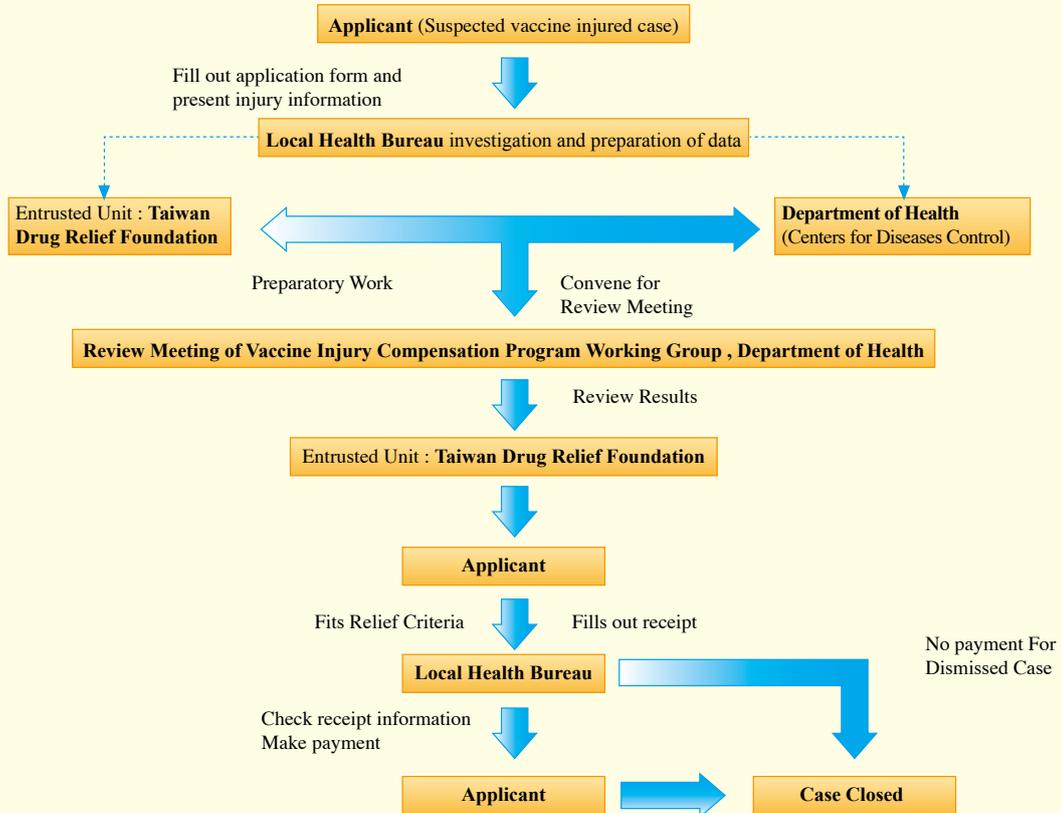
Scope and Maximum Amount of the Vaccine Injury Compensation Program

| Type of Compensation | Compensation Classification | Max. Compensation Payment |
|---|--|---------------------------|
| Death compensation | Vaccination is related to the cause of death | NT\$ 6 million |
| | Vaccination is possibly related to the cause of death | NT\$ 3.5 million |
| Physical or mental impairments compensation | Vaccination is related to the cause of the physical or mental impairments. | NT\$ 5 million |
| | Vaccination is possibly related to the cause of the physical or mental impairments. | NT\$ 3 million |
| Serious illness compensation | Vaccination is related to the cause of serious illness. | NT\$ 1 million |
| | Vaccination is related to the cause of the serious disease | NT\$600,000 |
| Adverse reaction | Vaccination is related to the cause of adverse reactions. | NT\$200,000 |
| Funeral assistance | Vaccination is related to the cause of death and an autopsy is conducted on the victim. | NT\$300,000 |
| Medical Allowance | Medical examination done to verify the correlation between the individual's medical condition and vaccination. | NT\$100,000 |
| Death of fetus or miscarriage of a pregnancy due to vaccination, as determined following an autopsy or medical examination of the miscarried fetus or embryo. | Miscarriage or fetal death on or after the 20th week of pregnancy | NT\$100,000 |
| | Miscarriage or fetal death before the 20th week of pregnancy | NT\$50,000 |

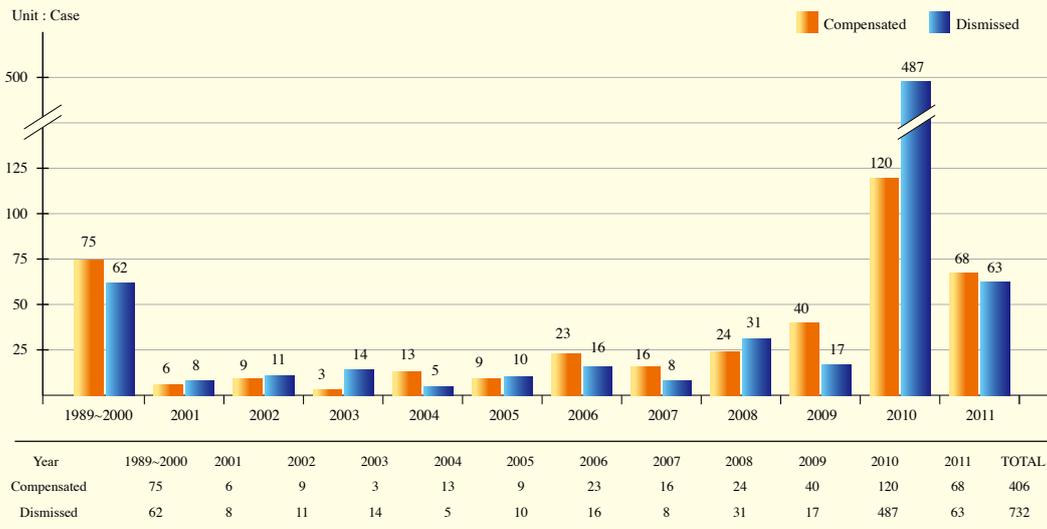


Current Immunization Program & Vaccine Injury Compensation Program in Taiwan

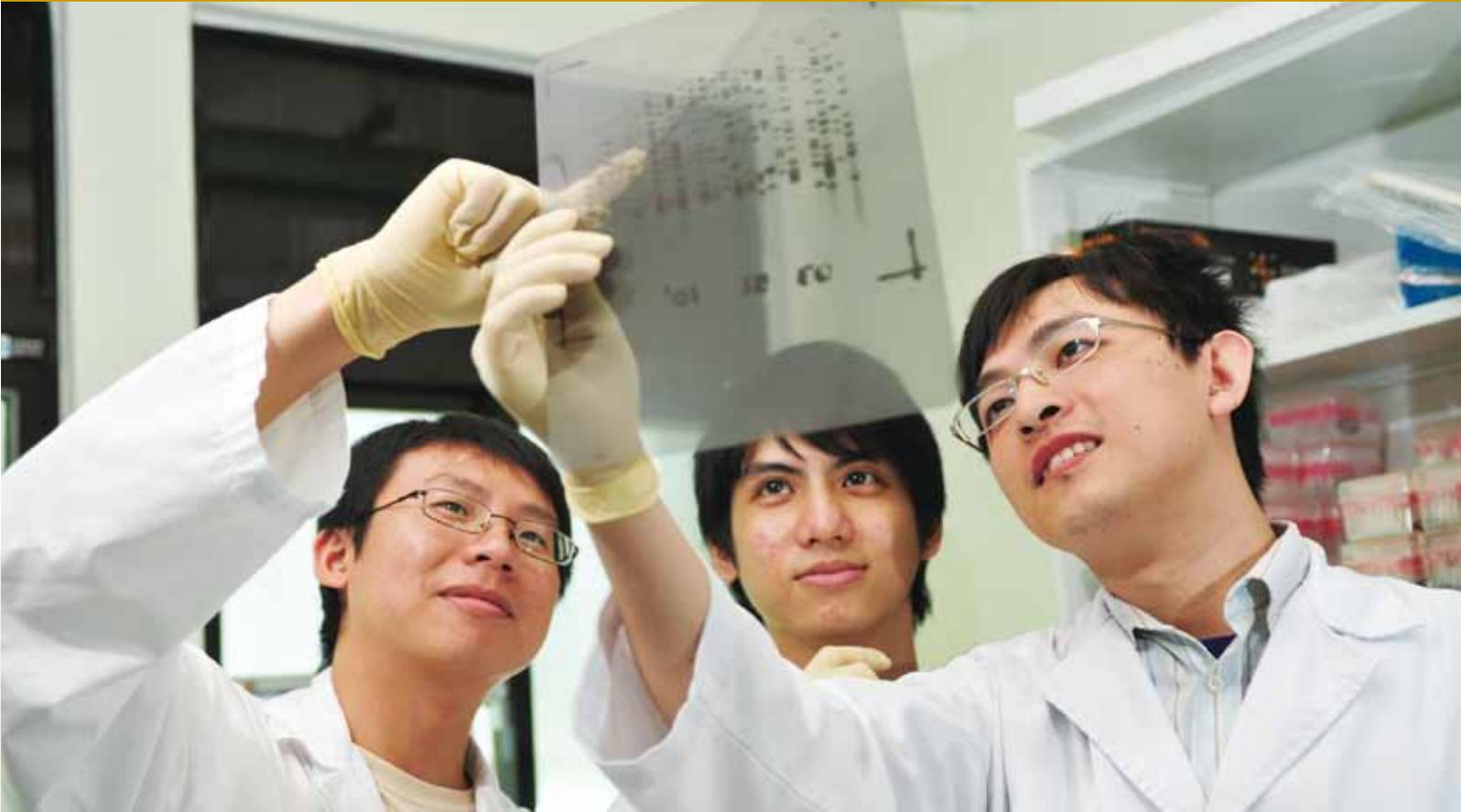
Vaccine Injury Compensation Claim Evaluation Process



Vaccine Injury Compensation Evaluation Status to Dat



Scientific Research and Development



Current Status

To meet administrative plans put forward by the Department of Health, Taiwan CDC develops policies and tasks to guide its technological research. When planning yearly technological research themes, each professional unit evaluates the need and importance of key tasks and then analyzes and researches needed topics. Through this work, the units consider how to best combine research and disease control practices with policy goals.

Taiwan CDC covered 11 key technological themes in 2011, including the National Research Program for Genomic Medicine, the Tuberculosis Integrated Project, the Evaluation and Formation of the Communicable Disease Monitoring and Early Warning System, the Communicable Disease Testing Techniques and Drug Resistance Research Project, and the Laboratory Monitoring and Testing Quality Control System Formation Project. It placed high value on both internal research and outsourcing to conduct its technological development research projects. In addition, Taiwan CDC's main administrative units for research, development and manufacturing were the Research and Diagnostic Center and the Vaccine Center.

Research and Diagnostic Center

In 2011, the Research and Diagnostic Center employed 164 individuals and received and processed 156,450 diagnostic specimens. Facing emerging and re-emerging communicable diseases, the center emphasized international collaboration, focusing on information exchange and laboratory technology advances. In addition, center laboratories regularly took proficiency tests (CAP) to assure the quality and accuracy of their diagnostic results. The center consists of 10 laboratories and three service sections.

The primary objectives of the center are to research more efficient and comprehensive diagnostic methods, perform laboratory-based epidemiological studies, and study communicable disease pathogenesis. Secondary goals include establishing national reference laboratories, performing diagnostic services and technical support to control notifiable communicable disease incidents, and assisting national and international health agencies in consolidating control strategies and policies.

Accomplishments

National Influenza Center (NIC)

July 5, 2006, marked the third anniversary of Taiwan's removal from the WHO list of SARS-affected areas, and Taiwan CDC chose this day to hold the inauguration of a new affiliate called the Taiwan National Influenza Center (Taiwan NIC) at its Kunyang facility. Thus far, Taiwan NIC has achieved the following three major goals:

1. Integrated influenza surveillance and notification with laboratory analysis systems throughout Taiwan to enhance and evaluate epidemic data.
2. Monitored the occurrence of new types of flu viruses and viral antigen variation trends, also provided references for vaccine strain selection.
3. Published the Influenza Express periodically in both Chinese and English during every flu season.

PulseNet Taiwan

PulseNet Taiwan, a national molecular subtyping system for surveillance of bacterial infectious diseases, was established for early detection of infection clusters by comparison of DNA fingerprints of bacterial isolates. The system can be applied in food safety surveillance systems for early detection of food-borne disease outbreaks and can serve as a platform for academic study and disease surveillance for domestic and international public health institutions.

Viral Enteric and Emerging Diseases Laboratory

1. Conducted HIV-1 genotyping and drug-resistant surveillance among different risk groups such as IDUs, MSMs, and heterosexuals.
2. Applied molecular diagnosis to discover novel viral pathogens and successfully identify Aichivirus and Salivirus/Klassevirus from samples without definite detection results.



3. Executed an acute flaccid paralysis surveillance system to comply with the WHO Global Polio Eradication Initiative and maintain good Proficiency Testing results evaluated by WHO reference laboratory.
4. Implemented a quality assurance program for serological detection of HIV-1 and hepatitis B/C virus infections at teaching hospitals and major medical laboratories.
5. Cooperated with domestic teaching hospitals, scholars, life science research institutes, and international public health research institutes such as U.S. CDC and Japan's NIID for the prevention of emerging infectious diseases.

Viral Respiratory Diseases Laboratory

1. Performed routine diagnoses of respiratory viruses, including the viruses that cause SARS, influenza, measles, rubella, and mumps, plus adenovirus, human respiratory syncytial virus (RSV) and varicella zoster virus (VZV).
2. Tracked influenza virus evolution in Taiwan, including its antigenic and genetic mutations.
3. Prepared ferret antisera against local flu virus strains and facilitated their diagnoses and typing.
4. Maintained close contact with the WHO Collaborating Centers for Influenza and delivered prevailing influenza virus isolates from Taiwan to help in surveillance, epidemiology studies and control of influenza.
5. Investigated genotypes of measles and rubella viruses in Taiwan.
6. Established an active surveillance network for pneumonia, encephalitis and sudden death with unknown pathogens and integrated various detection technologies, multiplex real-time PCR panels, high-throughput sequencing systems and microarrays for detecting possible pathogens.

Vector-Borne Viral and Rickettsial Diseases Laboratory

1. Established and maintained an arboviral and rickettsial reference laboratory to provide laboratory standards and diagnostic services to domestic and international health agencies.
2. Conducted routine diagnoses of dengue fever, Japanese encephalitis, yellow fever, West Nile fever, chikungunya, hantavirus infection, scrub typhus, and typhus fever using serological methods (ELISA and/or immunofluorescence assay), molecular methods (real-time PCR), and isolation methods (cell culture).
3. Conducted an airport fever screening program to look for dengue fever, chikungunya, and other arboviral diseases.
4. Built and maintained genomic databases for molecular epidemiologic studies of the dengue, Japanese encephalitis, and chikungunya viruses, plus *Orientia tsutsugamushi*.
5. Conducted an international arbovirus surveillance cooperation program with Japan's NIID

Bacterial Respiratory Diseases Laboratory

1. Diagnoses and identification of pathogens causing notifiable bacterial respiratory diseases, including *Bordetella pertussis*, *Neisseria meningitidis*, invasive *Streptococcus pneumoniae*,

Scientific Research and Development

Legionella spp., invasive Haemophilus influenzae type b, Bacillus anthracis, and invasive Streptococcus pyogenes.

2. Diagnoses of respiratory bacterial pathogens in autopsy specimens for legal cases.
3. Outbreaks investigation for respiratory bacterial pathogens.
4. Participation in external and internal quality assurance programs.
5. Establishment of international collaborations.

Bacterial Enteric and Emerging Diseases Laboratory

1. Conducted conventional diagnoses of Vibrio cholerae, Salmonella typhi, paratyphi, Salmonella spp, Shigella spp, Enterohaemorrhagic Escherichia coli (EHEC), Burkholderia pseudomallei, Yersinia pestis, Leptospira interrogans, Borrelia burgdorferi, Bartonella henselae, Francisella tularensis and NDM-1 producing enterobacteriaceae.
2. Performed surveillance of carbapenem resistant Enterobacteriaceae.
3. Established multiplex real-time PCR methods for detection of pathogens causing encephalitis and meningitis.
4. Employed high-throughput sequencing for unknown pathogen discovery.

Mycobacterial Diseases Laboratory

1. Strengthened the laboratory system for better diagnostic services.
 - a. Standardized conventional and molecular diagnostic methods.
 - b. Developed, evaluated the improved conventional tests and new molecular diagnostic and genotyping methods.
2. Involved in tuberculosis outbreak and pseudo-outbreak investigations of cases at schools, hospitals, long-term care facilities, etc.
3. Conducted needed molecular epidemiological studies.
4. Established a mycobacteria genomic database.
5. Maintained a mycobacteria strain banking system.
6. Implemented a laboratory external quality assessment program.
 - a. Conducted acid fast bacilli (AFB) smear and drug susceptibility rechecking.
 - b. Provided proficiency tests for drug susceptibility testing and molecular assays.
 - c. Carried out on-site visits of contracted clinical laboratories.





7. Maintained a mycobacterial laboratory surveillance system by monitoring drug-resistant *Mycobacterium tuberculosis* isolates, *Mycobacterium bovis* and *Mycobacterium bovis*-BCG complications.
8. Carried out international collaborative activities including continuation of the international MDR tuberculosis PETTS study with the U.S. CDC, participation in an international collaborative molecular epidemiology of tuberculosis study organized by the Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association and conduction of bilateral collaborative research projects on tuberculosis and leprosy with NIID, Japan.

Parasitic Diseases Laboratory

1. Applied a new one-tube multiprobes real-time PCR diagnostics system to routine enteric amebiasis examination of notifiable patients and alien workers.
2. Established a phylogenetic method for the molecular epidemiological studies of amebic infection for high-risk groups, such as foreign laborers, men who have sex with men and institutionalized psychiatric patients.
3. Applied microscopic examination and a molecular surveillance system to malaria diagnosis.
4. Participated in CAP tests (parasitology and blood parasite surveys) for professional evaluation and accreditation.
5. Studied pathogenicity and drug tolerance of *Entamoeba histolytica*.
6. Applied molecular and cultural methods for the diagnoses of free-living amebas.

Mycotic Diseases Laboratory

1. Conducted diagnostic assays and molecular epidemiology studies of fungal and nocardial pathogens, sexually-transmitted pathogens, and special cases, such as *Chlamydia pneumoniae*, *Chlamydia psittaci*, *Chlamydia trachomatis*, and *Mycoplasma pneumoniae* infection.
2. Established diagnostic assays for imported mycoses.
3. Conducted epidemiology studies on *C. pneumoniae* and *M. pneumoniae* infections.
4. Performed molecular typing of *C. trachomatis* infections in Taiwan by MOMP genotyping.
5. Developed NAAT assays for *C. trachomatis* and *Neisseria gonorrhoeae* and conducted screening programs among specific high risk groups.
6. Carried out G-NICE (gonococci-National Isolate Collection for Epidemiology) for the surveillance of resistance trend and a molecular epidemiology study on *N. Gonorrhoeae*.
7. Finished the whole genome sequence of a MDR *N. Gonorrhoeae* strain and a MDR *Acinetobacter baumannii* strain and conducted comparative genomic studies.
8. Established novel multiplex bead array platforms to rapidly detect clinically important fungi, nosocomial pathogens and sexually transmitted pathogens.
9. Participated in the CAP tests (Mycology and *Chlamydia trachomatis*/*Neisseria gonorrhoeae* NAATs Surveys) for proficiency evaluation.

Vector Biology Laboratory

1. Established a molecular epidemiological surveillance for tick-borne emerging and zoonotic diseases.
2. Conducted a surveillance of mosquito-borne infectious diseases.
3. Monitored insecticide resistances of *Aedes aegypti* from several high risk areas of Dengue in southern Taiwan.

Establishment and Application of Pathogen Genome Sequence Databases in Taiwan

1. The collection of the Taiwan Pathogenic Microorganism Genome Database (TPMGD), already stands at 60,000 genotyping data from viruses, bacteria, and fungi, and over 60,000 other epidemiological data. The total number of hits on the website has reached 2,400.
2. In addition, Taiwan CDC established a TPMGD-open version (http://tpmgd.cdc.gov.tw/tpmgd_public/), which is accessible to the general public online. Anyone can surf and download from the website or do contrastive analysis of 23,409 pathogen sequence data (regarding influenza virus, enterovirus, and adenovirus) and simple epidemiological information. The website also has programs for primer design, genotyping enterovirus 71, and blast search with influenza vaccine strains.

Future Prospects

1. Develop a multiplex disease detection system as well as a rapid detection method for identification of vaccine derived poliovirus or VDPV in the era of polio eradication as well as EV 71.
2. Establish an internationally recognized flavivirus reference laboratory.
3. Apply advanced high-throughput and multiplexing diagnostic techniques such as bead array or microarray systems to improve diagnostic and genotyping capability.
4. Establish a genotype databank, participate in global surveillance and to collaborate with renowned international research institutes.
5. Establish molecular epidemiological surveillance for tick-borne emerging and zoonotic diseases.
6. Integrate existing viral diarrhea disease surveillance networks to better identify viral causative agents.
7. Provide clinical report forms based on HIV-1 genomic mutations to anti- retroviral treatment failure patients as a reference for selection of new regimens.
8. Enhance laboratory ability to identify unknown viral pathogens based on molecular mutiplex detections.
9. Assure HIV-1 viral load testing ability by participating in CAP HIV-1 viral load proficiency tests.
10. Establish a high throughput full genome sequencing technique for unknown pathogen detection and surveillance.



11. Establish a surveillance network and a bank for collection of newly emerging infectious pathogens.
12. Develop surveillance technology platforms for various unknown/newly emerging infectious pathogens.

Development and Manufacturing of Serum Vaccines

Production of Biological Products

1. Antivenin serum is manufactured by using horse serum. A total of 342.9 liters of antivenin horse serum were produced in 2011.
2. A supply of vaccines, toxoids, and antivenoms, totaling 2,084,378 shots, was available in 2011. Income from sales of these biological products totaled more than NT\$61.5 million.
3. Animals for experiment such as mice, guinea pigs, rabbits, poisonous snakes and ferrets are supplied and raised on contract.

Development of Bio-Products

1. Establishment of the virus strain bank for 38 types of different Enterovirus 71 and completed the production of five batches of prototype vaccines of C4 genogroup of Enterovirus 71. Laboratory rat testing indicated that intraperitoneal injection of antigen dosage (diluted 16x) may produce the neutralization antibody titration having a ratio of 1:120 or higher.
2. Implementation of a mass stability assessment plan to develop antivenins in Taiwan - snake venom obtained from milking snakes collected by the fire brigade: The venoms milked obtained from the snakes collected by the fire brigade as used in the study, the Umbrella snake (*Bungarus multicinctus multicinctus*) and the cobra (*Naja atra*), were found to be viable for practical applications.
3. A neutralization titer analysis and research project was conducted to determine the effect of the Bivalent antivenin of *Trimeresurus mucrosquamatus* and *Trimeresurus gr. Stejnegeri* on the venom of different varieties of *Protobothrops mucrosquamatus*. It was found that venom of the Alishan *Ovophis monticola makazayazaya* contained the highest level of toxicity, followed by that of the *Trimeresurus mucrosquamatus*, and that of the *Trimeresurus gracilis* contained the lowest level of toxicity. The Bivalent antivenin of *Trimeresurus mucrosquamatus* and *Trimeresurus gr. Stejnegeri* has the best neutralization effect on the venoms obtained from *Trimeresurus mucrosquamatus*.
4. Implementation of the “Construction of the New Immune Horse Ranch Project of the Centers for Disease Control of the Department of Health”. Construction is projected to be completed in April to June 2012; the ranch shall become the first immune horse ranch compliant to the Current Good Manufacturing Practices (cGMP) standards.
5. Evaluation of the effect of the Tetanus vaccine potency on horses and discovery of the fact that the Antivenin serum has no impacts on the Tetanus vaccine, thereby defining the best immune duration of the Tetanus vaccine and maintaining the health of horses and the safety quality of antivenom medicines.

Health Marketing



Current Status

For the public to become more knowledgeable about communicable diseases, understand related policies, and support Taiwan CDC's actions, the agency has created a health marketing program. It hopes that through a series of interactive events it can promote disease prevention.

Goals

To strengthen communication between the government and citizens on the risks of communicable diseases, improve knowledge among the general public, and make everyone part of the battle against epidemics.

Accomplishments

1. Monitoring and Immediate Response to the Disease Prevention Related News.

A news monitoring and alert mechanism was established to enhance communication of communicable disease control policies. In 2011, a total of 4,813 related news had been reported, in response to the public concern over the disease control conditions, authorities voluntarily held press conferences and issued news releases to inform the public and intensify policy communication. Moreover, 76 press conferences had been held, 255 press releases had been issued, and a total of 782 news reports had been made.

2. Integrated Marketing of Disease Prevention

Taiwan CDC holds press conferences to create awareness of its major policies and achievements. By focusing on a specific issue, Taiwan CDC aims to attract media attention and spread its message to every household in the nation.

In 2011, Taiwan CDC held the following disease prevention campaigns:

(1) Integrated Marketing of Influenza Prevention

In 2011, Taiwan CDC launched the annual free seasonal influenza vaccine campaign on October 1. The theme of campaign this year was “Thanks to vaccines, families homes are safe from the flu!” It emphasized the scenario that in the influenza season, it is likely that a member of each household may be infected, and caring for the sick could keep the entire family busy. Thus, the campaign urges families to bring their infants and senior citizens, aging 65 years and above, to take the free flu vaccines as a safety net for the family.

Mr. and Mrs. Sean Lien, popular celebrities Ma Ju-Lung and Pei Hsiao-Lan were invited to join the press conference as concerned parents and elder to urge the public to avail of the government-funded vaccine before the start of the influenza season.



In a campaign to stem the spread of flu, Taiwan CDC mobilized an epidemic control task force to distribute more than ten thousand sanitary masks at the Taipei City Hall MRT station on 2012 New Year’s Eve.

A series of information dissemination materials were developed to urge flu vaccination. Messages of the campaign were disseminated to the public through both printed and electronic media; moreover, popular physicians were urged to recommend or advocate for the campaign in blogs. Effects of the vaccines were posted on the Internet for general information in an effort to pass information of its efficacy through word of mouth. At the same time, commuters regularly using public transportation were reminded of the need for hand hygiene and proper courtesy when coughing to prevent the communication of any virus in the vehicles.

(2) Integrated Marketing of Tuberculosis Prevention

In response to the 2011 WHO World Tuberculosis Day, Taiwan CDC launched a campaign pivoting on “Fight TB with 100% Determination”. We filmed a video news featuring Ms. Chen Shu-Chu, recognized by *Time* and *Forbes* magazines as one of the most influential people in 2010. She shared her successful experience to fight the disease to motivate those who suffer from tuberculosis. She urged that as long as they faithfully take their medicines, they could rid their lives of tuberculosis. Furthermore, the CDC invited Dr. Lee Jen-Jyh, recognized for his experience in treating tuberculosis patients for the past twenty years, and Mr. Yang Jian-Sheng, works as a DOTS worker . serving the Guangfu Township of Hualien County to join the campaign in promoting the prevention and control of tuberculosis.

In light of the recent concern of students, parents, and the society on the problem of tuberculosis infection in school campuses, Taiwan CDC developed a school campus

information drive directed towards the students to enhancing their knowledge of the disease and alleviating unnecessary fears.

(3) Integrated AIDS Prevention Marketing

- World AIDS Day

On November 30th, eve of the World AIDS Day, Taiwan CDC held the “100 Celebrities pledging their support to the AIDS prevention and control campaign in the 100th year of the Republic” press conference and hoped to consolidate the concern of all sectors of the community in the fight to stem the spread of AIDS and promoting the campaign against prejudice towards AIDS sufferers.

Hundreds of people dressed in red to form a giant red ribbon in front of Legislative Yuan and hundreds of celebrities sign their names on T-shirts to support HIV-infected patients. Taiwan CDC launched an event where hundreds of celebrities were invited to sign their names on the event T-shirts in support of HIV-infected people and those living with AIDS, including President Ma, Vice President Xiao, Premier Wu, President Wang of the Legislative Yuan and others, as well as many artists such as MayDay, Soda Green, Chen Yen Xi participated in this meaningful event by signing names on the event T-shirts.

Taiwan CDC and the Taiwan Love and Hope Association co-hosted the premier of a documentary film, “The Hope of Love”, which is about the parents of HIV infection cases. The objective of this event is to encourage the public to use “3H” (a Home to protect you, a Heart to love you, and a Hand to support you) and promote ways to prevent HIV/AIDS, including making home a safe shelter for HIV/AIDS patients and improving teenagers’ awareness of safe sex. Taiwan CDC appeals to the public not to discriminate against HIV-infected individuals and to provide those individuals a comfortable and friendly social environment.

In response to the social trend of AIDS infection among younger people, Taiwan CDC launched a promotion campaign against AIDS in the social hub of Taipei’s youth, Ximending on 2nd October, 2011. Famous “otaku” Lucifer Chu and popular “goddess” among otaku Phoebe Yuan were invited to demonstrate the proper way to use condoms. Moreover, Taiwan CDC dropped thousands of free condoms from the sky to remind young people that “love should not be burdened with AIDS and sex should be totally protected and safe.”





A. Campaign materials for the general public

The concept of the Golden Shield to ward off external force impact, which is popular in the Chinese kung fu, was associated to the full coverage protection offered by condoms. The campaign instilled that even a lay person without kungfu skills may enjoy full protection from the hazards of HIV/AIDS as long as condoms are used during sex.

In another ad, the condom is depicted as an amulet for self-protection and clearly urged people to avail the use of condoms throughout the sexual intercourse to ensure their health and safety against the hazards of HIV/AIDS – got condom, got protection.



B. Campaign addressing high-risk groups: A reminder to take part in the drive for safe sex practices and to use a condom during the whole time. Moreover, high-risk individuals are urged to desist from spreading their disease through blood donation.

(4) Integrated Marketing of “Washing Hands with Soap; Drying after Washing” Campaign

On October 15th, 2011, in response to the Global Handwashing Day, Taiwan CDC and relevant enterprises that could help effectively raise public awareness of handwashing with soap as a key approach to disease prevention, including chain restaurants, hyper-markets, grocery shops, department stores, hotels, the Taiwan Railway and CPC Corp., worked together to launch the new hand washing movement, “Washing Hands with Soap; Drying after Washing”. On the same day, a popular hyper-market chain and a famous pizza chain mobilized thousands of employees to promote this event at their shops and while making delivery. In addition, hygiene-related corporations donated soaps to schools in remote districts and a famous financial holding company also participated in this event. In 2011, a total of seventy-one corporations participated in the campaign, and around 1,500 hand hygiene information promotion spots were opened.



3. Communicable Disease Reporting and Counseling Hotline: 1922

To provide a convenient channel for communicable disease reporting and counseling, Taiwan CDC has operated an easy-to-remember, toll-free hotline “1922” since 2003, which provides 24-hour service on disease reporting, communicable disease counseling, prevention policy promotion and control measure education to the public throughout the year.

In 2011, the 1922 hotline received 62,740 calls and referred 30,095 for handling. Since Jan. 1, 2010, a survey has been conducted on customer service satisfaction toward the hotline, among

7,023 responses gathered in 2011, 98.9% of people said they were either extremely satisfied or satisfied toward the service.

4. Social Marketing Media

Taiwan CDC's marketing channels includes three media platforms – Taiwan CDC Facebook, Taiwan CDC Blog, and the Taiwan CDC Youtube video page - were linked for wide-range information dissemination. The linked platforms provide an excellent tool for “risk communication” and “health marketing”.

Taiwan CDC Facebook: Fan interaction was achieved through simple and easily comprehensible language, pictures, as well as video footages. Timely delivery of accurate epidemic control information and activities coordinated with the epidemic control information campaign theme were provided for the benefit of fans and to draw new fans. In 2011, number of website fans had grown to 15,000 and still growing.

Taiwan CDC Blog: Tips for stemming the spread of epidemic were given through the poignant stories or ideas of communicable disease control workers. The blog instilled proper knowledge and preventive information against communicable diseases to enhance the public awareness. The views of the website exceeded 40,000 person-times.

Taiwan CDC Youtube video page: This became the epidemic control video information platform that showed audiovisual news information and promotional short films. Total worldwide views of the page have now exceeded 150,000 person-times.

5. Medical Correspondence Letters:

To provide up-to-date information on communicable diseases, clinical treatments and disease prevention policies to medical personnel, Taiwan CDC sends special correspondence letters. Through its electronic reporting system, the Bureau of National Health Insurance and medical hospitals, schools and guilds, Taiwan CDC passes on important information. In 2011, Taiwan CDC sent out 47 medical correspondences. The response was positive, with 7,000 regular subscribers, including 58 hospitals, schools and guilds.





6. Innovative Practices

• Innovative interaction:

The interactive features of the Internet were used in the AIDS prevention and control drive which advocated the safe sex through a series of Internet ad campaigns. In the Facebook site “get a condom and take a picture” and “fully cloaked, holding AIDS at bay” raffle draw, over 5,000 site viewers participated. Moreover, famous Internet audiovisual blogs, Internet opinion leaders and subscribers were invited to join filming of “Tsai A-Ga’s Sex Classroom”, “Sex Education”, “House-keeping man’s Resistance Army”, and “Combating AIDS – Ninja”. The films were viewed over 340,000 times. Furthermore, the Internet image site blogs were invited to create AIDS prevention images to disseminate proper information on AIDS control. The images successfully gathered the interest and discussion of young viewers.

• E-card

On New Year’s Eve, Taiwan CDC sent a red e-card to local and international disease control partners to thank them for their support over the past year and to wish them good health and a happy coming year. A dragon design word art of the Taiwan CDC greeting e-card was sent out to call for a new health climate in the year of the dragon. The e-card demonstrated the Taiwan CDC’s efforts to protect the national health with best wishes for a healthy and safe year.



• Creative Promotional Materials:

To promote disease prevention concepts, Taiwan CDC has created many creative, stylish and useful promotional materials.

The Dengue Fever epidemic control information promotion kit:

The “Door Gods” idea was launched to motivate the public to pay attention to cleanliness in order to prevent the onslaught of Dengue fever. People were urged to regularly reduce exposed unused containers and remove possible “mosquito breeding sources”. Moreover, in case of any suspicious sign of the symptoms, cases should be immediately reported to nip the outbreak at the bud. Magnetic message board information promotion kits were made to enhance the Dengue Fever



awareness of people reporting possible cases of Dengue fever, thereby providing them more accurate information and preventive concepts.

Contagion-Free Travel Information Kit:

Health information promotion kits containing common sense tips before, during, and after their trips remind the public to watch out and avoid contracting communicable diseases in their travel and bringing these diseases into the country.

Caps and scarves

Caps and scarves carrying the CDC design and highly sporty and sentimental logo fonts depict the rapier-sharp resolute epidemic control force of the CDC which shall cut down any attacking epidemic virus.

7. Disease Prevention Awards

To encourage people who made major contributions to disease prevention research, strategies, and efforts along with groups or individuals who were particularly successful in conducting communicable disease control work, on Sep. 9 Taiwan CDC held the 2011 Disease Prevention Awards Ceremony. In total, it gave disease prevention awards to 49 public and private organizations and individuals. The theme of this year's awards ceremony was "working as one to prevent disease."

8. CDC Exhibition Center

Taiwan CDC established the country's first CDC Exhibition Center with the theme of infectious disease prevention at its Taipei office in 2000. The playful yet educational approach of the exhibit has won widespread praise and made it a favorite attraction for schoolchildren.

Together with the National Science and Technology Museum, Taiwan CDC held the 2011 3rd Disease Prevention High School Summer Camp. The camp gave students the chance to see what college life is like while sharing disease prevention information and allowing the students to experience disease prevention work. More importantly, the camp was aimed at arousing and cultivating students' interest in disease prevention work so they could influence family and friends. Providing the students with strong individual health habits and concern for the community enable proper disease prevention ideas to flourish everywhere.

9. Corporate Cooperation

Taiwan CDC cooperates with private companies or foundations that are also involved in disease prevention to maximize resource efficiency, creativity, and marketing opportunities and improve awareness of related issues.

Future Prospects

Taiwan CDC will continue to promote disease prevention, develop new marketing channels, and improve communication on infectious disease risks to protect the health of Taiwan's citizens.

International Cooperation



Current Status

Over the past several years, Taiwan CDC has worked hard to enhance international exchanges on health affairs. Its efforts include participating in international public health programs and conferences, strengthening bilateral and multilateral relationships, helping allies raise their capacities for infectious disease control, taking part in international humanitarian relief activities, and exchanging advanced technology with other countries. As a result, Taiwan CDC has many impressive achievements in disease control. Furthermore, Taiwan CDC has been able to share its unique experiences with the rest of the world as it endeavors to achieve health for all.

Accomplishments

Organizing International Conferences

1. In response to the “SAVE LIVES : Clean Your Hands” promoted by World Health Organization (WHO), Taiwan CDC hosted “SAVE LIVES : Clean Your Hands–2011 Hand Hygiene International Conference” to present our accomplishments in hand hygiene, as well as to continuously promote “My 5 Movements for Hand Hygiene” approach.

International Cooperation

2. To curb the HIV/AIDS epidemic globally, Taiwan CDC hosted the “APEC Conference on Harm Reduction Approach to HIV/AIDS Control”. A total of 30 representatives from 13 economies, and 77 experts from Taiwan participated in this conference. The conference focused on “The Development in Harm Reduction”, “The Challenges of Harm Reduction” and “The Epidemiology, Treatment and Prevention of IDUs and other High Risk Groups.”

Promotion of Bilateral or Multilateral Cooperation

1. For the Cooperative Program in Public Health and Preventive Medicine with USCDC, Taiwan CDC continued Arrangement No. 3 (a TB prevention project) and Arrangement No. 4 (a Taiwan-US EIS training plan).
2. Led and completed the stakeholder analyses of AsiaFluCap international cooperative project and presented final report on Stakeholder Analysis on the Response to the 2009 H1N1 Influenza Pandemic in Six Asian Countries in Thailand and Netherland.
3. Deployed staff to the Australian Gynaecological Endoscopy Society (AGES) for European CDC EPIET training.
4. Participated in the 8th Taiwan-Japan Bilateral Symposium on Antibiotics Resistance and Foodborne Diseases, hosted by Japan NIID.
5. Conducted 6 bilateral cooperation projects on the diagnosis or mechanism of vector-borne diseases, dysentery, drug-resistant tuberculosis, leprosy, brucella as well as leptospirosis with Japan NIID.
6. Continued the cooperation on “Research on Proteomics of Snake Venom in *Trimeresurus mucrosquamatus* and *Trimeresurus stejnegeri*” with the Institute of Buomedicine of Valencia and the University of Costa Rica
7. Continued to work with Haiti's National Public Health Laboratory to improve her capacity and assist in control and prevention of communicable diseases.
8. Invited Dr. Kiyosu Taniguchi of Japan NIID to assist in assessment the core capacity requirement by the IHR2005 for designated airports and ports in Taiwan.





International Exchanges in 2011

1. A total of 156 guests from 14 different countries visited Taiwan CDC.
2. Taiwan CDC participated in WHO conferences and related activities, including attending the 64th World Health Assembly (WHA) as an observer, the 62nd Regional Committee for the Western Pacific and attended 5 technical meetings.
3. It joined 7 APEC Conferences, including the 2011 1st and 2nd APEC Health Working Group Meeting, and purposed a plan on “APEC Workshop on Influenza Vaccine Policy and Strategies in Post-Pandemic Era”
4. It participated in 42 international conferences, sending 67 staff overseas.
5. Taiwan CDC also published 81 papers in international journals, including 80 SCI papers.

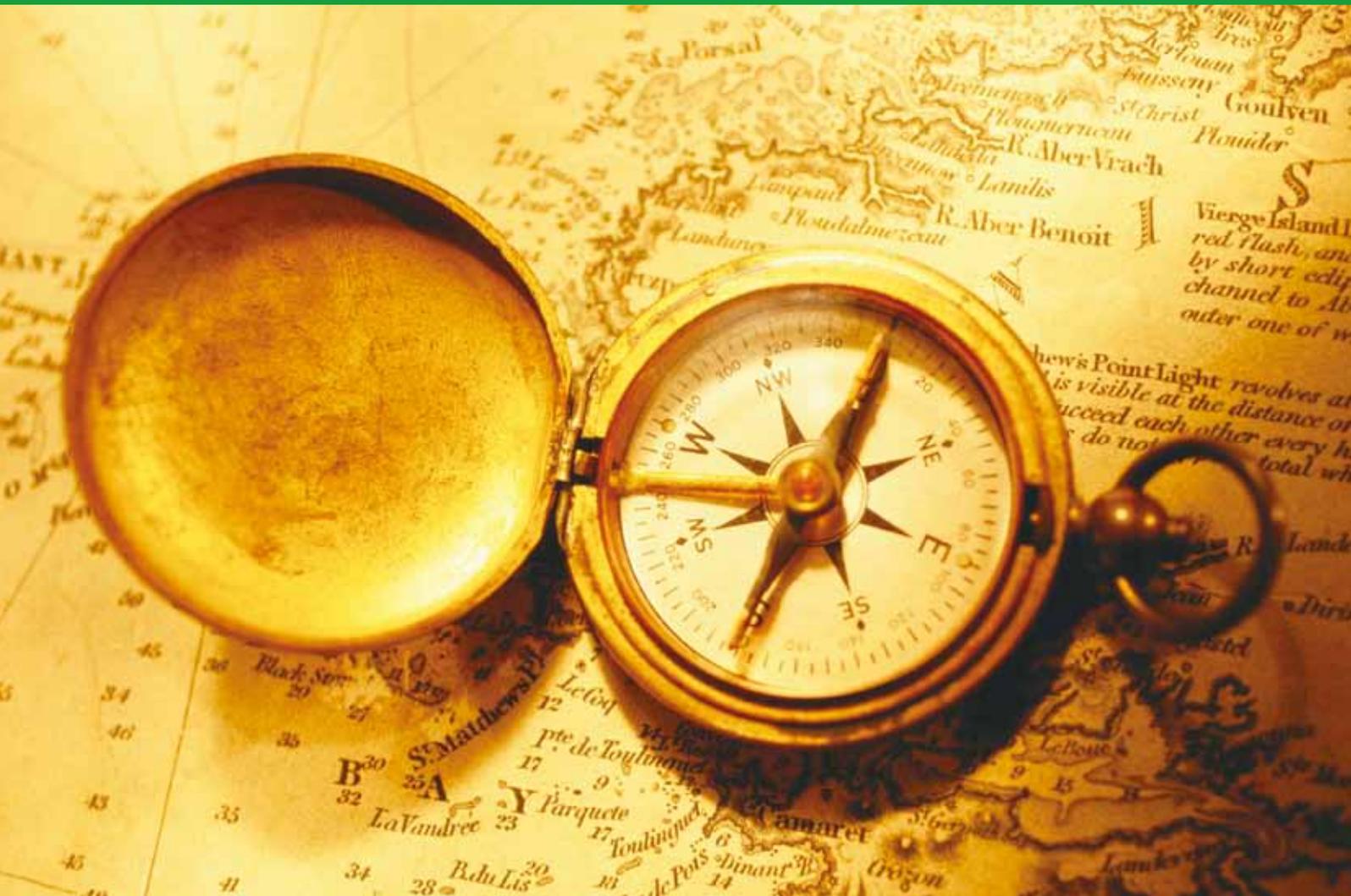
Future Prospects

Increasing international contact and transport have made global cooperation even more vital in the fight against communicable diseases. Taiwan CDC strives to strengthen cooperation with other countries and international health care institutes. Encouraged by the accomplishments of training and educational programs, Taiwan CDC will cooperate with other countries in forming a global surveillance network for the prevention and control of communicable diseases. In addition, the next stage for Taiwan CDC is to train personnel specializing in international public health and emerging infectious disease prevention and to seek full involvement in international communicable disease prevention projects. Future efforts include:

1. Continuing to participate in conferences or other events organized by international institutes and forums, including the WHO and APEC.
2. Establishing more bilateral or multilateral cooperation projects with other countries.
3. Taking part in international humanitarian relief efforts and dispatching more epidemiologists and experts to needy areas to provide disease prevention support.



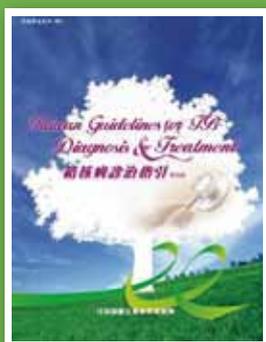
Publications



Publications



Atlas of Common Breeding Sites of Dengue Vector Mosquitoes



Taiwan Guidelines for TB Diagnosis & Treatment



Influenza Vaccine



Guidelines for Dengue Control



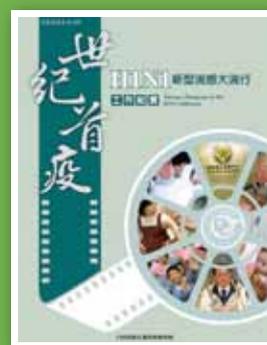
Minutes of 2011 Communicable Disease Control Expert Meeting



Manual for Infectious Specimen Collection



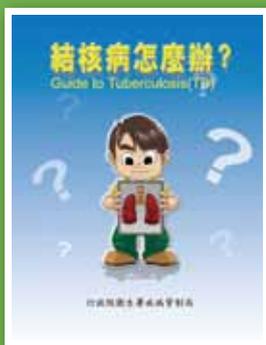
Strategy Plans for Execution of Influenza Pandemic Response



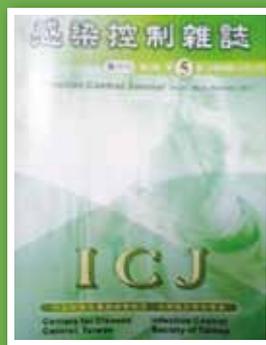
Taiwan's Response to H1N1 Influenza



Manual of Standard Operation Procedure of Communicable Diseases



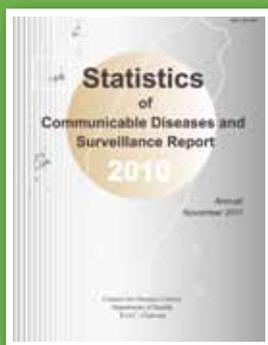
Guide to Tuberculosis (TB)



Infection Control Journal



CDC Annual Report



Statistics of Communicable Diseases and Surveillance Report



Taiwan Tuberculosis Control Report 2011



Taiwan Epidemiology Bulletin



Story of HIV-Infected Patients





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