CDC

Center for Disease Control, Taiwan

2005 Annual Report

Mobilized,

Informed, Professional

All-Involved

CDC

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2005 Annual Report

Highlights of activeities in 2004 and future prospects

Center for Disease Control, Department of Health, Executive Yuan

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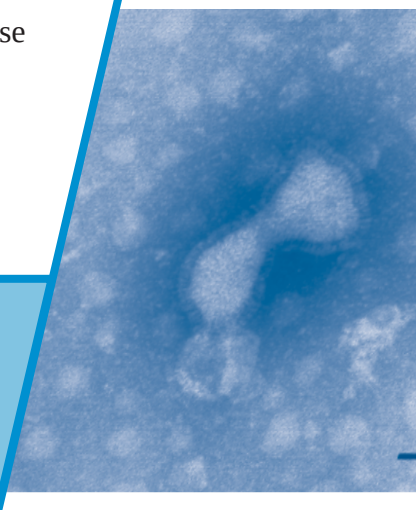
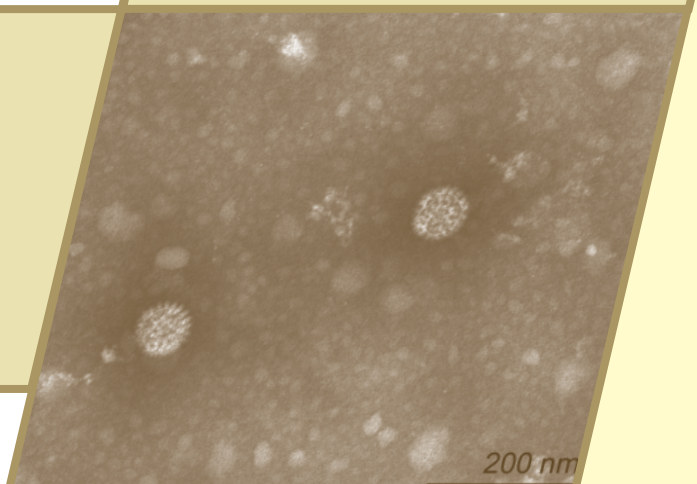




Message from the Director-General

Hello, everyone, welcome to the CDC annual Report 2005 and thank you for taking your time to know us better.

CDC is a leading public health agency in Taiwan and plays a key role in protecting Taiwanese people from infectious diseases. In this report, you will see CDC's outstanding team effectively working around the island to ensure a healthier environment for our people. In recent years, we have experienced several difficult battles, such as enteroviruses, SARS, etc., and up till now, our members have always stood firmly at the frontline to protect people's health.

In today's fast-changing world, newly emerging infections and the recurrence of indigenous communicable diseases have the potential to spread across borders. This greatly challenges our disease control capabilities as well as our access to contingency systems. Following the development of technologies and the globalization of information science, disease control must be more comprehensive, prompt, effective and international.

In1999, the CDC was established by merging the Bureau of Communicable Disease Control (BCDC), the National Institute of Preventive Medicine (NIPM) and the National Quarantine Service (NQS), under the Organization Law of the Center for Disease Control of the Department of Health, Taiwan. "Mobilized, Informed, Professional and All-Involved" is our motto to achieve the target of disease prevention. Moreover, dealing with unpredictable emerging infections, consolidating health resources and establishing disease surveillance systems are also the critical challenges of the 21st Century.

We have learned from our predecessors' experience that good preventive health measures should not merely focus on the disease control--sometimes taking steps to ease the public panic is more important. Taking SARS as an example, the hazard from the illness by itself was limited, but the impact on people's sense of security and the damage to the national economy were incalculable. As a result, we are developing a list of performance indicators to measure these goals. At the same time, we will continue to

recruit, train and retain the talented members to deliver CDC's health prevention programs. In the report, you will also see the progress we have made--CDC has become more efficient, effective and credible in serving Taiwan's people.

Meanwhile, with the frequent international exchanges, we realize that participating in international affairs is critical and necessary. As a member of the international community, we seek to accomplish our mission by working with partners throughout the nation and the globe to improve health services for the general public. In recent years, we have been actively participating in international activities, promoting bilateral and multilateral cooperation as well as providing international healthcare assistance to needed allies and organizations. We seize every opportunity to contribute our experiences in building up a better world and fulfill the vision of a healthy life for all.

In CDC, our extraordinary team workers constantly dedicate themselves to achieve outstanding results that we share with you in this report. I am encouraged and proud to serve as the director-general of CDC. I sincerely hope that you enjoy reading the report and continuously support us with your recommendations and feedback.

Steve, Hsu-Sung Kuo MD, MPH,PhD

Director-General

Center for Disease Control

General Information On Communicable Diseases

Table.1	Past-Year Major Disease Control Accomplishments in Taiwan

1. 1948-plague was eradicated.
2. Since 1948-Immunization program was implemented (1948 Diphtheria toxins, 1955-DPT, 1956-BCG. 1966-OPV, 1968-Japanese encephalitis vaccine, 1978-Measles vaccine, 1984-Hepatitis B vaccine, 1986-Rubella vaccine, 1992-MMR) to lower the incidence rate of the aforementioned communicable diseases.
3. 1955-Smallpox was eradicated.
4. 1959-Rabies was eradicated.
5. 1965-Malaria was eradicated.
6. 1984-Hepatitis B vaccination program was implemented, reducing the children-carrying rate by 84%.
7. 1995-Hepatitis A vaccination program was implemented, successfully eliminated the outbreak in the mountainous areas.
8. 1998-Influenza vaccination program for elderly was implemented, lowering the hospitalization by 54%.
9. 2000-Polio was eradicated.

General Information On Communicable Diseases

Background

Since the ancient times, diseases have never ceased to threaten humans. Fortunately, there were a group of forerunners who had fought gallantly against the enemy. Thanks to their sacrifice, numerous indigenous communicable diseases such a plague, smallpox, rabies and malaria (see Table 1) were successfully eradicated in Taiwan during 1948-1965.

The fight against communicable diseases is an ever-changing and fast-moving affair. To meet the challenges, the Center for Disease Control was established under the Department of Health by effectively merging the Bureau of Communicable Disease Control (BCDC), the National Quarantine Service (NQS) and the National Institute of Preventive Medicine (NIPM) in an effort to combine the disease control resources under one common for the more effective prevention of communicable disease.

To meet the challenges of disease control in the 21st century, the restructured Center for Disease Control has made “Prevention and control” the central thrust of its effort and geared its effort to the surveillance and research of communicable diseases. The CDC, under the command of the Director-General who, assisted by the Deputy Director-General and Secretary-General, commands the Planning Division, Infection Control Division, Emerging Infection Diseases Division, Quarantine Division, Prevention Division, AIDS and STDs Division, Immunization Division, Surveillance Division, Tuberculosis Division, Resources Management Division, Laboratory Research and Development Center, Vaccine Center, I nformation Management Office and six Branch Offices (see Table 2).

Currently, the Center for Disease Control has 787 employees, with an average age of 43.34 years. Of the staff, about 70% are under 49 years old, 86% have college degrees, and 19% have advanced degrees (see Figure 1 and Figure 2). With a team that combines credibility, vitality, and innovation,

the CDC is working hard to foster for the people of Taiwan an environment that is free from disease. In doing so, it counts on professional disease control measures, timely disease surveillance systems, state-of-art research, and innovative health publicity and education.

Achievements in Recent Years

Infectious Disease Prevention

In recent years, the CDC's energy for communicable disease control has been focused on enteroviruses and bacillary dysentery, dengue fever, AIDS, and tuberculosis.

In 1998, enteroviruses broke out in large scale in Taiwan, causing great panic in society. The Department of Health (DOH) immediately established a surveillance system and a medical consultation committee to deal with the problem. Then, the CDC started a movement to teach people the correct way for washing hands, enabling them to prevent the epidemic in their daily lives. As bacillary dysentery occurs more frequently among indigenous people, a plan was launched in aboriginal districts in 2001 to strengthen the control of dysentery through the joint effort of schools, churches, community volunteers, and local leaders. The achievement is remarkable.

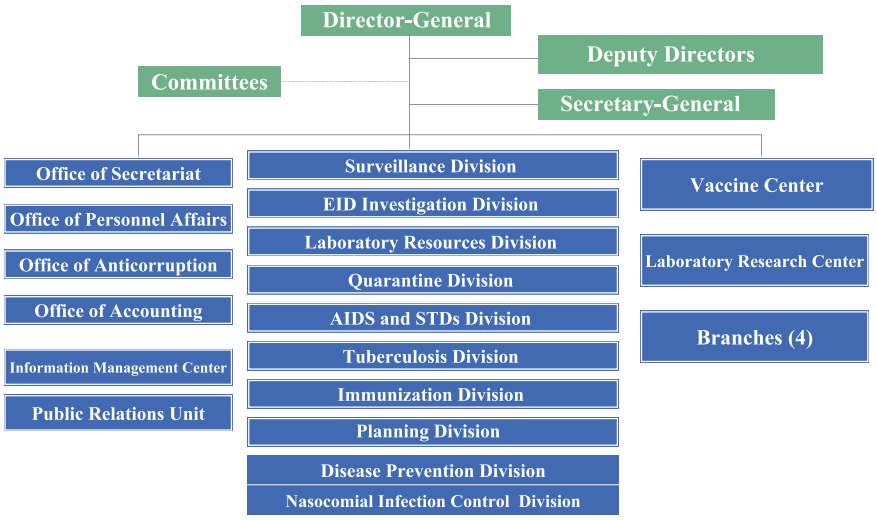
In the control of dengue fever, the CDC has strengthened the reporting by doctors and the general public and, at the same time, conducted a vector distribution survey in order to effectively control disease-carrying mosquitoes. It has also screened body temperature for inbound passengers at the airports and tracked the health state of passengers from Southeast Asia.

With regard to AIDS control, since the first case was reported in 1984, the CDC has taken measures to ensure safe blood transfusion and safe sex and strengthen the AIDS surveillance network. As a result, the spread of AIDS was much curbed, making Taiwan a low-infection country. Unfortunately, the number of reported cases surged 77% in 2004 over 2003 with a seven-fold increase of the infection among people sharing syringes. Now, the DOH is making plans on a cross-ministerial basis to jointly control the scourge of the century.

In Taiwan tuberculosis is the most notorious notifiable communicable disease either for the number of incidences or for the number of lives lost. Since November 2001, the CDC has used Web for registering reports on tuberculosis cases and for fatality check in an effort to make the reports more complete. At the same time, it strengthened the training of doctors working on the base level and intensified, through these doctors, the publicity of the advice: “See a doctor immediately, if the cough has lasted for three week.” This tactic has much improved the case reporting and management system for tuberculosis. Since 2002, it has tightened its case-tracking management by specifically assigning each case of tuberculosis to a public health nurse. Since 2004, the CDC has strengthened the horizontal integration of tuberculosis control by gearing the effort to the National Health Insurance Program. It mapped out a plan for providing better care to tuberculosis patients. To encourage patients to receive treatment, the Bureau of National Health Insurance (BNHI) waived the premium to be paid by tuberculosis patients effective in July 2004.

Table.2

Organization of CDC



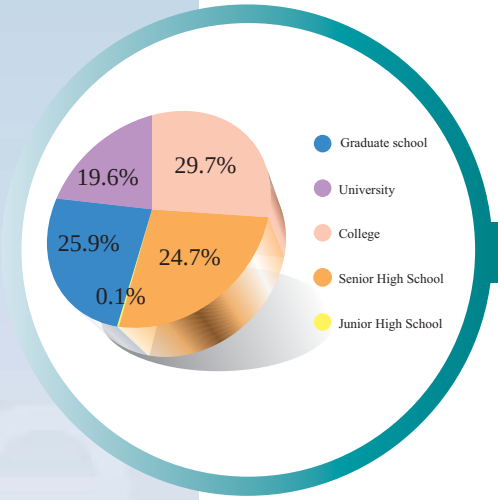


Figure.1 Employee Statistics Types of Degree

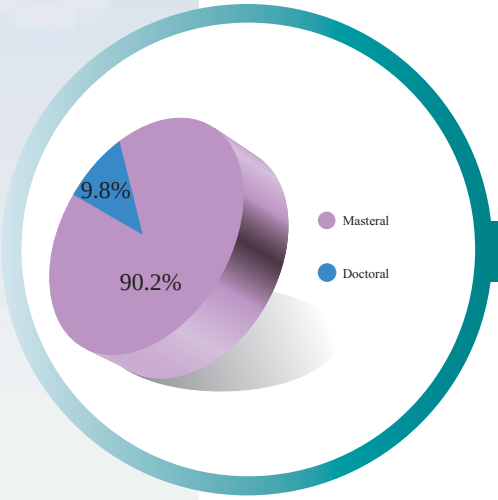


Figure.2 Employee Statistics Graduate Degree

In recent years, most of the emerging infections reported in the world are mutually communicable between animals and humans (for instance, the Hanta pulmonary syndrome reported in South America in 1993, the bird flu reported in Hong Kong in 1997, and SARS reported across the world in 2003). The CDC has placed the control of animal-human mutually communicable diseases at the top of its agenda. Its major tactics include formulation and implementation of policies, collection and analysis of materials, mobilization for the control the disease, proactive monitoring of world situation, preparation of perfect control plans, and cultivation of disease-control capacity through training and exercises. All these are intended to cut off the import of human-animal common diseases and their affection and spread for the protection of the health of the people.

In view of the shock caused by the SARS epidemic and in coordination with the Executive Yuan's preparations for total defense of the people, the CDC has consolidated its mobilization capability for epidemic control by integrating its efforts with medicinal mobilization, administrative medical mobilization, and contingent medical-care system. It has striven to ensure the people's safety by establishing a mutually supporting system under the government's all-people defense system.

Immunization

Taiwan has successfully reduced and even eradicated a number of communicable diseases through vaccination for babies. On October 29, 2000, the World Health Organization declared Western Pacific as a polio-free area, marking a final recognition of Taiwan's efforts made for so many years.

Taiwan is the first nation in the world in vaccination against Hepatitis B. After years' effort of the government, the number of Hepatitis B pathogen carriers has reduced from 10.5% to 1.7% of the population. The incidence rate of liver cellular cancer of babies is also decreasing remarkably. All these have attracted world attention. To treat Hepatitis B pathogen carriers and hepatitis C patients in the hope of cutting down the rate of liver cirrhosis and hepatoma, on October 1, 2003, the CDC launched a "Pilot Plan for Treating Hepatitis B and Hepatitis C patients under the National Health Insurance Program." Between October 2003 and the end of 2004, a total of 14,387 cases were registered, comprising 9,132 Hepatitis B cases and 5,255 Hepatitis C cases, making Taiwan the first country in the world to provide large-scale free-of-charge treatment for such patients.

Hepatitis A is more common among indigenous people living in the mountains. The DOH began to vaccinate the children in mountainous villages and nearby lowland villages in June 1995 and brought about good results. In the mountainous villages, the incidence rate of Hepatitis A plummeted from 108.59 cases per 100,000 people in 1995 to 0.5 cases in 2004. Researches revealed that most of the people under 30 living in Taipei City do not have Hepatitis A antigen. Therefore, publicity on Hepatitis A has been strengthened for this category of people in hopes that prevalence of the epidemic can be avoided.

Current State of Immunization

To prevent the outbreak and to curb the spread of the various communicable diseases, the government provides babies with routine immunizations, of which the items and schedules are shown in Figure 1.To facilitate the access to immunization and raise the rate of immunization, hospitals and clinics in various counties and cities are contracted to assist with immunization service. So far, there are more than 1,600 such contractual hospitals and clinics across the nation. In 2004, more than 4000 hospitals and clinics participated in the flu immunization program (including vaccination for children).

Attachment 1

Current Immunization Schedule in Taiwan

Age Vaccine	24 hr	2-5 days	1m.	2m.	4m.	6m.	9m.	12m.	15m.	18m.	24m.	27m.	30m.	6yrs yrs	≧65
BCG	BCG	HepB1													
Hepatitis B		HepB1	HepB2			HepB3									
Diphtheria,				DTP1	DTP2	DTP3				DTP4				Td	
tetanus, Pertussis Polio				OPV1	OPV2	OPV3				OPV4				OPV5	
Measles							MV								
Varicella								Var							
Measles, Mumps, Rubella									MRR1					MRR2	
Japanese Encephalitis															
Influenza						Influenza yearly									Flu yearly
Hepatitis A											HepA1		HepA2		

Surveillance

For early detection of a communicable disease and adoption of control measures, the CDC has established an all-faceted monitoring network by marrying its epidemic-control tactics with modern information technologies.

The current surveillance systems for communicable diseases include the “Notifiable Disease Surveillance System,” “Syndromic Surveillance System,” “Sentinel Surveillance System,” “School-based Surveillance System,” “National Nosocomial Infection Surveillance System,” “Symptom Surveillance System,” “Surveillance System for Populous Institutions,” and “Geographic Information System.” To make them more effective, these systems have established sub-systems targeted on different categories of users and community groups.

On the basis of the concept of " general mobilization for epidemic control, " the CDC has also set up an around-the-clock toll-free hotline for people to make reports and " Hotline 1922 " for people to inquire about the problems of disease control.

Infection Control

Network for infectious disease control and treatment

The CDC has developed an "Online Hospital Referral and Bed Management System for Patients of Infectious Diseases " for hospitals to make online enquiries and assignment of beds. When an infectious disease breaks out, the CDC can start the infectious disease control hospitals at all levels according to the gravity of the situation and make use of the online referral system to refer the patients to the rightful hospitals and to seek beds for them.

The CDC has established an "Infectious Disease Command Center " each in northern (including Taipei), central and eastern Taiwan, and the Kaohsiung-Pingtung district. Each command center is made up of representatives of the local health bureaus and medical centers. The commanders and deputy commanders of the centers are charged with infectious disease control and the establishment and improvement of negative-pressure hospital wards in their respective areas. When an infectious disease breaks out, the various hospitals for infectious disease control are started by the command centers in accordance with the need of the time and locality.

When SARS hit the world in 2003, people began to recognize once again that hospital control of infection is a vital link in the control of an epidemic. Just in case, the DOH added trengthening the control of infections " to the list of the global budget for expense growth adopted for various medical agencies under the National Health Insurance Program. It also mapped out an implementation and supervision plan at the beginning of December 2003. After thorough discussions among concerned government agencies, academics and specialists, the plan was launched on February 4, 2005.

Enforcement of plan in different districts

According to article 45 of the Medical Treatment Act formulated in 2002, a hospital shall establish a hospital infection control system and a lab test quality control system, which are subject to review and evaluation. This is also provided for in the Enforcement Rules of the Medical Treatment Act. Article 41 of the Enforcement Rules provides that according to Article 45 of the Medical Treatment Act, a hospital shall establish a medical test quality control system. In pursuance of these provisions the CDC formulated a "Regional Guidance Plan for the Control of Hospital Affection" in an effort to help hospitals improve their medical quality, protect public health, and save medical resources. Under the plan, 122 hospitals and clinics across the nation received its guidance in 2002 and 195 more in 2003. Three years later, infection control business of various hospitals were put on the right track. By 2004, the emphasis was shifted from guidance to survey.

Laboratory Research

In addition to tightening internal control, the CDC collaborated with the US Society of Pathological Medicine, the WHO laboratory in Melbourne, Australia, and the US Center of Disease Control for the improvement of lab tests. As for the frightful enteroviuses, the CDC has used state-of-art biotechnology to develop enterovius 71 vaccines. To cope with the import of the infection by arachnidan, it has established Asia's largest center of yellow viruses.

Health Publicity and Education

It established a virtual magazine, a virtual station, and 15 color signboards across the island. Up to now, people throughout Taiwan can get animated color messages on disease control. Besides, it has set up a “digital museum,” a “children's website,” and a “game website” for children, parents and teachers to download any time the disease-control information laboriously designed by CDC.

Disease-control Diplomacy

Although it has been isolated from world organizations since 1972, Taiwan has never ceased to dispatch medical teams to offer humanitarian assistance, provide medical materials, make financial donations to medical activities, conduct medical trainings, and give technical support. In addition, it has followed the APEC model of cooperation in the surveillance of communicable diseases and in other international health activities.

2004 Focus

Influenza Pandemic Preparedness in Taiwan

Influenza Pandemic Preparedness in Taiwan

Background

Three influenza pandemics hit the world in the twentieth century, in 1918, 1957 and 1968 respectively. The 1918-19 pandemic took a toll of 20-40 million lives; the 1956-57 pandemic in Asia killed more than one million people, the 1968-69 pandemic claimed 700 thousand lives, also in Asia. In 1997, H5N1 avian influenza virus hit Hong Kong, registering 18 cases involving 6 deaths, a fatality rate over 30%. Since, the world has heightened its alert on the next influenza pandemic. Between 2004 and 2005, many Asian nations were attacked by high pathogenic avian influenza (H5N1). Later, the attack on humans was continuously reported in Vietnam, Thailand, Cambodia and Indonesia, which had a fatality rate as high as 50%. There were even reports of limited human-to-human transmission communication of the disease.

In Taiwan, the surveillance on avian flu is in the charge of the Council of Agriculture, which keeps tabs on hogs as well as birds, chickens, ducks, and geese. But between December 2003 and March 2004 only low pathogenic H5N2 was detected, destroying 370,000 domestic poultry. Fortunately, no sign of high pathogenic H5N1 has ever been discovered.

Taiwan's Center for Disease control(CDC) has built multiple sultiple survellance systems to detect human avian flu case and unusual cluster of influenza-like illness. Furthermore, 12 virology laboratories belongong to medical centers have joined the laboratory surveillance system, which offer more information about influenza activity. By the way of aggressive surveillance and case investigation, so far there is no human avian influenza case in Taiwan.

Although H5N1 has not yet made effective human-to-human transmission, it has become an endemic in certain regions, indicating the condition for a pandemic is gradually taking form. In the next few years, the avian flu currently hitting Asia threatens to trigger a pandemic.

Goals and Strategies

In 2004, Taiwan completed its preparedness plan and established a intra-ministerial mechanism for influenza pandemic. The plan was built on the framework of three strategies and four defense lines.”

Three Strategies: flu vaccine, anti-viral medicines, and public health intewentions.

Flu Vaccine

To ensure an ample supply of vaccine during the pandemic, Taiwan is seeking to develop the technology for making its own vaccine. It is expected that within seven years Taiwan can acquire the capability of making the vaccine domestically. Because it still counts on international procurement for the vaccine, Taiwan will continue to monitor the international progress of the development and production of the vaccine.

Anti-viral medicines

Currently, free antiviral medicines are offered to the following people:

(1) Those sampling cases who have clinical symptoms and epidemiology-related conditions

(2) Patients having rapidly deteriorating pneumonia

(3) People having high risks of developing complications

(4) People involved in cluster flu-like cases

The stock of antivirals will be increased, in accordance with the world situation, for being used by suspected patients and high-risk people.

Public health interventions

Before an ample supply of vaccine and antiviral medicines are available, non-medical intervention provides the major protective measures, including surveillance, quarantine, self-management of health, personal hygiene, survey, disinfection, lab examination, and control of hospital infection, et.al..

Four defense lines: off-border battle, on-border quarantine, control in community, and normal operation of medical system

First defense line – off-border battle

Currently, the main battlefield lies in the Chinese mainland and Southeast Asia, and therefore containment against the spread of the disease by air and sea transports has become the consensus of the world's public health circles. The basic approach is to grasp the information abroad and learn the experience of foreign nations. For instance, if an emerging infection is reported abroad, Taiwan should help the country to control the nascent outbreak.

Second defense line – on-border quarantine

To prevent the import of avian influenza, Taiwan should carry out quarantine work at its airports and seaports and provide the international travelers with information about the risks of

avian influenza. Measuring body temperatures with infrared thermal monitors has been conducted routinely at the international airports and seaports. All passengers found running a temperature or having the symptoms of pulmonary disease are subjected to further examination. If it is determined that H5N1 virus can pass between humans efficiently, passengers coming from affected areas will be required to conduct self-health-management for 10 days including taking body temperatures twice a day and reporting the readings to local health authorities.

Third defense line -control in community

Hygienic management in the place of avian flu occurrence is a vital link in community control now, which is being carried out jointly by public health and agricultural agencies. All those working in the destruction of infected poultry are required to receive thorough cleaning and disinfection and to take anti-virus medicines as well as undergoing self-health-management for 10 days. This is intended to avoid re-assortment of avian virus genes and human efficiently genes which creates new viruses.

Once the novel flu virus is determined, measures will be taken to keep it in limitted area" and prevent the virus from large-scale spreading in the community. Other measures to be taken are quarantine and control of activities in the community.

Fourth defense line – normal operation of medical system

The failure of hospital defense during the rage of SARS has caused great panic. When an epidemic breaks out, hospitals become the last line of defense, which must be kept intact for normal functioning. Since the rage of SARS, Taiwan has strengthened its capability of preventing nosocomial infection and established a medical network for the control of infectious diseases. This network comprises two national-level hospitals, six regional hospitals, and 18 county and city level hospitals. If a novel flu breaks out, these hospitals will be activated to deal with the disease according to the need at the time so that other hospitals can function as usual and avoid nosocomial infection.

Achievements

1. On December 29, 2004 DOH declared novel influenza virus infection a legal communicable disease. The declaration covered the definition of the disease and the level of prevalence to empower the DOH and the county and city health departments to take compulsory measures according to Communicable Disease Control Act during Pandemic.
2. A total of 450 hospitals were designated as sentinel for novel influenza sampling". They will actively monitor infections and when they find a patient meet the sampling criterion, they will immediately take the specimens, notify the health authorities, and treat the patient using antiviral medicines.
3. The DOH has stockpiled antiviral medicine for 0.4% of population to cope with the need of a major breakout.
4. On the basis of the experience learned from SARS control and the WHO proposed strategy, the CDC has mapped out specific plans for infectious disease surveillance, quarantine, case investigation, laboratory examination, hosocomial-infection control, and health-management procedure These plans have already been put in force.
5. Workers at the poultry farms have been listed as targets for free seasonal vaccination in order to avoid the re-assortment of human and avian virus genes.

Vision

Because Taiwan is not a WHO member, if avian flu breaks out in a large scale, whether Taiwan can obtain equitable allocation of disease-control resources or not is not known. This is to say the challenges for Taiwan will be much stern. It is hoped that the technology for the development of vaccines against novel influenza virus will become more mature and that Taiwan can start to procure new vaccines or develop its own. If influenza pandemic occurs, Taiwan can rely on its current preparedness to reduce the number of infection and its impact on society.

I. Sampling Criteria of Novel Influenza

Patient with clinical symptoms and epidemiology-related conditions

Clinical symptoms (any)

◇ Meet the definition of flu-like illness

◇ Pneumonia by x-ray

◇ Conjunctivitis

Epidemiology-related exposure 10 days before onset (any)

◇ Domestic: contact with birds/livestock (or fecal matter) or novel influenza suspected case

◇ Abroad: ever being in a place where transmissions between people or between animals and human have occurred in the latest 3 months.

◇ Engaging in experiment on avian influenza virus

II. Patients with rapidly deteriorating pneumonia of unknown causes

Table: Grade of influenza pandemic

Grade	When it is graded
O	H5 or H7 avian flu virus detected domestically or high pathogenic avian flu infection established abroad 1. Domestic poultry infected by low pathogenic influenza 2. Domestic poultry infected by high pathogenic influenza
A1	Case of human-to-human transunission of novel influenza confirmed abroad
A2	Suspected case of animal-to-human, imported, or infected in the laboratory found domestically
B	Cases of human-to-human transunission confirmed domestically
C	Large-scale outbreats of human-to-human transunission dosmestically

Figure 1: Simpling organization for novel influenza

Figure 2: Guidelines for influenza pandemic

Emblem of sampling organizations for novel influenza Denotation of emblem:

1. Configuration of the emblem for central organizations: The emblem features the initials of CDC at the center which is flanked by flu combatants, who hold a shield in one hand and a syringe in the other, suggesting that the CDC is fighting against the flu through the medical institutions.
2. Outer perimeter: It takes the form of C, representing the CDC, and carries the name of the medical institution.

Establishing multi-surveillance systems

Goals and Strategies

Achievements

National Disease Surveillance Systems

National Disease Surveillance Systems

Vision:

The vision of National Disease Surveillance Systems is to monitor the health of the nation and to detect outbreaks rapidly by integrating various infectious disease surveillance networks.

Mission:

The mission of National Disease Surveillance Systems is to:

1. Construct diversified disease surveillance systems.
2. Collect and monitor data for disease trend analyses, disease prediction and disease alert.
3. Provide the analysis and assessment for global and indigenous infectious diseases regularly.

Background

In July 1999 when Taiwan CDC reorganized, the National Disease Surveillance Systems began with notifiable diseases surveillance and sentinel surveillance to detect epidemics. Later on, several systems were built up to help collect timely, complete and precise information of infectious diseases.

Establishing multi-surveillance systems

1. **Notifiable Diseases Surveillance System:** The first stage of web-based version of Notifiable Diseases Surveillance System was accomplished in July 2001, which enabled easier and more complete to transfer the reporting information.
2. **Syndromic Surveillance System:** The system was implemented as a pilot project from July 2000 to December 2001. Several disease syndromes such as acute neurological system syndrome, acute jaundice syndrome, acute hemorrhagic fever syndrome, acute diarrheal syndrome, and acute respiratory syndrome could be reported to Taiwan CDC via this system. In the beginning, the disease syndrome reporting was limited to only five medical centers. Since the system has proved to be effective, it has expanded to include nearly 200 district hospitals, regional hospitals, and medical centers in August 2002. The purpose of this system is to detect emerging and reemerging infectious diseases by reporting severe suspected infectious cases with unknown causes, and also intends to improve the deficiency of traditional surveillance system.
3. **Sentinel Surveillance System:** This system was established in 1989, participated voluntarily by representative medical practitioners in small towns and cities. Sentinel physicians report the number of outpatients suspectly infected with chickenpox, diarrhea, flu-like illness, hand, foot and mouth disease, and herpangina. The system has several features: (1) it evaluates the impact of the reported diseases on people's health; (2) it assesses the efficiency of various plans mapped out for controlling infectious diseases; (3) it establishes the basic database for endemic diseases; and (4) it establishes the forecast of the trend and prevalence of infectious diseases.

4. **School-based Surveillance System:** In consideration of students' frequent interaction lead to rapid spread of infectious diseases, CDC endeavored to establish this surveillance system since 2001. Teachers and school nurses participating the project report the number of sick students and specify the number of cases in flu-like illness, chickenpox, mumps, hand, foot and mouth disease, herpangina, diarrhea, fever, and other infectious diseases weekly.

5. **Symptom Surveillance System:** This system was established in 2003 to early detect the suspected cases of SARS and novel influenza included in 2004. The diseases to be reported include pneumonia with unknown causes and flu-like illness. It may report on any diseases that meet the criteria of taking specimens. In addition to clinical symptoms, doctors are reminded of the need to take note of the contact history, travel history, and occupation of the patient.

6. **Surveillance System for Populous Institutions:** This system was established in 2004 for early detection of the infectious diseases clusters of occupants and staff (including temporary workers) in densely inhabited institutions. These institutions include the elderly hospices, long-term care facilities, elderly apartments, institutions for disability, protectories, reformatories, veterans' homes, prisons, nursing homes, day-care centers for mental recovery and so on. Since September 2004, these institutions have been required to report once a week, but if a legally defined case (including respiratory and intestinal symptoms) happens, the organization must report within 24 hours.

7. **Information Collection System for Infectious Diseases:** This system was established mainly for sorting out the latest international epidemic information every day and communicating them to our relevant divisions for undertaking suitable control measures if necessary. The information is simultaneously posted on the web site and can be accessed by general publics. Sources of the information include WHO, the websites of various nations' health departments, letters from diplomatic organizations, public health and epidemiological magazines, newspaper websites, television, Internet and other media. Taking advantage of the rapid publicity of the media and the accuracy of official reports, potential crisis can be evaluated early to prompt necessary moves.

8. **Disease Reporting and Consulting Center for General Public:** Whereas the experiences of the SARS outbreak during April to July in 2003 showed that in an epidemic, the disease control personnel were often disturbed by media interviews, answering phone calls and administrative business so that lost concentration on stamping out the epidemic. Hence, this center was established to provide the public with timely and complete consultation services.

Goals and Strategies

Enhancing the operational effectiveness of various surveillance systems

1. Establishing management and analysis supporting systems:

A. Geographical information system (GIS) was used in conjuntion with the Notifiable Diseases Surveillance System, Syndromic Surveillance System, and the Sentinel Surveillance System for epidemic analysis as well as for disease prediction model, which represented disease distribution in wave movement.

B. For providing the newest disease epidemic curve, Electronic Bulletin System (EBS) was designed to gather data from different systems or databases simultaneously, analyze the data and renew the tables or figures automatically through a single interface. The strengthened function enables users to timely view the information corresponding to the epidemic.

C. To cope with the global outbreaks of new diseases, the original "SARS Hospitalization and Management System" and "SARS Tabulation and Analysis System " were renamed the "Emerging Infectious Diseases Hospitalization and Management System" and "Emerging Infectious Disease Tabulation and Analysis System" respectively, and novel influenza was added into the system in December 2004. CDC is continuing to strengthen its capacity of flexible application for emerging infectious diseases.

2. **Reporting via the Web:** To make the surveillance operation more effective, Taiwan CDC has established various web pages on its systems for users to upload information.

3. **Adding the warning function:** The functions of warning and "timely checking of high-risk groups" were added to the web version of Notofiable Disease Surveillance System in 2004. Messages through mobile phone regarding important infectious diseases and cluster cases are provided so that prompt action can be taken.

4. **Integrating the systems:** To facilitate data analysis and make it more effective, Taiwan CDC has tried to integrate its various systems. Effective integration has already been completed for Symdromic Surveillance System, Symptom Surveillance System, and Notifiable Diseases Surveillance System.

5. **Exchanging information:**

A. Besides collating the updated endemic data from the Sentinel Surveillance System, the following weekly reports are published and distribute to sentinel physicians, school nurses, and other related personnel for reference. To increase visibility, the contents of the Weekly Reports are posted on the web. Weekly Reports include Sentinel Surveillance Weekly Report, the school-based Surveillance Weekly Report, and the Influenza Express.

B. To effectively utilize the surveillance materials, Taiwan CDC collaborates with the academic to conduct research projects every year.

C. Due to the close relations between the distribution and spread of infectious disease cases, pathogens and geographical factors, Geographic Information System (GIS) was often used to analyze the spatial and epidemiological data for further application and research worldwide. Although GIS has been widely developed in disease distribution or the application of map display, it still need more advance research in correlation of disease and spatial data in Taiwan. Since the disease surveillance system is close to the disease prediction and GIS, CDC organizes symposiums of 'Disease prediction model and GIS' regularly for professionals and CDC staffs to exchange opinions and provide a better understanding and application to GIS.

6. **Broadening the use of information:**

A. Both English and Chinese versions of the GIS epidemic inquiry system were completed

in December 2004. This system has increased the understanding of epidemic control in Taiwan to foreigners.

B. A daily updated information bulletin of the domestic and international epidemic has been established and broadcasted through the following systems: (1) the LED systems of the CDC offices and branches, (2) the system of DOH media center, (3) the specially integrated system of CDC's world wide web and SARS information integrated network. Besides, CDC uses e-mail to forward daily information to the Straits Exchange Foundation (SEF), Council of Agriculture, National Security Bureau, Class-A Tourism Agencies, Tourism Association, international airline companies, health departments of city and county governments.

7. **Conducting training and education:** Every year Taiwan's CDC offers educational training to users of various systems for absorbing new information of epidemic surveillance.

Achievements

1. Notifiable Disease Surveillance System:

In 2004, there were 2,796 notifiable disease cases that were required for reporting within 24 hours, of which 2,743 were reported timely, accounting for 98.1%, which is higher than the rate of 96.5% in 2003. In the same year, the average rate of completeness nationwide was 87.5%, also higher than the 2003 rate of 85.9 %. The following table shows the reported/confirmed case numbers of notifiable diseases in Taiwan in 2004:

2. Syndromic Surveillance System:

The system includes 179 regional hospitals currently. In 2004, there were 885 reported cases, comprising 101 acute hemorrhagic fever syndrome cases, 268 acute respiratory syndrome cases, 230 acute neurological system syndrome cases, 245 acute jaundice syndrome cases, and 41 acute diarrhoeal syndrome cases. Except the acute hemorrhagic fever syndrome cases, which were reported mostly in eastern Taiwan, other syndromes were reported most in northern Taiwan. Except for the diarrhoeal syndrome cases, most cases were over 60 years of age. As for the acute neurological system syndrome cases, most occurred in the 0-9 and over 60 age groups in a U-shape distribution. The other syndrome cases tended to increase with age, but the increases were varied. The monthly incidences were shown in Figure 1. There was no obvious peak of incidences for acute neurological system syndrome and acute diarrheal syndrome, but the acute respiratory syndrome cases surged in March, whereas the cases of acute jaundice syndrome peaked in July and August, and the acute hemorrhagic syndrome cases were reported more freguently in the second half of the year than the first half of the year.

About 19.5 %(173/885) of reported cases were found positive in CDC laboratory tests. The positive rates were 11.9% (12/101) for acute hemorrhagic fever syndrome, 24.6% (66/268) for acute respiratory syndrome, 21.7% (50/230) for acute neurological system syndrome, 16.3% (40/245) for acute jaundice syndrome, and 12.2% (5/41) for acute diarrheal syndrome. To sum up, the major achievements of the syndromic surveillance

Table 1. Numbers of Notifiable Diseases in Taiwan in 2004

Diseases	2004	
	Reported cases	Confirmed cases
Food/Water-Borne Diseases	**1059**	**620**
Cholera**	1	1
EHEC (Enterohemorrhagic E. coli infection)	8	0
Typhoid fever	93	38
Paratyphoid fever	72	19
Shigellosis	232	156
Amoebiasis	233	96
Acute flaccid paralysis	63	56
Enteroviruses infection complicated severe case	148	49
Acute Viral Hepatitis A	209	205
Vector-Borne Diseases	**3783**	**852**
Dengue fever	1421	427
DHF/DSS (Dengue hemorrhagic fever/Dengue shock syndrome) *	7	7
Malaria**	18	18
Japanese encephalitis	319	32
Scrub typhus	2018	368
Respiratory Diseases	**27181**	**18094**
Meningococcal meningitis	38	24
Measles	36	0
Pertussis	190	21
Scarlet fever	1254	759
Legionellosis	1342	105
Rubella	48	4
Open pulmonary tuberculosis	12225	10523
Tuberculosis (except Open pulmonary tuberculosis)	11936	6619
Haemophilus influenza type b infection	71	20
Influenza severe case	41	19
Other Diseases	**672**	**608**
Hemorrhagic fever with renal syndrome*	3	3
Tetanus	16	0
Acute Viral Hepatitis B	379	378
Acute Viral Hepatitis C	195	195
Acute Viral Hepatitis D	12	12
Acute Viral Hepatitis E	36	18
Unspecified Acute Viral Hepatitis	29	0
Leprosy	5	5
Syphilis*	5209	5209
Gonorrhea*	1978	1978
HIV Infection*	1570	1570
AIDS*	260	260

1. * includes only confirmed cases

2. ** confirmed cholera and malaria cases were imported

system in 2004 were as follows: (1) one confirmed dengue case was detected by acute neurological system syndrome, demonstrating the effectiveness to detect cases with specific clinic symptoms; (2) 47% (15/32) of Japanese encephalitis confirmed cases were detected in reports of acute neurological syndrome in the early stages of its prevalence, showing the effectiveness in advance warning; (3) of the159 specimens tested positive, more than two pathogens were detected in twelve specimens, demonstrating that this surveillance system had the distinguished characteristic of a broader scope of performance.

3. Sentinel surveillance system

Similar to previous years, the major peak of flu-like epidemic in 2004 appeared in winter with a small wave in summer, and enteroviral epidemic peaked in spring and summer. Unlike previous years, a major wave of enteroviral epidemic appeared in early winter in 2004. Chickenpox epidemic was in the interval between winter and spring; diarrhea prevailed in winter. (Figure 2)

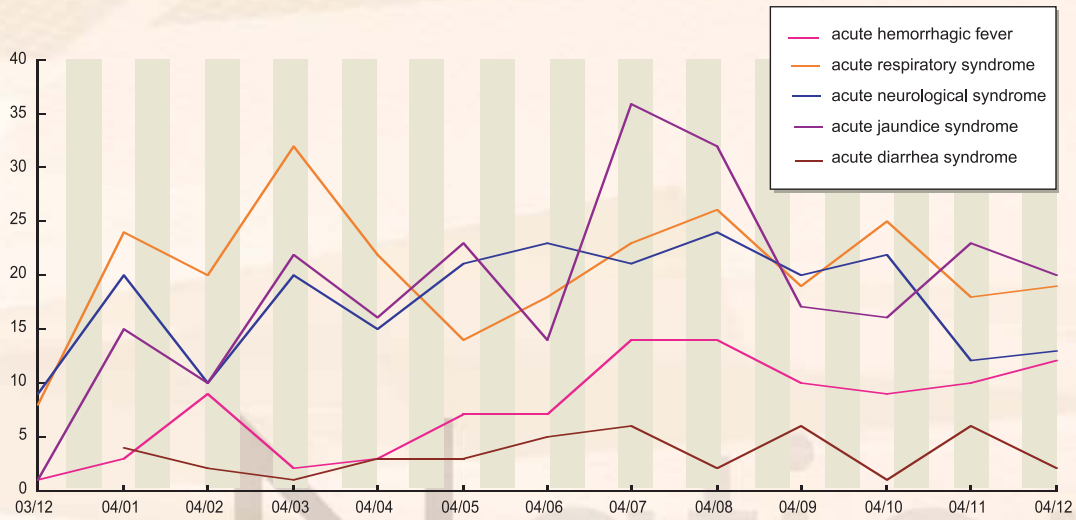


Figure 1: Reported Case Curves from 2004/3/12 to 2004/4/12 in Taiwan

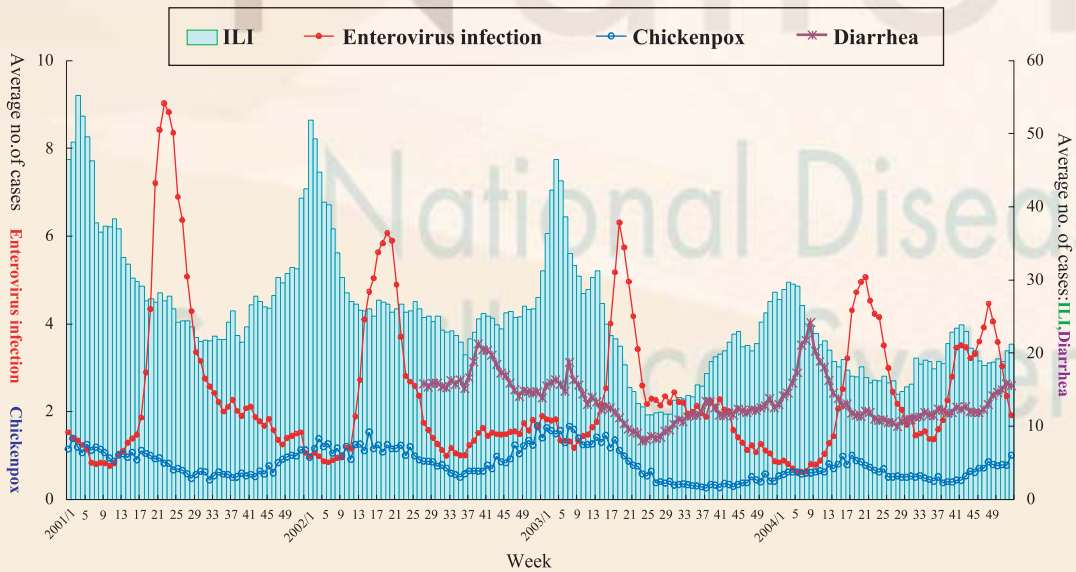


Figure 2: Trends of sentinel surveillance diseases in Taiwan, 2001-2004

4. School-based surveillance system

At present, 449 primary schools have participated in the school-based surveillance system, which monitors 37,000 pupils. Due to the promotion of this system, the pupils' sick leave proportion has increased nearly 12%, which indicating this system effectively increased the attention to the prevention of infectious diseases in schools. Besides, the information of flu-like illness, hand, foot and mouth disease, and herpangina were compared each week with data obtained from other surveillance systems (Figure 3), and data were sent to CDC's officers for evaluation. After the school-based surveillance system was implemented, 46 clusters were received, mainly the clustering of influenza. By comparison, the trends found on the system with regard to flu-like illness, hand, foot, and mouth disease, and herpangina were similar to the findings of Sentinel Surveillance System. This system has accurately reflected the prevalence of infectious diseases among school pupils and the findings can be used as a major reference for evaluating epidemics in the prevalent season.

5. Symptom surveillance system:

In 2004, 1,323 specimens were taken from patients infected with pneumonia of unknown causes, of which 225 came from high-risk groups and 1,098 from low-risk groups. Thirty-seven specimens from the high-risk groups were tested flu positive compared with 121 positive from the low-risk groups.

6. Surveillance System for Populous Institutions:

About 1,500 institutions have participated in this surveillance system, involving 140,000 occupants and staffs. From September 1st to December 2004, 259 persons were reported for suspected respiratory infections, 36 for intestinal symptoms, and 17 clusters.

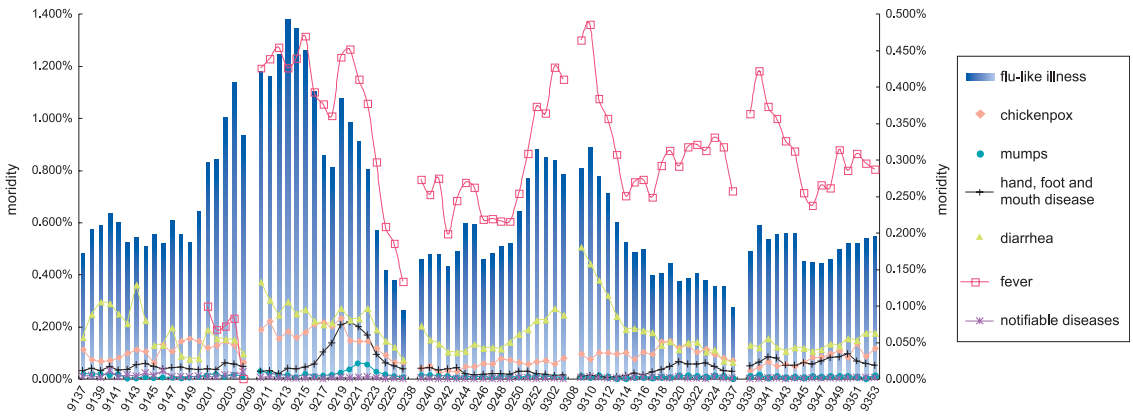


Figure 3: Weekly statistics on infection rates of disease in Taiwan as reported by school-based surveillance system, Sep 8,2002 (37 weeks) to Dec.8,2004 (52 weeks)

Notes:
1. Infection rate = infectious student number / total weekly attendance x 100
2. 2004 participants were 451 primary schools and their kindergartens
3. In 2002, 51 weeks were conducted in Pingtung City; in 2003, ever" was included for reporting from the ninth week.
4. In the 17th week, 2003, Hoping Hospital was isolated for SARS infection, causing panic in society and suspension of classes in schools
5. Please see left-hand Y-axis for flu-like illness, and right-hand Y-axis for other disease.

Infections Control

Hospital Infection Control

Infectious Disease Prevention Network(IDPN)

History

The duty of controlling infections was passed to the Bureau of Disease Control, DOH on August 5, 1998. It was later transferred to the Bureau of Medical Affairs DOH, and then to the Center for Disease Control. On May 1, 2000, "Hospital Infection Control Section" was established under the Epidemic Division. When the CDC was restructured in May 2001, the Epidemic Division was renamed the "Division of Disease Surveillance and investigation" No original section was in place for the control of hospital infection. On March 1, 2004, the CDC was restructured again and the "Infection Control Division" was set up. After the constituent statue of the CDC was approved in the Legislative Yuan in June of 2004, the "Infection Control Division" was officially established on July 1, 2004.

Hospital Infection Control

1. Goal

To ensure better control of hospital infection, reduce the incidence rate of nosocomial infection, promote the quality of medical service, and perform the establishment of fever-screening stations to assure the patients' right and protect the health care workers from infections.

2. Achievements

a. NNIS (National Hospital Infection Surveillance System) has maintained the functions of the existing hospitals and those of the infection surveillance system and increased the surveillance on special bacteria and their drug-resistance including: PDRAB, PDRPA, PDRSM, ESBL, VRE, VRSA, Imipenem resistant *Acinetobacter baumannii*, Imipenem resistant *Klebsiella. pneumoniae, Imipenem resistant Pseudomonas. aeruginosa*, and MRSA.

b. Hospital Infection Control Policy

(1) Strengthen the plan for infection control by improving the global budget system for hospitals contracted by the Bureau of National Health Insurance.

When SARS hit the world in 2003, people began to recognize once again that the control of hospital infection is a vital link in the control of an epidemic. The DOH included an infection control strangthening surchange into the list of the global budget, a system of expense control for various medical agencies joining in the National Health Insurance Program. It also mapped out an implementation and supervision plan at the beginning of December 2003. After thorough discussions among representatives of concerned government agencies, academics and specialists, the plan was put in force on February 4, 2005.

(2) District-by-District Guidance

In 2002, the Division of Infection Control urged the hospitals to establish a hospital infection control system and a medical test quality control system for review and evaluation. Article 40 of the Enforcement Rules of the Medical Act stipulates that a hospital shall set up a hospital infection control system in accordance with Article 45 of the Medical Act. Article 41 of the Enforcement Rule also requests the establishment of a quality control system for medical test.

To ensure good medical quality, protect people's health, and save medical resources, the CDC drafted a guidance plan for regional hospitals. When the plan was launched in 2002, 122 hospitals followed the guidance. In 2004, three years after the plan was in force, infection control in hospitals and clinics was running on the right track.

(3) Guidance and Evaluation of Hospital Infection

(a) Infection Control Guidelines for clinical management of humans infected by Avian influenza

(b) Handbook of SOP Infection Control in Dental Office

(c) Infection Control Guidelines for Surveillance of Sterilization

(d) Infection Control Guidelines for Respiratory Units

(e) Infection Control Recommendation for Norovirus Practices

(f) Infection control Guidelines for mass population

(g) Infection Control Guidelines for Psychiatry Hospital (Sanatorium)

(4) Education

(a) For Specialty of Infection Control: Holding discussions on infection control in the wards of respiratory diseases and on infections in psychiatric hospitals (sanatoriums)

(b) For all health care workers: Discussion on the practice of hospital infection control

(5) Anti-microbial Agents Monitoring-NHRI (National Health Research Institutes): The CDC had preliminary contact with Dr. John Amis Jernigan and Dr. Sophia V Kazakova of the US Center for Disease Control regarding the second executive plan of the cooperation on public health and preventive medicine between Taiwan and US.

(6) Control of Infection Outbreaks

(a) Statistics on pathogens of clustering infections: 233 persons were infected and 38 tested positive (for the period between July 1 to December 31, 2004)

Pathogen	Clustering (%)
Norovirus	5 cases (83.4%)
Flu-like virus	1 case (16.6%)
Total	6 cases (100%)

(b) Statistics on clustering infections:

	Norovirus (%)	Flu (%)
Hospital	2 cases (40)	1 case (100)
School	1 case (20)	0 cases (0)
Caring unit	2 cases (40)	0 cases (0)
Total	5 cases (100)	1 case (100)

(7) Six issues of an infection-control magazine were published.

Infectious Disease Prevention Network (IDPN)

Background

In 2003, the whole world came under SARS impact. In Taiwan, SARS spreaded in Hoping Hospital and Ren Ji Hospital, triggering a strong shock on the medical system, which spread to the social public and other areas.

To avoid more clustering breakouts, the DOH announced on May 20, 2003, a plan for graded care of SARS patients and established a medical system for treating infectious patients in accordance with the gravity of the disease and the urgency of the need.

In July 2003, Deputy Minister Li Long-teng of DOH went to the Executive Yuan to report to the Cabinet about the plan for controlling communicable diseases aimed at softening SARS' impact on the medical systems and the nation's capability to cope with the contingencies of emerging infections.

On August 23, 2003, the DOH approved the CDC's plan for establishing a network to control communicable diseases. To carry out the idea of graded medical treatment and to make it a permanent measure and to look into the future, the plan was incorporated into the plans for "ost-SARS reconstruction" and the "2005-2008 biological defense against emerging infections."

Objectives

To establish an epidemic prevention and control network which combines medical and public health system for hospitals. The system enables hospitals a safer and more effective treatment for health care providers and infectious patients in order to avoid the occurrence of nosocomial infection.



Strategies

1. Divide the country into five districts-north (including Taipei), central, south, Kaohsiung-Pingtung, and East, and sign up 23 hospitals to serve as infectious hospitals for the treatment of communicable diseases. These hospitals have a total of 392 isolated wards with negative pressure and 198 isolated wards. In ordinary times, the CDC pays these hospitals for maintenance of these wards. If a communicable disease breaks out, these hospitals will be activated immediately to take patients.

2. Organize a command center in each district. It is made up by local health bureau, medical centers, and other related organizations. A commander and a deputy commander are selected to coordinate the operations of the infectious hospitals and the set-up and improvement of the negative-pressure wards.

3. Set up an online consulting committee on communicable diseases, which is composed of epidemiologists, lab researchers, emergent medical rescue workers, hospital designers, and jurists to offer professional advice and serve as an advisory body for the formulation of policy.

4. Streamline the reporting system. If an epidemic outbreak, the system will be used for reporting to the health department, the local branch of the CDC, and the commander of each command center. After considering the state of the patient, the commander will decide where he or she should start up the medical network for the treatment of the patient and, through the patient referral and hospital bed management system, to send the patient to the right hospital. (The referral process is shown in Attachment 2.)

5. Manage the quarantine wards. When a hospital for treating communicable diseases is started up, it should first make the quarantine wards ready for use and also consider the choice of isolated units or a whole floor of the building for the purpose. If needed, the whole hospital should be emptied to admit many patients of communicable disease in order to avoid the spread of the disease and endanger other people.

6. Develop the mode of cooperation between the supporting hospitals and 23 infectious hospitals specifically for treating infectious patients by assisting them in the training of their medical staffs and in the development of their medical services

7. Map out a manual on referral of infectious patients to meet the requirement of offshore islands that need to send out their infectious patients. The airline that has signed a contract with each local health bureau in remote area should be the first choice for the transportation of the patient. The second choice is the airborne service unit under the Ministry of the Interior, and the third choice should be the Coast Guard Administration.

8. Ask the infectious hospitals for communicable diseases to provide a name list of their medical personnel and supporting staff, which is subject to update all the time. Besides, CDC helps these hospitals to conduct education and training to cope with the situation when these hospitals are activated.

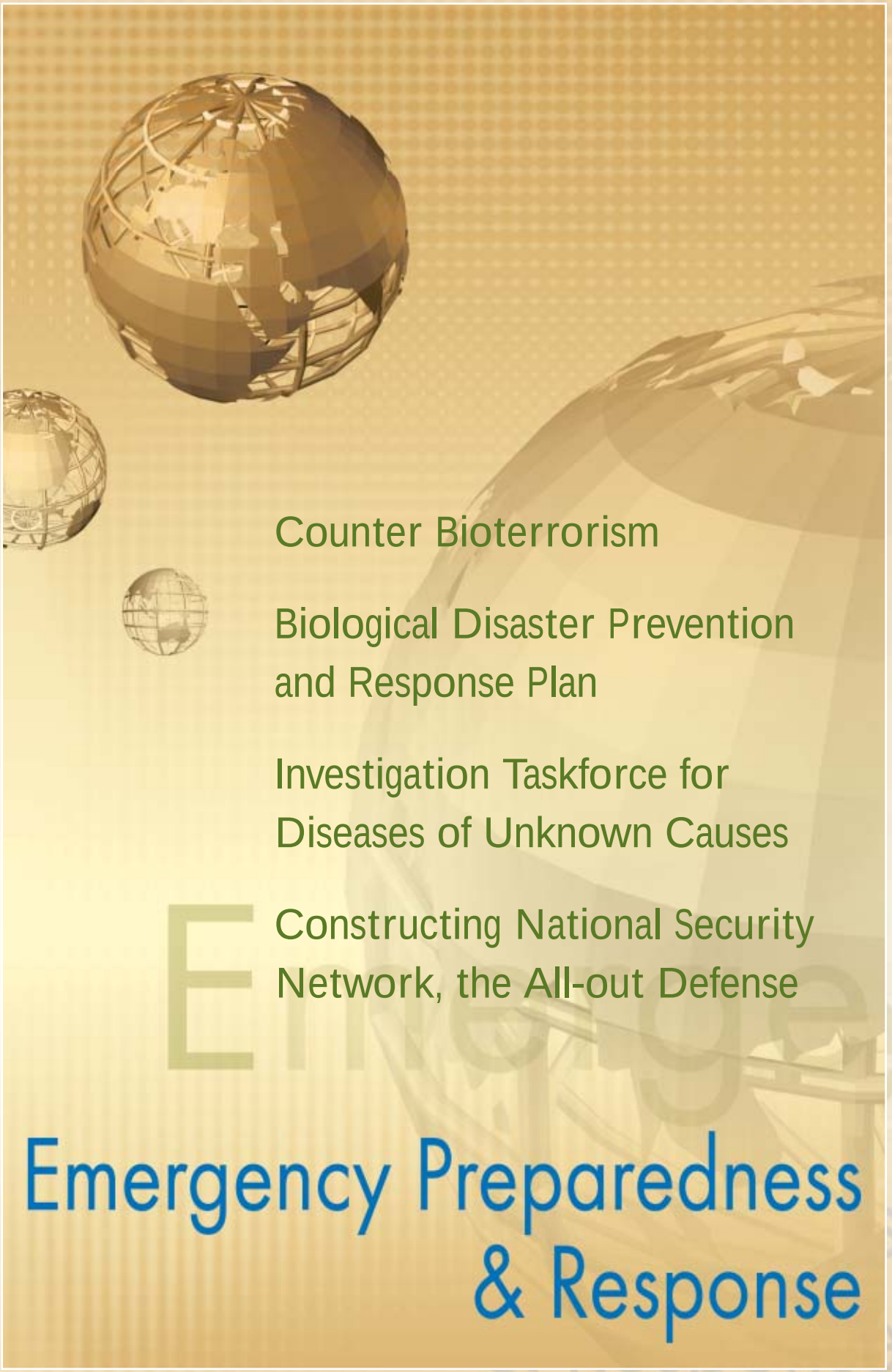


Achievements

1. Completion of the signing of contracts with 23 hospitals for taking infectious patients
2. Selection of the commanders and the deputy commanders for the consulting committees on the network of medical treatment for infectious patients
3. Formulation of the guidelines for supporting operations and personnel deployment
4. Collaboration with related societies and hospitals to train personnel for the control of communicable diseases
5. Preparations for the configuration of the special wards complex
6. Affirmation of the operation plan for mutual support and cooperation among hospitals contracted by the medical network for communicable diseases
7. To accomplish 52 courses for the health education and training of nosocomial infection control specialists and technicians

Future Prospects

1. To continue the operation of the infectious disease network prevetion and control to attain the set objectives.
2. To establish “special isolation wards/laboratory complex” to cope with the reemergence of communicable diseases and bio-terrorism. Besides, a training center for bio-terrorism will be established to treat critical patients and handle bio-terrorist cases.
3. To complete the preparations of the DOH communicable disease prevention and control center for the admission and treatment of infectious patients. Besides, it is planned to establish a training center for the cultivation of talented people for clinic treatment of communicable diseases, neighborhood disease prevention, and infection control.



Counter Bioterrorism

Biological Disaster Prevention and Response Plan

Investigation Taskforce for Diseases of Unknown Causes

Constructing National Security Network, the All-out Defense

Emergency Preparedness & Response

Counter Bioterrorism

Background

The terrorist attacked in the United States, on September 11, 2000 and the following Anthrax bioterrorism incidents led to a global atmosphere of fear. Three years later, the emerging communicable disease, the severe acute respiratory syndrome, SARS, stroke the global public health system and revealed the weakness in Bio-Defense and national security. Either the deliberately distributed biological agents or naturally occurred novel pathogens were proven highly likelihood of destroying economic, physical and mental health and common wealth.

Therefore, well preparedness for bioterrorism and biological threats from novel pathogens became the first priority task in our division. The most important parts of the counter-bioterrorism practice lay on the comprehensive training, well preparedness, early detection, real-time motivation and action.

The Executive Yuan also took the lead of strengthening Taiwan's national security by integrating intelligence, finance, economic, health and judicial departments to cooperate into the government's anti-terrorist campaign, the Counter-terrorism convention. And by cooperating related departments we will be able to promptly detect biowarfare and act swiftly to stem the onslaught of epidemic diseases and assure the health of our society.

Goals

(1) Prevention and Preparedness of Bioterrorism

To form counter-bioterrorism preparedness plan including organizating a counter-bioterrorism taskforce, stockpiling vaccines, antibiotics, antiviral medicines and antitoxins against bio-warfare, setting up priority of vaccination and motivation.

(2) Routinely rehearse Bio-Defense strategies

To routinely train of Bio-Defense and Emergency Medical Service Personnel on hands-on practice and to rehearse motivation and counter-bioterrorism action.

(3) Bio-Defense Training for disease control staff and Public Health Personnel

The Taiwan CDC and the Medical Affairs Bureau, Ministry of National Defense held two serial training courses of seeds and teachers in standard procedures against biological weapons.

(4) Counter Bioterrorism Information for the experts, health care providers and general public

The Taiwan CDC collected bio-weapon related information and edited Handbooks of Anthrax and Smallpox for Public Health Personnel, posted relating materials and placed them on the CDC web pages for public information（http://www.cdc.gov.tw/index1024.htm/）.

Reporting and Notification:

Either by the Office of Counter-terrorist or Toll-free hotline: 0800-024-582.

Events:

(1) Policy

Establish the committee for bioterrorism and unknown communicable diseases to institute policies in July 27th, 2004.

(2) Bioterrorism-related training

a. Staging a drill on bio-terrorist attack at Taipei City Hall on September 22, 2004, in coordination of the Wan-Ann Military Exercise

b. Giving "education on bio-defense and drill on the use of protective equipment" to epidemic control personnel

c. Holding an Tabletop exercise on the mobilization of disease control personnel for epidemic surveys

(3) Conference

a. Holding four defense meetings against biological and other complex calamities for health, police, firefighting, and environmental protection personnel

b. Conducting five bioterrorism and bio-defense emergency meetings participated by medical, disease-control, and quarantine workers

(4) International conference

On September 4-5, 2004, an international conference called the "2004 Asia Pacific Intercity Symposium on Anti-Bioterrorism" was held at National Taiwan University.

(5) Visitors

a. A WHO team visited the bio-safety lab of the National Defense Medicine Center on January 7-9.

b. USCDC specialist Thomas Ksiazek and Japanese expert on communicable diseases, Dr. Sugiyama inspected BSL-3 and BSL-4 (laboratories) during February 16-20.

(6) Education

Holding 16 bio-defense sessions for officials of county/city health departments and the general public

(7) Budding two grade-3 biological safety laboratories (BSL-3) in central and southern Taiwan in 2004

Future Prospects

(1) Incorporating Department of Health and Minister of National Defense to construct a motivation and back up system for dealing with bio-events based on All-out Defense, Motivation and Preparedness Act.

(2) Constructing Health Command Center based on Communicable Disease Prevention Act, including GIS, NetMeeting, and Inter-government cooperation.

(3) Editing anti-bioweapon standard operation protocols, standardizing the guidelines for disease investigation, treatment, prevention and control.

(4) Strengthen training courses for anti-bioterrorism, according to the needs of citizen, medical staffs, public health workers, and emergency responsers.

(5) Drill on anti-bioterrorism to improve the prompt emergency response.

(6) Setting up an incorporated Bioterrorism Preparedness Plan, including establish e-learning system for education of anti-bioterrorism and Counter Terrorism Action Plan (CTAP) in harmony with APEC anti-bioterrorism strategy.

Biological Disaster Prevention and Response Plan

Background

In recent years, concerns over the communicable diseases and likelihood of a bioterrorism attack involving unconventional threats have increased, and disaster prevention and rescue has transformed from traditional two-dimensional operations to a cross-department integrated collaborative task. The integrated responsive capability and performance has proved to improve significantly over the past, so we establish command operation guidelines of biological pathogens incident site. It enables achieving overall goals in-group modularization and execution systemization for various rescuing resources, including personnel, vehicles, equipments, apparatus, and logistic supplies, administrative and financial supplies. We introduce the modern US ICS to guide all the disaster-related units to establish ICS, aiming to develop functions of coordination and integration, setting up a nationwide disaster prevention network and assuring collaborative efforts to advance on-site commanding performance, to boost up rescuing efficiency, in order to reduce risks caused by emergency incidence and protect the people's life and property.

Introduction

This set of contents is formulated in accordance with regulations of Article 17 of the Communicable Disease Control Act and Article 3, Article 19 of the Disaster Prevention and Response Act. To build regulations of biological pathogens of mitigation and preparedness before disaster, response actions during disaster and recovery after disaster should strengthen digitalization, information, systemization and standardization in operation capability. During the time of serious epidemic conditions of communicable diseases within the country, or epidemic conditions induced by terrorist incidents of biological pathogens, implement jointly with the national defense mobilization reserve system is relevant disease control measures.

Action of Response Working Groups

The central competent authority meet the severity epidemics of major communicable diseases, attacks of biological pathogens, or conditions judged to consolidate resources, facilities, and to integrate personnel of organizations (institutions) concerned, may make concrete recommendations on the mobilization for disease control and reports to the Executive Yuan for approval for the establishment of a central epidemics command center. The functions of the Center are as follows:

1. To evaluate the information of disease surveillance, to formulate and promote emergency policies for disease control;

2. To consolidate and integrate resources, facilities, and personnel of organizations (institutions) concerned needed for meeting emergencies of disease control;

3. To conduct matters concerning news releases, information and education, use of mass media with priority, border control, house quarantine, liaison and cooperation with international organizations, control of airports and harbors, requisition of transportation means, cleaning and disinfection of public environment, labor security and hygiene, control of zoonoses (diseases transmitted between humans and animals), and other necessary control measures against major communicable diseases.

The Center may establish a secretariat, department of execution, department of planning, department of logistics, and department of finance; each department may establish several task force sections.

Supervision and Evaluation

Central Disaster Prevention and Response operation regulating authorities and civil utilities shall survey, assess and review the Disaster Prevention and Response operation plan once every two years, or from time to time when required, according to Disaster Prevention and Response basic plan, related disaster prevention, disaster emergency strategies, and restoration and reconstruction after disaster. the performance of Disaster Prevention and Response of the central administration, municipal, and county/city governments is supervised and evaluated by the Executive Yuan National Disaster Prevention and Response Council.

Investigation Taskforce for Diseases of Unknown Causes

Background

To effectively control diseases, the CDC has constructed a surveillance system for unknown diseases and established the Field Epidemiology Training Program through the joint efforts of the government's administrative system of health and disease-control (including the CDC of DOH, county/city health departments and health stations) and the academic research system (including the National Institute of Health, Council of Agriculture, medical colleges, public health colleges, and hospitals). It is hoped that this will reduce the spread of diseases of unknown causes through the field investigations made by health organizations and members of the epidemiology-training program and by taking advantage of the collective wisdom of experts from many fields such as public health, epidemiology, toxicology, insects research, environmental health, community health, infection, and infantile infection control.

Upon receiving an infection report either from a medical institution or the surveillance system for infection reporting and management or the general public, the Investigation Taskforce for Diseases of Unknown Causes will immediately mobilize the district's epidemiologists, clinicians, health department or station, CDC's related units, and members of the epidemiology training program to go to the site to handle the case on the spot. The task force will also coordinate the medical laboratories to pinpoint as soon as possible the factors of infection and the path of communication so that the infection can be contained and controlled as soon as possible and in the course the CDC's capability for disease control can be enhanced. In 2004, the CDC handled 13 suspected cases of unknown causes, including two fatal enterovirus cases.

This taskforce has worked steadfastly to integrate the flexible, homogenous, and maneuverable cross-platforms of investigative and analyzing systems for communicable diseases and also the various communities, medical, health, and infection investigation systems in order to provide prompt information for reference by the policy-making authorities. Besides, the taskforce seeks to enlist all people in epidemic control by propagating the concept of epidemic control and self-management of health. In this respect, it uses a digitalized platform of learning to spread the knowledge of disease control deep into the community, so that epidemics can be brought under control as soon as possible.

Constructing National Security Network, the All-out Defense

In coordination with the Executive Yuan's call for “all-out defense” and the various government agencies’ mobilization efforts, the CDC strives to boost its mobilization capability and carry out the ideal of constructing a homeland security network. In mobilization for combating communicable diseases, the CDC has routinely taken advantage of its system of emergent rescue to complete the preparations for mobilization in order to meet the needs in a disaster and protect the lives and property of people. Following were the major items on the 2004 agenda:

1. Formulating the “plan for mobilization preparations for the control of epidemics” and guiding counties and cities to work out simultaneously the “Execution plan for all-defense mobilization.” This effort was based on the “All-out Defense Act,” “Epidemic Control Act,” “Principles of Preparations for All-out Defense” and “Plan for Health Mobilization Preparations.”

2. Holding in conjunction with the Taipei City Government an “anti-bioterrorism drill” in coordination with the Wan An Civil Defense Exercise of the government to prepare related personnel for the control of bio-terrorism.
3. Convening the third coordination meeting on “Central government's response to an contingency” in order to strengthen the horizontal exchange of information with regard to disaster rescue, civil defense, emergent medical service, epidemic control, and preparations for all-out defense.
4. Participating in the “2004 mobile lectures for official of all-defense mobilization” offered in accordance with the decision of the “Executive Yuan meeting on preparations for all-defense mobilization”. The CDC also directed local health officials to do related preparations.
5. Helping 25 county and city governments to conduct field surveys on the preparations for epidemic-control mobilization according to the decision of the “Executive Yuan meeting on preparations for all-defense mobilization.”

In controlling the zoonoses, the CDC has set the following priorities: policy planning and execution, material collection and analysis, mobilization for controlling the epidemic, and education and training for health personnel. In the future, the CDC will work persistently to monitor across the world the major breakouts of emerging zoonoses, to formulate sound plans for their control, and to boost the capability of control through training and drills. With these measures, it is hoped that the import of such diseases can be blocked, their spread can be curbed, and people's health can be protected effectively.

Major Achievements in 2004:

1. Established a cross-agency epidemic-control mechanism with the holding of communication meeting on zoonoses and a 24-hour window of connection.
2. Organized a databank system regarding animal related personnel.
3. Worked out the preparations for the surveillance on animal hosts of zoonoses.
4. For the first time published the handbooks and educational posters on West Nile Fever and Tularemia
5. Called the “ zoonoses workshop in CDC ” into meeting regularly.
6. Sponsored the “ 2004 symposium on zoonotic diseases ”
7. Entrusted the “ Taiwan Society of Neurology ” to monitor CJD.

Dengue Fever Prevention

HIV/AIDS

Tuberculosis(TB)

Enteroviruses

Bacillary Dysentery control in Mountainous Areas

Communicable Diseases of Interest to the Public

Dengue Fever Prevention

Background

There were three island-wide dengue outbreaks in 1915, 1931 and 1942. After forty years of dormancy, a DEN-2 outbreak occurred in Luchiu Township of Pingtung County in 1981. Yet, more dengue outbreaks took place in Kaohsiung (1987-1988), Chung Ho, Taipei County (1995), Taichung (1995), Taipei City (1996) and several others in Kaohsiung City and County, Tainnan City and Pingtung County.

In the year 2002, another outbreak of dengue fever occurred in the southern part of Taiwan and it was similar to the outbreak in 1988 that started in 1987. The number of dengue fever cases increased tremendously since mid-June. The epidemic originated at the border between Chien Chen, Kaohsiung City, and Feng Shang, Kaohsiung County. The disease gradually spreaded to other places such as Pingtung County, Tainan City and Penghu County. The total number of confirmed cases was 5336, including 242 dengue hemorrhagic fever (DHF) cases and 21 deaths. There were only 86 indigenous confirmed cases reported in 2003, and 51 cases out of total initiatively reported in Kaohsiung and Pingtung area before March 8, those were the last of dengue outbreak in 2002.

In 2004, there were 336 indigenous cases of dengue fever, of which five were the hemorrhagic variety causing no death. The distribution was mainly in the south, including Pingtung County, Kaohsiung City, Kaohsiung County, and Tainan City.

Objectives

To eradicate dengue fever in Taiwan by thoroughly cleaning the vector breeding ground and effectively controling the vector (mosquito) density.

Strategies

The CDC has devised three stages of preventive measures in an attempt to control dengue fever infection. The primary prevention includes vector source reduction and the number of vector population controlling. The secondary prevention covers disease surveillance and a disease emergency contingency mechanism. The tertiary prevention involves controlling the number of deaths resulted from the critical illness.

1. Primary Prevention

(1) To implement health education through various means of communication in an attempt to promote dengue awareness.

(2) To get the community involved in improving environmental and household hygiene as well as vector source reduction through trained volunteers.

(3) To put the regular vector breeding source inspection and operation mechanism into practice by vacating empty houses, places and other potential vector breeding sources and by keeping a record of these places for future inspection.

(4) To reinforce the educational training for the disease prevention workers and volunteers.

(5) To set up a vector surveillance mechanism to check on places with a higher mosquito density in an attempt to spontaneously wipe out the source of the vectors.

2. Secondary Prevention

(1) To construct a disease surveillance mechanism to promptly control suspected cases and strengthen disease surveillance and disease trend evaluation through the use of legal epidemic reporting system, emerging infection surveillance, and the public reporting and symptom declaration forms.

(2) To set up a disease emergency contingency mechanism in order to promptly investigate the suspected source of transmission, spray insecticide to abolish the vector source as well as to promote health education to eliminate any likely infection.

3. Tertiary Prevention

To establish a set of guidelines for dengue hemorrhagic fever (DHF) diagnosis and treatment and organize continued education for medical personnel in order to raise the healthcare quality and lower the mortality rate.

Achievements

There were 336 people in the south afflicted with dengue fever in 2004. Thanks to the joint effort of the central and local governments and the organized mobilization of the community, the control was remarkably successful in comparison with Southeast Asian nations. These were the major achievements:

A. Primary Prevention

1. Continuation of taking body-temperature readings at international airports. In 2004, 57 cases of imported dengue fever were detected this way, accounting for 63.63% of the total number of 91 imported cases. This measure effectively blocked the inroad of the disease.

2. Publication of health educational and publicity materials including facial paper, posters, buntings, fans, the second edition of the dengue fever handbook, VCD, and leaflets in five languages (Chinese, English, Thai, Vietnamese, and Indonesian)

3. Preparation of materials for publicity in the media, including, publicity recordings, epidemic control programming, newspaper ads, TV commercials for broadcast along with TV programs and short films for projection in TV slots reserved for the Government Information Office to make public-service announcement. All these materials call on the people to eradicate the breeding grounds of mosquitoes, the vector of dengue fever.

4. Compilation of the third edition of the Handbook for Dengue Control in keeping with the amendment to the Communicable Disease Control Act for distribution to disease-control units at all levels

5. Provision of subsidies to 16 communities in the southern cities and counties endangered by dengue fever for mobilizing residents to eradicate the breeding grounds of vector mosquitoes

6. Purchase of shoulder-carried sprayers and extra-low capacity machines in 2004 for use by the CDC's district offices to kill mosquitoes. Spraying insecticide is for killing disease-carrying adult mosquitoes and, therefore, must be done from the air. The particles of ordinary spraying are too big and cannot float in the air, so they are no good for the control of dengue fever.

7. Commission on scholars and experts to study drug resistance of mosquitoes and to evaluate the effectiveness of the insecticides for the CDC's reference in the procurement of insecticides for disease control. The CDC purchased a total of 1,800 bottles of Cyhalothrin, 2,273 bottles of Deltamethrin, and 1,800 bottles of Cyfluthrin for use by its district offices and the health departments of county and city governments.

8. Conduction of “training for technicians involved in the control of disease vectors” in conjunction with the Environmental Protection Administration of the Executive Yuan. Four sessions of training were offered in 2004 for 100 technicians, of whom 97 passed the examinations. Their participation in dengue fever control remarkably raised the quality of survey on vector mosquitoes and the effectiveness of the spraying of insecticides.

9. Conduction of nine sessions of training in the vector of mosquitoes and emergent spraying in April and May 2004 (one each in northern, central and eastern Taiwan, and six in southern Taiwan) for 997 persons selected from health and disease-control organizations

10. Implementation of the plan for surveillance of vector mosquitoes. The CDC entrusted the high-risk counties and cities (the distribution area of *Aedes aegypt*) to hire 168 persons and subsidized the expenses for surveying vector mosquitoes. In 2004, surveys were conducted in more than 80,000 precincts and villages, once for every one to three months on the average.

B. Secondary Prevention

1. An awarding system was established to encourage physicians and the public for reporting cases in an attempt to detect the disease transmission as early as possible. NT$2,500-NT$5,000 was awarded to physician and other medical personnel for reporting the first indigenous case of dengue fever and for discovering the imported case of dengue fever. If an individual voluntarily received examination of his or her sampling and was determined to be the first case of imported dengue fever or the first indigenous case of the village or township where he or she lived, the individual would be awarded NT$2,500.

2. Reinforce the frequency of vector density surveillance and investigation to one time per month for every village around dengue fever prevalent areas in southern Taiwan. 80,067 time/ village of vector density surveillance were implemented in Taiwan area in 2004. There were 88% of total under Breteau Index one.

3. In 2004, 87,258 mosquitoes were trapped for checking whether they carried virus. There were 19,820 female *Aedes aegypti*, 27,416 male *Aedes aegypti*, 29,567 female *Aedes albopictus*, and 10,455 male *Aedes albopictus*. On September 8 and 9, different adult aedes aegypt were captured in Yongning precinct of Kaohsiung City and lab examination proved they were positive of the fourth type of dengue fever.

4. To grasp the change of drug resistance in vector mosquitoes after indigenous dengue fever broke out in the south in 2004, the CDC sent vector experts to the place where emergent spraying was made to evaluate drug resistance of mosquitoes. They also offered timely advice on the use of insecticide and equipment to make the control effort more effective.

C. Tertiary Prevention

1. In April and May 2004, the CDC offered five sessions of training in northern, central, southern, and eastern Taiwan for medical personnel participating in the control of hemorrhagic dengue fever with 1,053 attending. The courses covered symptoms, diagnosis, and treatment of hemorrhagic dengue fever in order to raise the medical quality.

2. On December 18, 2004, the Kaohsiung Veterans General Hospital held a southern Taiwan symposium on tropical medicine, which focused on dengue fever, lab diagnosis and clinic treatment.

3. To strengthen the service of medical workers offered to patients afflicted with dengue fever or hemorrhagic dengue fever, the CDC dispatched 19 medical and epidemic-control personnel to Ho Chi Minh City in Vietnam on a two-week training course in clinic treatment of dengue fever and hemorrhagic dengue fever. After their returning to Taiwan, they held a meeting in the Kaohsiung Veterans General Hospital to discuss what they had learned. These people have become seed lecturers for educating domestic medical workers.

4. Thanks to the intensive training offered by the CDC and the hard work of the medical workers of various hospitals, no death from hemorrhagic dengue fever was registered in 2004.

Future Prospects

The CDC will formulate the “reinforcement plan for dengue control - Vector breeding ground eradication, a 4-year plan for elimination of indigenous dengue fever” to strengthen dengue control. The CDC, the Environmental Protection Administration (EPA), the local governments and community bodies will implement the plan in collaboration to augment health education promotion and encourage the general public to get involved in environment maintenance and household hygiene. The CDC and the EPA will construct a spontaneous disease surveillance and responsive mechanism in an attempt to annihilate the vector source and consequently stop the occurrence of indigenous dengue fever.

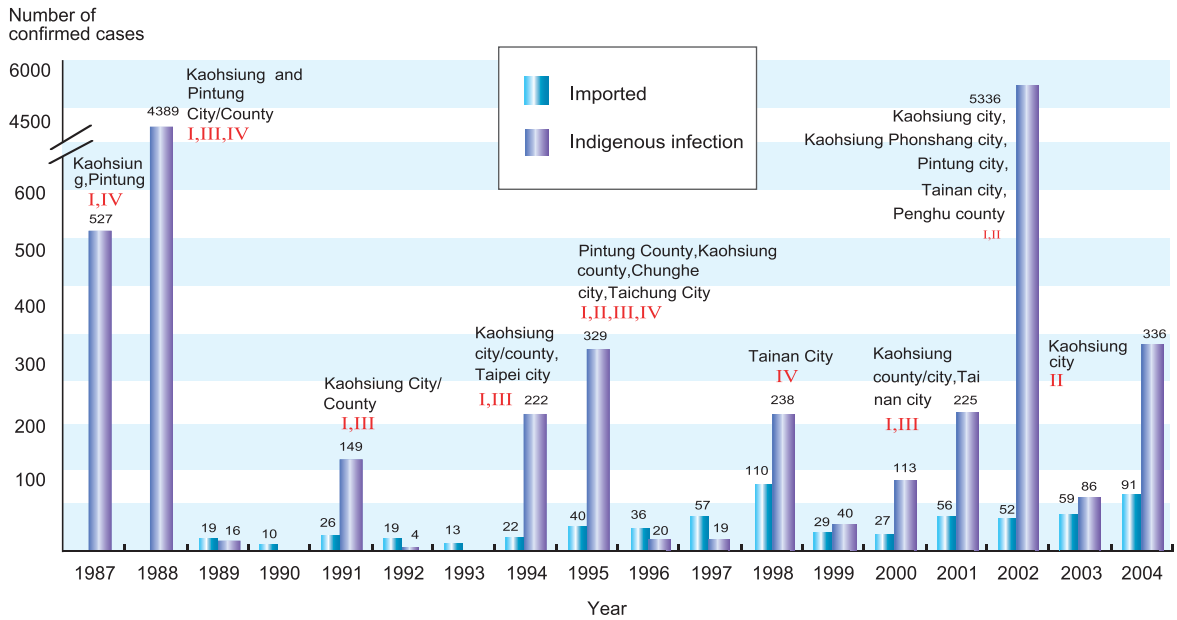


Figure 1. The number of confirmed dengue cases from 1987 to 2003

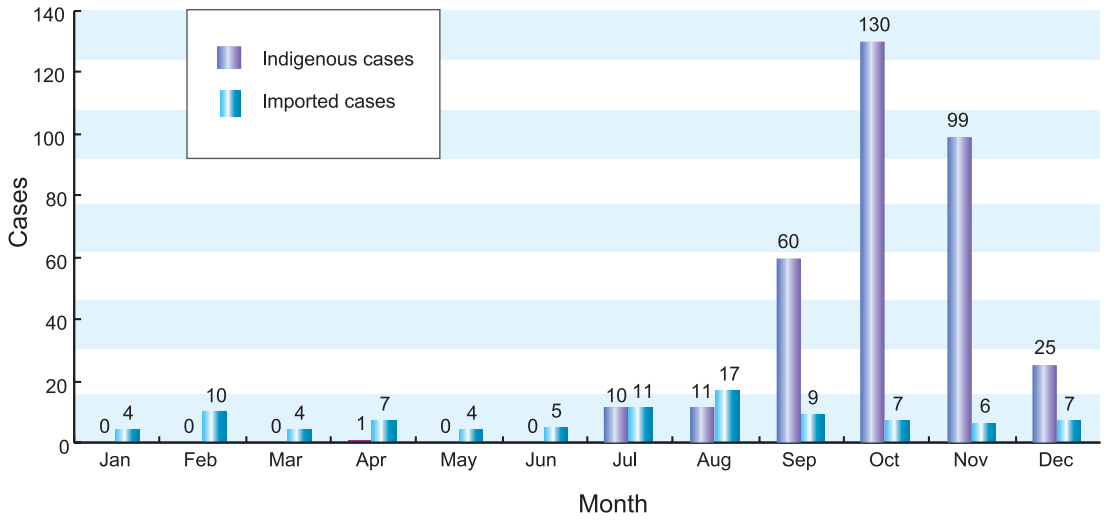


Figure 2. The number of confirmed dengue cases in 2004

Figure 3. Distribution of indigenous dengue fever cases in different cities and counties in 2003.

HIV / AIDS

HIV destroys the normal function of the human immune system, and it is transmitted from an infected person through blood, semen, or vaginal fluid to another person with damaged skin or mucus membrane. Besides, an infected pregnant woman may pass the infection to the infant during the pregnancy, birth, or through breast feeding. People who loss of the immune function can lead to AIDS(Acquired Immunodeficiency Syndrome). AIDS is likely to become the catastrophe of human beings in the twenty-first century.

Since the first HIV case in Taiwan was reported in 1984, the number of HIV infections had accumulated to 7,264 by 2004, including 6,773 indigenaus Taiwanese, of whom 1,145 had died. In 2004, indigenous HIV infections had a sharp increase, for the first time breaking the 1,000 mark, to 1,521, up by as much as 77%. The distribution was 640 (42.1%) for the 20-29 age group and 533 (35.0%) for the 30-39 age group. An analysis of the transmission routes of the total HIV infections showed that the injecting drug use had the largest increase, and accounted for 36.4%, although the cases attributed to unsafe sex were also on the increase. Of all the HIV infections, 31.2% were homosexual contact and 19.9% were heterosexual contact.

Besides, among the newly diagnosed HIV cases, the infections among injecting drug users (IDUs) tended to increase. In 2004, 565 HIV cases caused by intravenous injection were reported, increasing seven-fold compared with the previous year. Hence, intravenous injection of drug posed to be the more serious problem and challenge to disease control.

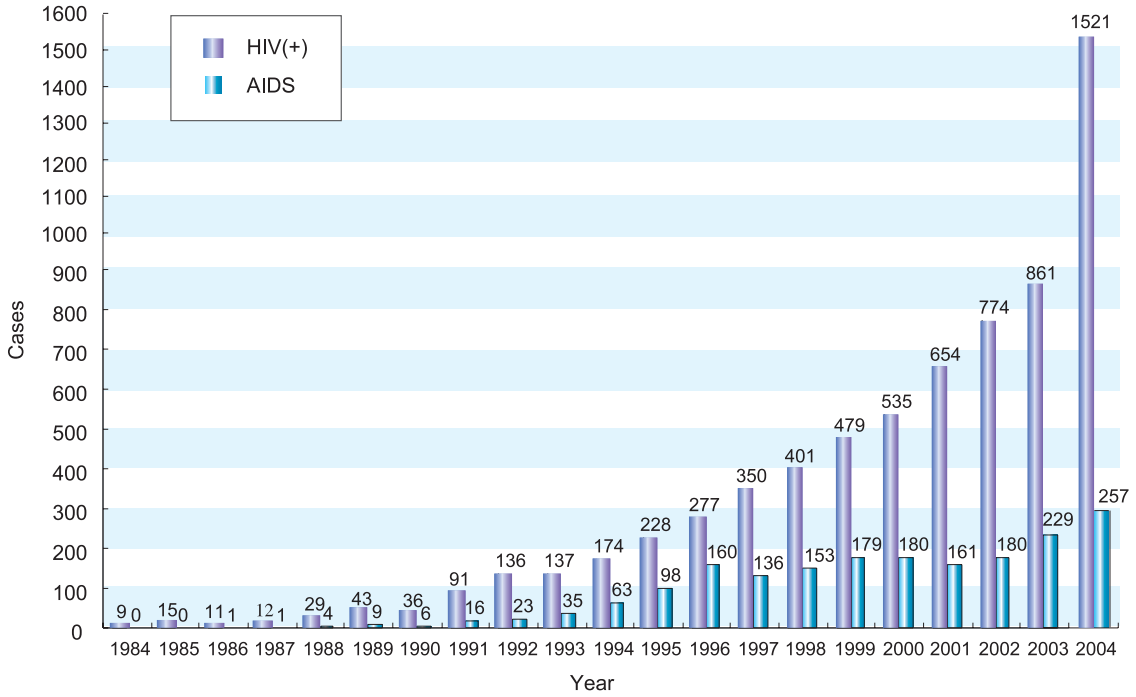


Figure 3. Report Cases of HIV/AIDS by Year in Taiwan 1984-2004 (Taiwanese).

Goals

1. To protect the uninfected population from HIV infection and to effectively control the spread of HIV/AIDS
2. To provide the infected cases with proper medical treatment and to raise the quality of their lives

Strategies

1. Organized mobilization and policy declaration: In December 2002, the CDC organized a Promotional Committee on AIDS Control, which composed of 13 ministries and 5 representatives from NGOs and was in charge of making major policies and supervising the implementation of the AIDS-control program. To carry out the policy down to earth, AIDS-control groups were set up in counties and cities by their heads.
2. Enhanced the understanding of the disease: Publicity on AIDS should be directed at selected population groups and performed through different channels, especially the media:
   a. Care for AIDS patients: HIV does not pass on through handshakes, embraces, dining together, use of toilet, so people are sincerely asked to wholeheartedly accept AIDS patients.
   b. The ABC for preventing AIDS: A. Resist sex temptation. B. Be a faithful sex partner. C. Use condoms in sex.
   c. Don't share the use of syringes, needles, and diluted solution.

3. Targeted on the groups with high risk behavior: Specific population and floating population, including sex workers, men who have sex with men(MSN), drug users, seamen, should be given a preventive plan for HIV/AIDS control.

4. Respected and supported the affected: Medicine should be provided for HIV/AIDS patients, their rights should be respected, and the care system should be strengthened so that the patients, their families, and their communities can obtain appropriate support.

5. Tightened the surveillance system: Understanding and analysis should be made for different population groups in order to formulate appropriate policies and to provide services consistent with their cultures.

6. Performed research and development: The social, economic, demographic, cultural and medical studies and surveys on HIV/AIDS control should be increased.

Achievements

1. The working group of the Promotional Committee on AIDS Control has met 12 times to formulate a national plan for the control of AIDS.

2. Publicity on AIDS has been stepped up by taking advantage of every occasion, for example the Western Valentine's Day, the Chinese lover's Day (on the seventh day of the seventh month of lunar calendar), the Mid-autumn Festival, and the evening parties on New Year's Eve. In response to the theme of the World AIDS Day, “Women, Girls, HIV and AIDS,” the CDC invented its own slogans: “No Condom, No Love.” This was intended to arouse women to the need of protecting themselves through safe sex. The curtain of a series of AIDS-control activities in 2004 was raised with a press conference on November 30, which was followed by large-scale publicity in northern, central, and southern Taiwan through the



use of regional resources. A famous female national player in tae kwon do (kicking boxing) was recruited as the campaign speaker to trumpet the importance of self-protection for women. As condom and the glove of tae kwon do are intended for self protection, sportsmanship may evoke a woman's courage to reject unsafe sex and inspire man to wear a condom as an expression of love and concern.

3. For prevention and early finding, Taiwan began to screen for blood donors in 1988, for draftees in 1989, for prison inmates in 1990, and for alien laborers in 1991. Since 1997, ten hospitals have offered anonymous HIV blood-screening services. In 2004, 4,610 persons received the screening and 136 of them, or 2.95%, were found HIV positive.

4. The medical expenses of AIDS patients are paid by the Bureau of National Health Insurance (BNHI). By the end of 2004, 30 hospitals had been designated to treat AIDS patients. To provide a quiet place to live for the homeless and terminal AIDS patients, the government have subsidized NGOs for a long time that offer care and assistance to AIDS patients. These include the Garden of Mercy Foundation, Harmony Home Association, and Lourdes Home. Government assistance was designed to meet different needs of the patients like the neighborhood plan for the care of AIDS patients, renting house, living assistance, and referral service for employment.

5. As to technological research and development, the CDC was funding nine research projects in 2004 and commissioned National Taiwan University Hospital to establish an AIDS Prevention and Treatment Center in order to cultivate more specialists and create an outstanding medical team for the control of HIV/AIDS.

Future Prospects

According to BNHI statistics and estimates, medical treatment for AIDS patients cost as much as NT$931 million in 2004, or NT$250, 000 per person on the average, which was 70 times the average amount of NT$3,500 spent by a person in Taiwan general population. The amount will climb frighteningly in view of the increase of AIDS patients and the lengthening of their lives due to the effectiveness of HAART(Highly Active Antiretroviral Therapy). Besides medical spending, the direct costs for AIDS control may also shoot to new highs such as the expenses for public education, blood screening, clinic diagnosis, and psychological consultations. Still, there will be labor losses, technical losses, and hesitation of foreign investments, reduction of exports, and cutback of income, of which the economic impact is inestimable.

The first phase of AIDS control plan began in 1994. By now, ten years have passed, and the effectiveness of medical care has won recognition. However, the annual contraction rate has failed to lower significantly. The CDC proposes to control the HIV infection rate more effectively in the near future by taking up a more active role in stopping the spread of HIV/AIDS.

Prevention of Tuberculosis (TB)

The TB Epidemic Situation in Taiwan

1) Mortality Rate

In 2003, the mortality rate of TB in Taiwan was 5.8 per 100,000 populations, and the total fatalities were 1,309 people, which were 1.01% of total deaths and ranked the 12th on the list of leading causes of deaths. It has been the number one killer of Notifiable Communicable Diseases for years. In 1947, the mortality rate of TB was 294.44 per 100,000 populations and the number has decreased to 5.80 per 100,000 populations in 2003 in Taiwan. The morality rate has reduced every year; however, the declining rate has been slow down in recent years.

There are 95.72% of TB patients died of pulmonary tuberculosis in total mortality rate of TB in 2003 and the rest of 4.28% died of the other organs of tuberculosis. Classifying by gender in 2003, the male TB death counts was approximately 3.74 times that of females while the mortality rate was approximately 3.68 times. Classifying by age, the TB mortality rate increases with age, and out of the total 1,309 deaths due to TB, 78.76%, which was 1,031 people were elderly over the age of 65 and followed by age between 45 and 64. In comparison with the past, the age distribution of TB deaths is noticeably leaning towards the elderly population; and the mortality rate in the younger population has declined in recent years.

Classifying by cities and rural areas, the mortality rates and incidences of TB have parallel tendency; eastern part of Taiwan is higher than the western and the southern is higher than the northern and cities are usually lower. In 2003, Taitung County had the highest mortality rate of TB and the number was as high as 16.84 per 100,000 population which was followed by Pingtung County and Hualien County. The mortality rate of mountain regions was 34.76 per 100,000 populations, which was 5.99 times of TB mortality rate of common areas of 5.8 per 100,000. The mortality rate of the mountain regions was 3.45% .

2) Prevalence

Starting from 1957, there was a pulmonary tuberculosis prevalence survey every five years in Taiwan to understand the epidemic inclination and as references for the prevention strategies of TB; however, the other kinds of TB weren't included. There were 8 such prevalence studies from 1957 to 1993.

The 1st TB prevalence survey in 1957, the prevalence of chest X-ray diagnosis for the population of 20 years of age and above showed 5.15% of possible cases and after bacteriological exam the prevalence was proven to be 1.02%. In 1993, data from the 8th prevalence survey showed that the prevalence of chest X-ray diagnosis for the population of age 20 and above was 0.65% and after bacteriological exam was proven to be 0.06%. The prevalence had lowered by 87.4% and 94.1% respectively in decades. Results from past surveys all revealed that the older the age the higher the incident rate, and male pulmonary TB prevalence was comparatively higher than female, by about 2.2 to 3.3 times.

3) Incidence

The registered number of TB notification in 2003 was 22,362 people. After diagnosis, there were 15,042 new TB patients and the incidence rate for TB was 66.67 per 100,000 populations. It had been the number one incidence rate for notifiable communicable diseases for years.

The new 15,042 TB cases in 2003, classifying by gender, male patients were about 2.34 times that of females, and incidence rate was 2.25 times that of females. Classifying by age, the number increased evidently with age. The new TB case of age 65 and above was at 48.93%. The incidence rate has increased with age and male more than female. In the mountain regions, the incidence rate for TB was 248.78 per 100,000 populations and it is 3.73 times higher than common area at 66.67 per 100,000.

The Prevention Strategies on TB

Taiwan's tuberculosis control, as compared with developed countries, still has room for improvement. Tuberculosis is a chronic communicable disease of long incubation period, and unlike acute communicable diseases, a single measure will not produce immediate result, nor will incidence and mortality rate drop sharply in no time. Tuberculosis control takes many coordinated measures for a long period of time to see any effects. To meet the current situation of tuberculosis in Taiwan, the following strategies are formulated.

1. To set up in coordination with the Infectious Disease Prevention Network a high-quality Tuberculosis Diagnosis and Treatment Network

   1) To establish a tuberculosis medical care network: Under the framework of the "Infectious Disease Prevention Network (IDPN)", six referral and training centers for tuberculosis have been set up in Taiwan to handle drug resistant cases and cases with difficult problems in treatment, and also for the training of professional workers.

   2) To establish "tuberculosis diagnosis, treatment and counseling groups".

   3) To strengthen the nosocomial infection control of tuberculosis.

   4) In coordination with the plan for the improvement of payments for the medical care of tuberculosis of the Bureau of National Health Insurance, plans for the improvement of the quality of care and management of tuberculosis in hospitals have also be drafted.

5) To train professional workers.

2. To establish and strengthen the laboratory testing network for tuberculosis bacilli

1) To establish a network of commissioned laboratories for the testing of tuberculosis bacilli.

2) To make testing for tuberculosis bacilli more available.

3) To upgrade the quality of laboratory testing for tuberculosis bacilli.

4) To conduct training on techniques of laboratory testing for tuberculosis bacilli.

3. To strengthen the public health management system of tuberculosis

1) To strictly monitor disease situations.

2) To actively find cases.

3) To conduct follow-up management of cases.

4) The DOTS pilot project.

4. To strengthen tuberculosis control in some specific groups and to enhance tuberculosis-related research

1) Medical care services for economically less-privileged groups.

2) Prevention and control projects for special groups.

3) Related medical associations and societies will be coordinated to conduct strategic screening of tuberculosis patients for AIDS and diabetes.

4) Topic-oriented research, academic collaboration, data analysis and utilization of research findings.

2005 Eight Major Policies on Tuberculosis Control

1. To overall upgrade the quality of sputum testing for tuberculosis

2. To strengthen the prevention and control of tuberculosis in residents of the mountain townships

3. To establish referral hospitals for tuberculosis patients, and to promote hospital care of sputum-positive cases

4. Localization of tuberculosis control in counties and cities

5. To continue to supervise measures for the control of tuberculosis in institutions

6. Health education on the correct concept of tuberculosis control

7. To strengthen medical network and manpower development

8. International Cooperation

Fight for Tuberculosis by All; Halve the Number of Patients in 10 Years

Tuberculosis control in Taiwan is still way behind the developed countries. The 2003 report of the US CDC shows that the incidence of tuberculosis in the US was 5.1 per 100,000 population; and the mortality rate of tuberculosis in 2002 was 0.3 per 100,000 population. In Japan, the incidence in 2003 was 24.8, and the mortality rate was 1.9 per 100,000. In Taiwan, the incidence in 2003 was 66.67, and the mortality rate was 5.8 per 100,000. There in Taiwan are still rooms for improvement.

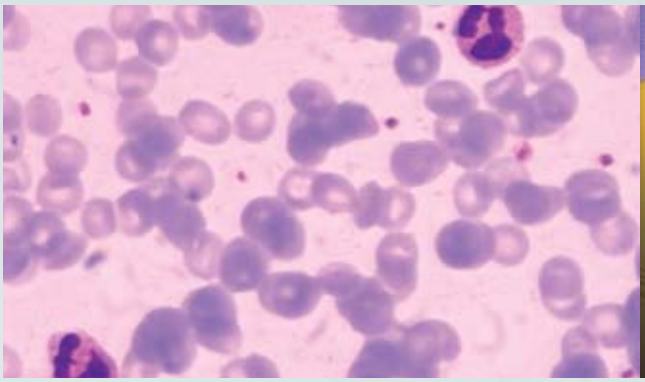
The CDC of Taiwan declared on the 2005 World Health Day that the number of tuberculosis patients would be halved in ten years; that is, from about 15,000 new cases each year to 7,500. Tuberculosis control is not the responsibility of the government alone, the successful policies formulated by the government need to be implemented thoroughly. This is a program that takes the efforts of all, the government, the private sectors, the academics, the medical circles and others, for the effective control of tuberculosis, and to attain the final goal of tuberculosis control, and thus to protect the health of the people.

Enteroviruses

Background

Enterovirus belongs to a group of small RNA viruses, including polioviruses, Coxsackie A viruses, Coxsackie B viruses, echoviruses and other enteroviruses (EV68~). The EV71 has a significantly higher pathogenicity among the known enteroviruses, especially in the respect of causing neurological complications. Enterovirus is found in gastrointestinal tract (stool of an infected person, mouth, water, food) and respiratory tract (aerosols such as saliva, sputum, or nasal mucus, coughing, sneezing). People can be infected by direct contact with the secretions of an infected person or a contaminated surface or objects.

According to the sentinel surveillance data over five consecutive years provided by the Center for Disease Control, Department of Health, the number of eneterovirus infection outpatients increases in late March every year and the number reaches its peak around mid-June and decreases after mid-June. In addition, there is usually another smaller outbreak of enterovirus infection when the schools reopen in September. Many types of enteroviruses disseminate around the world and they have been living in the human. Apparently, human being is the only known host and source of transmission. There are currently no preventive vaccine for non-polio enteroviruses and no known highly efficacious medicine that could kill the infectious virus that lives inside the human body. Therefore, enterovirus will continue to exist and pose threat to human's well being in the predictable future.



According to various surveillance data, the enterovirus infection trend in 2004 suggests that children under the age of 5 are prone to critical complication and death resulted from enterovirus infection and the associated mortality rate is 10.0%. The major symptom of enterovirus infection is herpangina and hand-foot-and-mouth disease (HFMD). EV71 is the most commonly seen type of enteroviral pathogen in Taiwan. Another surveillance data collected by the local health departments and the sentinel surveillance system points out that the number of suspected enterovirus cases increased from mid March 2004 and reached the peak around early May. A total number of confirmed enterovirus complicated severe cases in 2004 is 50, including 5 deaths.

Objectives

1. To control the trend of enterovirus infection in Taiwan and to set up a database of the variety of active enteroviruses in Taiwan.
2. To lower the mortality rate resulted from enterovirus complications.
3. To organize a "Clinical Critical Care Consultation Team" to set up guidelines for acute enterovirus complication treatment.
4. To schedule enteroviruses conference on a regular basis in order to ameliorate the academic standard in the field of enterovirus studies.
5. To develop EV71 prototype vaccine.

Strategies

1. To reinforce case surveillance and disease evaluation abilities

The CDC will continue to collect and analyze enterovirus infection information both abroad and at home (especially in Taiwan) to construct an enterovirus infection database in an attempt to understand the disease outbreak and to make responsive policies.

2. To augment health education

Knowledge removes fear. The CDC consolidates governmental and public resources to educate the general public, medical personnel, educational conservationists and the media with the basics of the enterovirus through various means of media. The following information is conveyed to the public to ensure significant results in the disease prevention. General cleanliness and frequent hand washing can boost one's immune system. Proper hand-washing facilities are encouraged to install both at home and in the public. Urge the public to seek immediate medical treatment when they develop symptoms of enterovirus infection. Educate health care workers with the up-to-date treatment. Disease prevention can only be effectively accomplished when everyone takes his/her initiatives to practice personal hygiene, hence eliminating his/her chance of infection and stopping the spread of the disease.

3. To strengthen emergency disease control mechanism

It is crucial that the central and the local governments readily set up an enterovirus prevention decision-making center when the disease surveillance system malfunctioned. In addition, an appropriate coordination mechanism is organized between the central and the local government bodies for efficacy in disease control. A complete disease prevention network provides a timely and adequate medical treatment, research, cases inspection and consoling service in an attempt to slow or stop the spread of the disease, to decrease the number of deaths and pacify people's fear towards the disease.

4. To conduct prudent research and related personnel training

Epidemiological research and vaccine developments are some of the plans that are underway. Human resource training is reinforced to improve enterovirus infection preventive methods, diagnosis and cures. Thereafter, enterovirus can no long pose any threat to people's well-being and social security.

Achievements

1. Accomplishment in the construction of surveillance and database

Figure 1 shows the trend of enterovirus infection in Taiwan. The annual number of enterovirus outpatients begins to increase mid March and reaches its peak around early-May. The number generally decreases afterward. Enterovirus has become one of the seasonal epidemics in Taiwan.

Table 1 shows the annual critical enterovirus complication fatality rate in Taiwan is around 10.0% to 25.7%.

Figure 2 shows that the trend of the various enterovirus infection in Taiwan over the past five years. EV71 is recurrent every year.

Figure 3 shows that EV71 is the most pathogenic virus in acute enterovirus complication in Taiwan.

2. Health Education

(1) Red banners about enterovirus education are hung in school and on garbage trucks. A variety of talks on children enterovirus preventive measures and related health issues are organized.

(2) The local organizations work with the community to promote enterovirus education and prevention.

(3) Restaurants, schools, hospitals, clinics, and other public gathering places are required to conduct regular inspection for environmental hygiene and hand-washing facilities.

3. A "Clinical Critical Care Consulting Team" is organized by recruiting all the clinical professional island-wide in an attempt to provide clinical healthcare consultation and to set up guidelines for treating enterovirus complication. Providing the complicated patients with primary care can effectively lower the complication mortality rate.

4. "Enterovirus Control Plan", "Enterovirus-prone group Control Booklet" and "Enterovirus Control Handbook for Child Care Worker" are written to list all the necessary precautions and published in large quantity for distribution to all the health departments in Taiwan.

5. Holding an enterovirus workshop to assemble disease control personnel, public health workers, epidemiologists and clinicians together to forge a consensus on the control of enteroviruses

6. Conducting a workshop on the treatment of enterovirus complications to increase the doctor's ability and to raise the quality of the treatment of enterovisus complications and hence the reduction of mortality and aftereffects

7. Since 2000, efforts have been made to develop vaccine for EV71. In order to shorten the development time, the responsibility for the development has been passed transferred to the National Institute of Health. Besides, the CDC has commissioned National Chengkung University to study based on the animal model to investigate the mechanism of infection and the feasibility of vaccine development for EV71

Vision:

1. Reinforce Enterovirus prevention

(1) Strengthen promoting household Hand-Washing Activity, the adults come back from outside must wash hands before contact children.

(2) Highlight the concept of "no school and no work when get sick".

2. The assessment of present prevention policy.

(1) The assessment of consequence of no school policy

(2) Conducting the across area and medical facility integrity research to assess the treatment criterion of Enterovirus severe cases.

3. Continuing the related research.

(1) Research in EV71 Vaccine.

(2) Seroepidemiologic surveillance for EV71.

(3) To investigate and study the risk factors of enterovirus complicated severe case.

(4) To study the genetic mutation and toxicity of enterovirus.

(5) Study of biological characteristics of Enterovirus

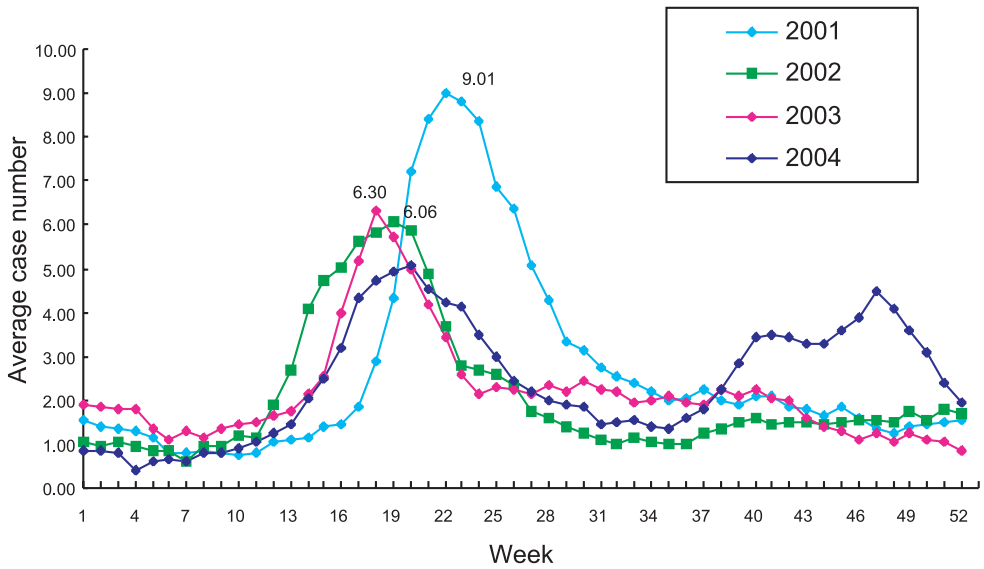


Figure1: The Average Number of Enterovirus Cases reported by sentinel sites physicians in Taiwan

Table 1. Acute Enterovirus Complication Fatality Rate during 1998-2004

Year	Confirmed Cases	Death	Fatality Rate
1998	405	78	19.3%
1999	35	9	25.7%
2000	291	41	14.1%
2001	393	58	14.8%
2002	162	30	18.5%
2003	70	8	11.4%
2004	50	5	10.0%

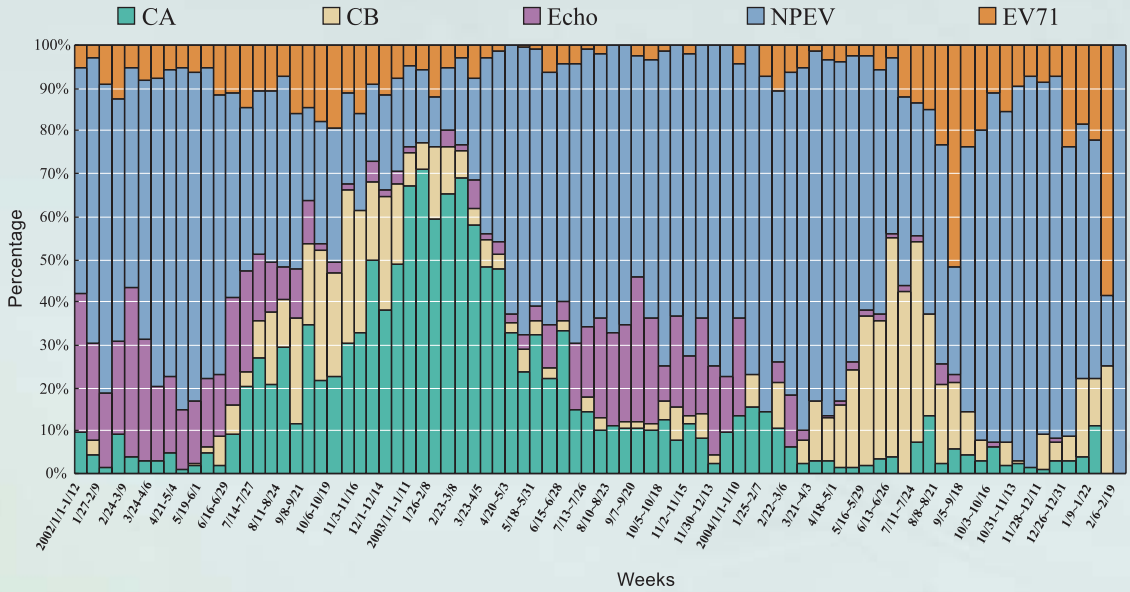


Figure 2. The isolation rate of different type Enterovirus in Contracted Laboratory, 2001-2004

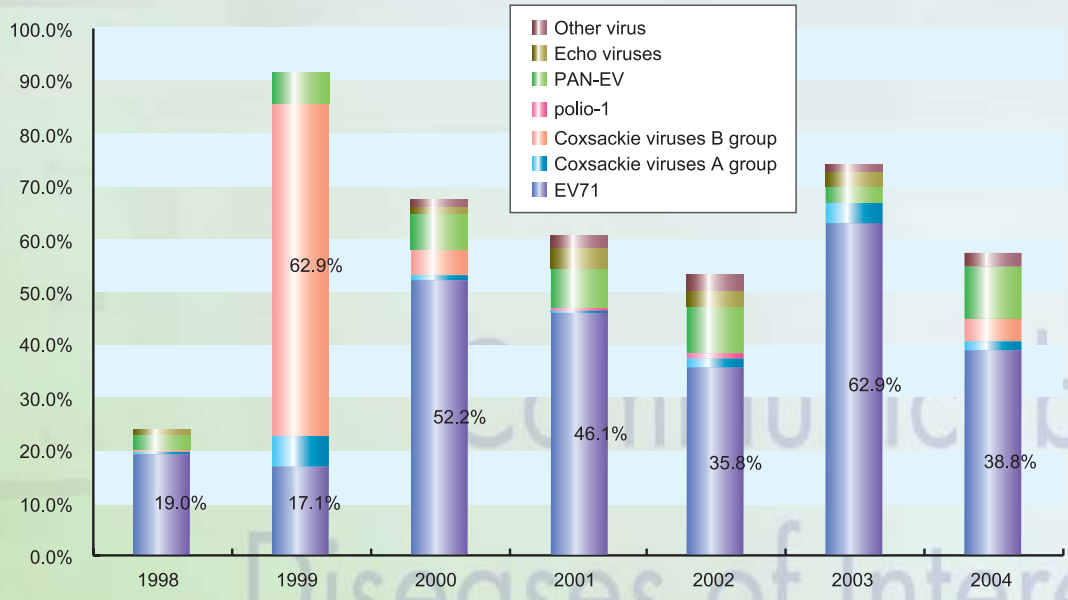


Figure 3. Distribution of number of confirmed critical enterovirus complication cases resulted from different types of enteroviruses over year 1998-2004

Bacillary Dysentery Control in Mountainous Areas

Background

Gastrointestinal tract infections such as cholera, typhoid fever, paratyphoid fever, amoebic dysentery, hepatitis A and other diseases are very rare in Taiwan now. Due to the several disease control policies implemented by the government, the environmental hygiene and people's standards of living have thus been greatly improved. However, hepatitis A and bacillary dysentery (shigellosis) are still the major epidemics in the mountainous regions. Therefore, the Department of Health has performed the hepatitis A vaccination program in the mountain regions since June 1991. The disease incidence rate has been significantly reduced since 1997 and it was even lower than other regions in Taiwan in 1998. Nevertheless, there are still numerous cases of bacillary dysentery in parts of mountain districts in Taiwan. Bacillary dysentery has become the major endemics in these regions. The shigellosis incidence rate is considerably higher in the mountain regions compared to that in other regions. The rate is about ten-folds and even hundred-folds higher in mountain regions. (Refer to Figure 1.)

Shigellosis (Shigella spp.) is a gastrointestinal tract epidemic caused by the shigella bacteria. The incubation period is one to three days. People who caught the bacteria usually developed diarrhea (often with blood and pus) along with symptoms like fever, nausea or toxemia, vomiting, cramps, and tenesmus . Moreover, one third of the patients develop watery diarrhea. On the other hand, an infected person might not develop the symptoms of shigellosis but he is still a shigella bacteria carrier. As a result, he can pass the disease to other people because the pathogen can be found in his stool. Shigellosis is transmitted through oral-anal contact. People are infected with shigellosis through eating or drinking contaminated food or by direct contact with an infected person. In addition, pathogen-carrying insects like flies and cockroaches can also contaminate food. Therefore, practicing personal hygiene, environmental cleanliness and ensuring food and water safety are ways to prevent the spread of shigellosis.

Bacillary dysentery plagues all sectors of society and country. The disease is not merely a personal health problem. It is, at the same time, an economic burden for the family, the community and the nation. For instance, the infected patients would not be able to go to work for several days due to the symptoms of the disease, affecting the amount of home income. In addition, hospitalized isolation of the patients depresses the medical resources. On the other hand, the shigellosis incidence rate is considerably high in mountainous regions. Therefore, the presence of bacillary dysentery greatly discourages tourism in the mountainous regions. As a result, if shigellosis cannot be eradicated from mountain district, the tourists' health is at stack and the tourism business is also greatly affected. Furthermore, the circulation of shigella bacteria could damage the nation's image due to the fact that shigellosis usually happens in places where public health system and sanitation are poor, especially in southeastern Asia and Africa. Yet, Taiwan is already a developed country and the people's average annual gross salary is over 14 thousands US dollars. The numerous shigellosis cases have indeed lowered Taiwan's image in the international society. Consequently, the eradication of mountainous bacillary

dysentery ensures the mountainous inhabitants' well-being, protects the tourism business and enhances the nation's image.

The CDC has set up a "4-year Mountainous Shigellosis Control Promotion Plan" in 2000. The plan was implemented in 2001 in the hope to eliminate the epidemic from the mountainous areas.

According to the annual statistics, several mountainous villages are more prone to bacillary dysentery compared to the other villages. The plan is thus implemented in the thirteen villages in six counties where the shigellosis incidence rate is comparably higher. They respectively are Datong Village and Na'ao Village in Yilan County, Xiulin Village, Wanrong Village and Zhouxi Village in Hualian County, Daren Village, Haiduan Village and Lanyu Village in Taidong County, Fuxing Village in Taoyuan County, Jianshi Village and Wufeng Village in Xinzhu County, and Xinyi Village and Ren'ai Village in Nantou County (refer to Table 1).

Conclusively, changing various respects of the aborigines' life is the only way to completely control the spread of shigellosis in mountainous areas. Correcting personal bad habits, improving cleanliness of residence and water supply as well as reinforcing health education and disease surveillance reporting system are ways to stop the mountainous aborigines from being infected by shigella bacteria. The CDC has already organized a "Mountainous Shigellosis Control Group" in order to improve people's living standard and wipe out bacillary dysentery. The Group works in collaboration with the mountainous health departments and actively set up health education in an attempt to promote shigellosis awareness among the aborigines.

Objectives

To lower the average bacillary dysentery incidence rate in the thirteen mountainous villages to below 50% of the incidence rate in five years, by the end of year 2004.

Strategies

1. To cooperate in the tribal health promotion plan, training and involvement of mountainous social workers in order to organize health education campaigns
2. To subsidize colleges and other charities in constructing health education programs
3. To hold residence cleanliness competition or community observation activities in an attempt to promote the concepts of cleaning and maintaining environmental sanitation
4. To organize talks on shigellosis prevention and drinking water safety for schools and long-term care organizations as well as officials in the health departments in order to upgrade their knowledge about bacillary dysentery control
5. To schedule health education programs for medical personnel in an attempt to control the disease transmission, strengthen the reporting system and carry out the disease prevention as early as possible

6. To implement the health education programs both at school and the community in order to correct people's habits and to stop the circulation of the disease

7. To set up integrated epidemics surveillance system in order to completely control the disease outbreaks and eventually eradicate the disease

8. To establish laboratory examination supporting system in the areas of transmission for early detection of the disease, keeping track of cases and pathogen carriers, preventing double transmission and disease outbreak from happening

Detailed tasks to be carried out in 2001-2004:

1. A special subsidiary fund would be distributed in those targeted rural areas to help with the construction of basic sanitation facilities, such as upgrading drinking water piping, water drainage or disposal facilities, household hygiene improvements, and adding hand-washing facilities.

2. Each involved county in the program would establish a mission-oriented county prevention workgroup that should routinely hold annual and seasonal review meetings within their own jurisdictions.

3. The Taiwan CDC would hold countrywide regular yearend and end of season review meetings of the mountainous rural area Shigella dysenteric prevention and control programs.

4. Motivating local volunteers to take part in the programs: In all the aforementioned thirteen targeted mountainous rural areas, namely Nanao and Datong in Ilan County, Fuhsin in

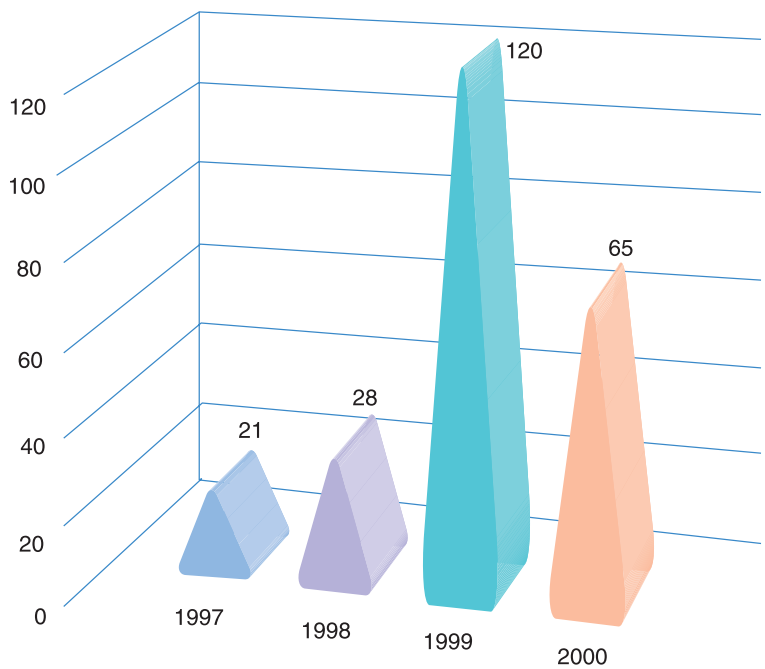


Figure1. The ratio of the bacillary dysentery incidence rate between non-mountainous region and mountainous region.(Y-axis:ratio ; x-axis:Year)

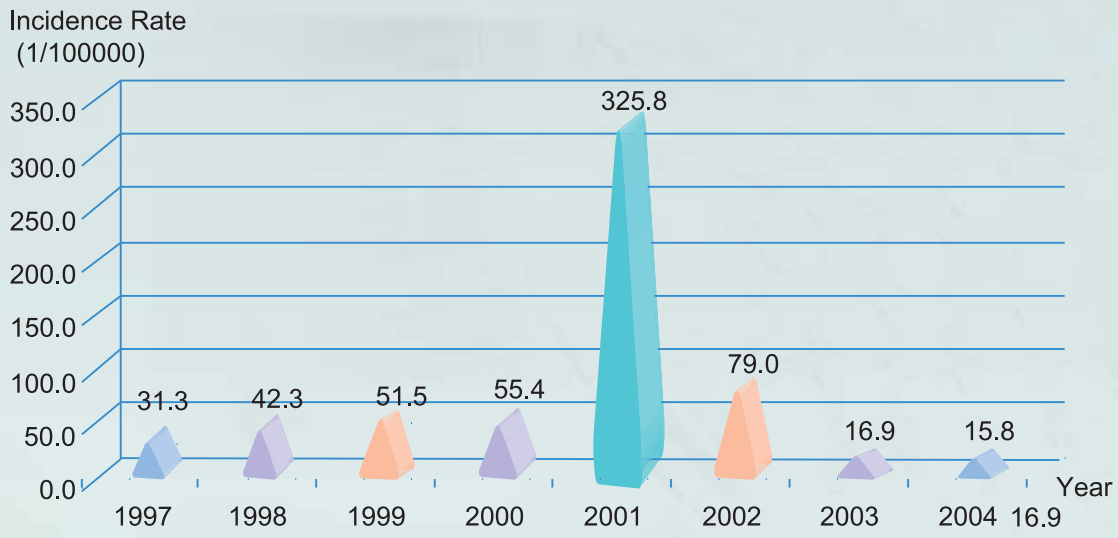


Figure2. Incidence rate of the bacillary dysentery on mountainous region in Taiwan,1997~2004. (Y-axis:Incidence Rate ; x-axis:Year)

Taoyuan County, Chanshih and Wufeng in Hsinchu County, Renai and Hsinyi in Nantou County, Hsiulin, Chaohsi and Wanjung in Hualien County, and Haituan, Dajen and Lanyu in Taitung County. Later in 2002, we also expanded the program coverage to add some rural areas in Chiayi County, Kaohsiung County, and Pingtung County, and some additional other later added mountainous rural areas in Chiayi County, Kaohsiung County, and Pingtung County, volunteers would be recruited, trained, and put in the program to assist in the efforts.

5. Holding health education campaigns by giving lectures to the public on living environment, habits of hygiene, and agricultural behaviors: Altogether during the four years of this program, we held a total of 4343 lectures of such kind in the nine counties, i.e. Ilan, Hsinchu, Taoyuan, Nantou, Chiayi, Kaoshiung, Pingtung, Taitung, and Hualien, involved in this program.

6. Increasing the frequency of lectures offered on disease reporting protocols for healthcare workers: During the four years of this program, we held a total of 458 lecture sessions in the above-mentioned nine participating counties.

7. In all targeted thirteen rural areas, a widespread propaganda campaign was mounted for program promotion through the creating and showering of the region with flags, flyers, posters, and large billboards of a health education nature.

8. Setting up laboratory supporting systems in Nantou County, Hsinchu County, and Ilan County.

9. In the three counties included later in the program, the local health bureaus held countywide painting contests on the subject of prevention and control of mountainous region Shigella dysenteric infections, and transformed the winning paintings into large health educational

billboards. In this way, the campaign was rich in the culture and character of the indigenous people, and elicited a popular response.

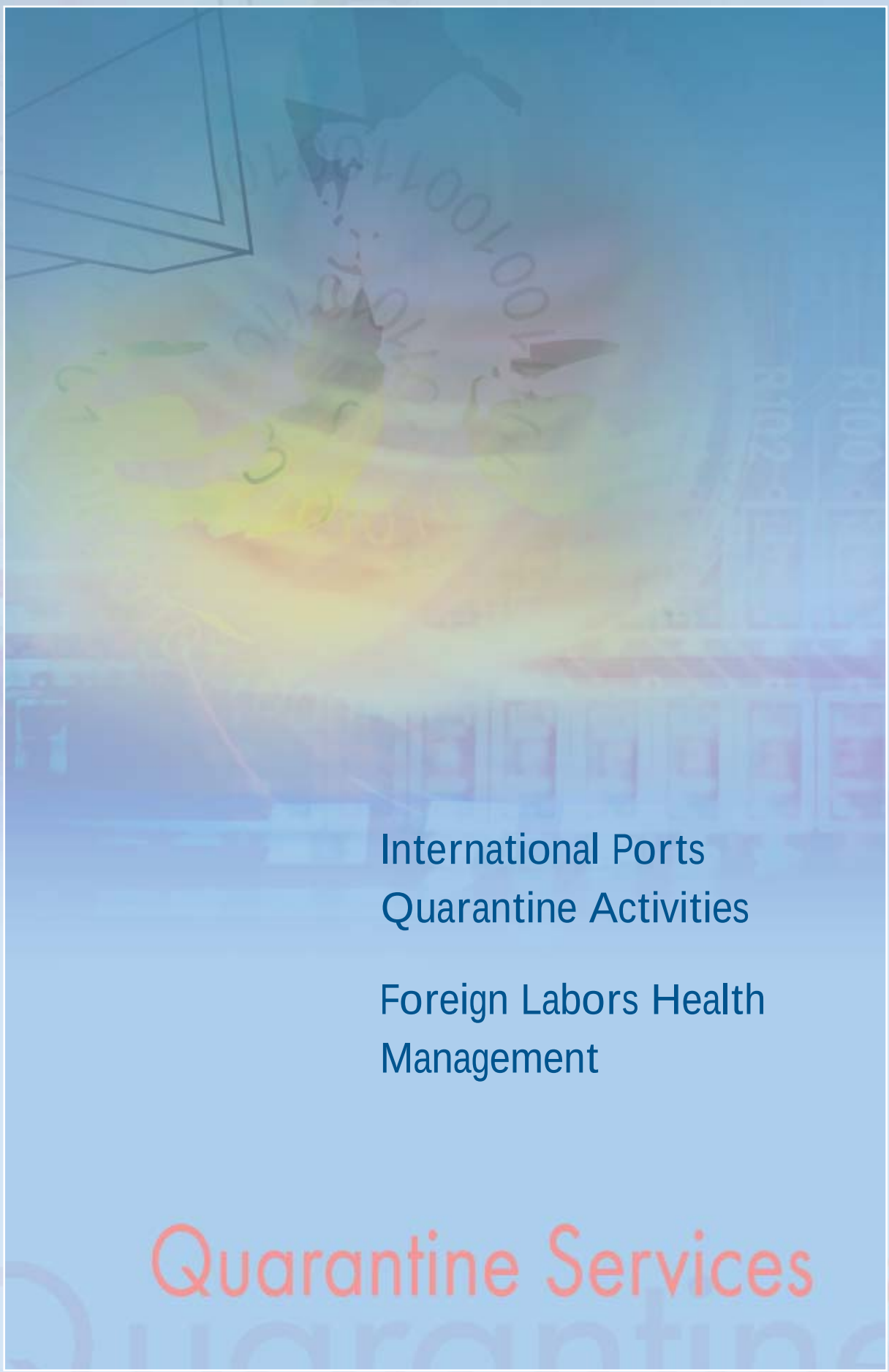
10. At the yearends of 2002, 2003, and 2004, the three later added counties conducted their own annual achievement evaluations and contests.

Achievements

The Four-year Plan for Controlling Bacterial Dysentery in Mountain Villages was wrapped up in the end of 2004. In the year, 36 cases were found per 100,000 people in the mountain villages of nine priority counties and cities, showing a 84% decrease in incidence in these villages in comparison with the average of 223 cases for the previous five years. Of all the mountain villages, the case counts for the eight years, 1997-2004, were 31.3, 42.3, 51.5, 55.4. 325.8, 79.0, 16.9, 15.8 respectively, indicating the rampage of bacterial dysentery was brought under control. Thanks to the control on imported cases and in populous organizations, the rates of incidence per 100,000 people in villages and townships on the level land between 1997 and 2004 (January 1 to Deecember 16) were 1.5, 1.5, 0.4, 0.9, 2.7, 1.1, 0.3, 0.1, showing that bacterial dysentery in these villages and townships were brought under control as well.

Table1. The number and the statistics of shigellosis cases over five years (1997-2000) of disease prevention

		1997	1998	1999	2000	Total	Average	Median
Taidong County	Haiduan	1	0	1	4	6	2	1
	Daren	1	0	1	0	2	1	1
	Lanyu	1	2	0	1	4	1	1
Total		3	2	2	5	12	3	3
Yilan County	Datong	3	8	35	17	63	16	13
	Na'ao	1	2	7	8	18	5	5
Total		4	10	42	25	81	20	18
Hualin County	Sioulin	12	11	18	49	90	23	15
	Zhouxi	0	6	3	9	18	5	5
	Wanrong	1	12	0	9	22	6	5
Total		13	29	21	67	130	33	25
Nantou County	Ren'ai	35	30	25	11	101	25	28
	Xinyi	4	1	6	6	17	4	5
Total		39	31	31	17	118	30	31
Taoyuan county	Fuxing	0	6	0	0	6	2	0
Total		0	6	0	0	6	2	0
Xinzhu County	Wufong	0	0	4	0	4	1	0
	Jianshih	1	10	10	1	22	6	6
Total		1	10	14	1	26	7	6
Overall Total		60	88	110	115	373	93	99



Quarantine Services

International Ports Quarantine Activities

Foreign Labors Health Management

International Ports Quarantine Activities

Background

Taiwan, situated in the subtropical zone, is suitable for the spread of many tropical diseases. This is especially true when international tourism and trade have become increasingly frequent. To tighten the quarantine, the government has set up quarantine offices at the Chiang Kai-shek Airport of Taipei and the Xiaogang Airport in Kaohsiung, and in the seaports of Keelung, Kaohsiung, Taichung, Hualien, Suao, Mailiao, and Heping to prevent the import of diseases and protect people's health. At present, quarantine work at these airports and seaports is in the charge of the branch offices of the CDC, which plans and supervises the operations through its Quarantine Division.

To meet the requirements of the International Health Regulations (IHR) and prevent the import of diseases by aircrafts and ships, the CDC has revised the Requlations Governing Quarantine at Port, authorizing the quarantine units to take necessary quarantine measures against inbound ships, aircraft, their crews, passengers, and cargos for the sake of national security and the protection of people's health.

Goals

1. Strengthening information management: This involves strengthening the functions of the “one-window stop system of quarantine operations” to make the quarantine process and the information management more efficient.
2. Streamlining the process of operations: This calls for timely revision of the operational process by following the trend of the times and by benefiting from collective wisdom.
3. Following through the quarantine procedures: All inbound aircrafts and ships as well as their passengers and cargoes, including rats, must be subjected to quarantine so as to prevent the import of diseases.

Strategies

1. One-stop service: Establish a one-stop service for aircraft, ship quarantine and for the process of deratting certificates, vaccination, and collection of fees and make online check and statistics for quarantine operations.
2. Quarantine for aircrafts and ships

   (1) Quarantine by review: Let an incoming aircraft or ship to report to the quarantine unit on the state of its sanitation and the health state of persons it is carrying with the use of telegraph, telex, fax, mobile phone, or e-mail. It may be allowed to enter the port after the quarantine unit has reviewed the report and believes there is no danger of the import of disease so as to shorten the time of quarantine.

(2) On-board quarantine: If an inbound ship or aircraft has not applied for quarantine, or if it has but is found as having failed to meet the quarantine requirements, or if it has reported of carrying a patient suspected of suffering from a communicable disease, or if there is abnormal death of rats, or, in the case of an aircraft, if there is a suspected patient or death, quarantine officers will go aboard the ship or aircraft to quarantine the whole aircraft or ship. The following table shows the state of quarantine in 2004:

Statistics on quarantine work at international harbors in 2004

Quarantine unit	Ships	Passengers	Aircrafts	Passengers	Cargo planes	Tonnage of cargo
1st Branch Office (Keelung Harbor)	9,286	56,175				
1st Branch Office (Suao Harbor)	934	0				
1st Branch Office (Kinmen Harbor)	2,163	230,395				
1st Branch Office (Matsu Harbor)	997	21,015				
2nd Branch Office (CKS Airport)			59,303	8,140,362	15,243	4,609,713
3rd Branch Office (Taichung Harbor)	4,335	563	16	1,428		
4th Branch Office (Kaohsiung Harbor)	13,530	1,771				
5th Branch Office(Kaohsiung Airport)			12,701	1,621,243	645	222,192
6th Branch Office (Hualien Harbor)	414	0	13	1,062		
Total	31,679	309,919	72,033	9,764,095	15,888	4,831,905

3. Quarantine for crews and passengers

For the early detection and prevention of communicable diseases, all arriving passengers should have their body temperature checked by infrared thermal scan. All arriving passengers should fill out the “Communicable Disease Survey Form”. Individuals reporting possible symptoms would either be required to have a specimen taken on site depending on the severity of the symptoms and their travel history or will be followed up by local health authorities about their symptoms to prevent and contain imported communicable disease. However, from December 1, 2004, only arriving passengers who show symptoms are required to fill out the “Communicable Disease Survey Form”.

In 2004, a total of 10,589,159 passengers arrived in Taiwan, filling out 9,720,375 quarantine forms. Of these passengers, 50,889 indicated as having symptoms and, therefore, were put on the tracking list of the local quarantine units. Arriving passengers who become ill after entry are encouraged to seek medical advice, and inform their doctors of their recent travel history. A nationwide toll-free hotline has been set up by the Center for Disease Control at 0800-024-582 for consulting purposes. In 2004, 43 cases of shigellosis, 57 cases of dengue fever, 3 cases of malaria, and 1 case of cholera were detected from the filled forms or through the taking of body temperature.

4. Quarantine for imported fishery products: To prevent the import of *Vibrio cholera* through the import of fishery products, all products designated A02 in the Categorized Table of Imported and Exported of fishery Products should apply to the quarantine unit for inspection. Only when it has passed the quarantine, can it be allowed to clear the Customs. However, under the newly revised "Regulations Governing Quarantine at Port," quarantine of *Vibrio cholera* is no longer performed for imported fishery products as of August 12, 2004. The following table shows the quarantine situation for imported fishery products in 2004 (up to August 11):

Quarantine statistics for fishery products, 2004

Quarantine unit	Cases rejected	Tonnage	Cholera vibrio positive	
			Non-toxic	Toxic
1st Branch Office (Keelung H.)	1,077	18,600	0	0
1st Brach Office (Suao H.)	1	2	0	0
2nd Branch Office (CKS Airport)	15,462	15,653	0	0
3Rd Branch Office (Taichung H.)	39	703	0	0
4th Branch Office (Kaohsiung H.)	1,569	60,330	0	0
5th Branch Office (Kaohsiung Airport)	1,714	1,128	0	0
6th Branch Office (Hualien H.)	0	0	0	0
Total	19,862	96,416	0	0

4. Control of vectors in harbors: The purpose is to control the density of vectors in the harbor and the spread of communicable diseases. The various quarantine units have taken the following measures to stop the breeding of vectors for the protection of people's health.

a. Control of rats in harbor area

(1) Anticoagulant bait is placed around the year where rats are most active in the harbor area and airport. The bait is replenished every 10 to 15 days to ensure its effectiveness.

(2) A plan for monitoring the parasites and infectious serum of rats in airport and harbor areas (including Kinmen Matsu, a terminal of the mini sea link with the mainland) was mapped and carried out. The rats caught in such areas are examined for exterior parasites and blood analysis to understand the variety and quantity of the parasites. The blood serum is examined for evidence of plague and Hanta virus to prevent the import of such diseases.

b. Control of vector mosquitoes in the harbor area: Mosquitoes are vectors of several communicable diseases including yellow fever and dengue fever. Their density is closely related to the spread and development of an epidemic. Therefore, it is necessary to grasp the variety of mosquitoes and the rise and down of their quantity and to kill them in time for the prevention of an epidemic. The following methods have been adopted:

(1) Checking the density of dengue fever vectors breeding in containers: The empty bottles, jars, and tires that are prone to retain water in the harbor area are checked once every month to grasp the breeding of vector mosquitoes. The wigglers are killed.

(2) Setting up contrivance to induce mosquitoes to lay eggs on it: Such contrivances are placed in many places in the harbor area for mosquitoes to lay eggs. They are pieces of coarse cloth wetted with Temephos. After the eggs have hatched, the baby mosquitoes are killed by the insecticide, so they cannot grow up. The fabrics are replaced every month, and the eggs laid on them are used for calculating the mosquito index in the harbor area.

(3) Mosquito survey: Lamps are hung in a few selected placed to trap mosquitoes for analysis in order to grasp their types and activity.

(4) Establishing "joint supervisory groups for epidemic control at international ports": They are organized by the CDC's branch offices among representatives of the harbor (or airport) authority, the harbor (or airport) police, the customs, the cargo transportation station, and other related organizations. These representatives meet every four to six months, depending on the circumstances, to guide the improvement of pest control on the basis of the density of mosquitoes and the elimination of their breeding grounds. If necessary the related organizations are asked to spray insecticides.

c. Control of rats on ships: To prevent the spread of diseases by rats on ships plying on international routes, the CDC imposes control on such ships in accordance to Article 53 of the WHO's the International Health Regulations and Article 27 of the Regulations Governing Quarantine at Port.

(1) Deratting for ships (or deratting exemption): The deratting certificate (or deratting exemption certificate) held by a ship is valid for six months. A new one should be applied if the old one expires. If the sign of rats is discovered, the ship must eradicate the rats immediately before getting another certificate. If no sign is found, a deratting exemption certificate will be issued.

(2) To prevent rats running to the shore along the mooring cable, a rat guard must be hung on the cable. If a ship is found as having failed to do accordingly, it will be corrected and put on record for quarantine reference when it called on the port next time.

d. In coordination with the start of mini links with the mainland from Kinmen and Matsu, the CDC has set quarantine units on the two offshore islands.

e. The quarantine work for illegal mainland immigrants caught at various fishing ports is entrusted on the health authority of each place.

f. The CDC's quarantine units have invited the various related organizations to establish a "joint supervisory group for epidemic control at international ports."

Future Prospects

1. Increase the manpower and equipment, strengthen the functions of quarantine, and perform

the quarantine conscientiously in order to stop the import of diseases into the country

2. Strive to cultivate quarantine personnel, encourage the development of new quarantine techniques, and raise the quality of quarantine officers and their work
3. Strengthen the eradication of rats on ships, the survey of rat density in harbor area to avoid the spread of communicable diseases

Foreign Labors Health Management

The government began the introduction of foreign workers into Taiwan in October 1989 in response to the immense amount of laborers needed for the economic development. At present, there are about 300 thousands foreign workers in Taiwan. They are mainly from countries such as Indonesia, Malaysia, Philippines, Thailand and Vietnam. All legally imported foreign laborers are required to have a health examination before filing for an entry visa application in order to prevent any disease importation that might threaten the health of the people in Taiwan. Moreover, all admitted foreign workers are required to attend a routine health check-up within the first three days of arrival. On the other hand, they have to be given physical examination on the 6th, 18th and 30th month after their arrival to monitor their health during their stay in Taiwan. Currently, the mandatory health check-up categories include chest X-ray examination, HIV antibody screening, syphilis serum screening, hepatitis B surface antigen screening, intestinal parasite screening, pregnancy check in addition to general health check which includes psychological health state and leprosy screening.

If a foreign worker is found to carry intestinal parasite (excluding *Entamoeba histolytica*), he/she is required to receive treatment within the thirty days of the disease discovery. On the other hand, if the foreign worker is tested positive for any of the aforementioned categories or is found with any of the 21 notifiable communicable diseases would immediately be sent back to his/her own country in order to ensure the safety of the people in Taiwan.

The total number of health check-up for the employed foreign workers in 2004 is 404,989. 8,175 out of the total failed the check-up, resulting in a failure rate of 2.02%. Moreover, 7,833 of the failures were tested positive for intestinal parasites, resulting in the highest failure rate of 1.93% among all the tested categories. Followed by the chest X-ray examination, 178 people found tuberculosis and the failure rates were 0.04%. On top of that, 18 people were tested positive for HIV antibody.

National Immunization Information System

National Immunization Information System

Expanded Program Immunization(EPI)

Hepatitis Control Program

Eradication Program of Polio, Measles, congenital Rubella Syndrome and Neonatal Tetanus

National Immunization Information System

Background

The rapid change in society and the easy accessibility to medical resources have resulted in the withering of medical services rendered by health stations, but in another respect the immunization services of health stations have been valued increasingly. Therefore, they should move toward the use of computers to increase their efficiency. When computer came into being, everyone hoped that it would replace human labor to make work and management more effective. The DOH began to push computerization for the health departments in 1993 and have established DOS PHIS to help health departments and stations to establish three major systems--outpatient service, immunization for health protection, and administrative management. However, new operational needs continue to grow and the information and network technology have since developed by leap and bound dominating the mode and direction of the development of application systems. As a result, the DOS PHIS has gradually become inadequate.

As the people have the freedom of movement and the choice for their service environment, they can get to the vantage point to get immunization. Under the current system, when a man goes to a medical institution (including health stations) to receive vaccination, he must establish a basic personal file and, after evaluation, the doctor will enter the vaccination and other information into a referral slip and into the medical history. If the man goes to the health station of his locality to get vaccination, he can immediately be entered into the DOS PHIS system. On the contrary, if he goes to get vaccination in a health station or another medical institution not located at his domicile, he needs to complete a yellow card and mail it to the health station of his domicile, which will use manual labor to key in the information for filing and then the health station has to use PHIS to make the data of vaccination administered in other places into notices for transmission together with the referral slip to the health department, which will in turn transmit it to the health department of a county or city (the so-called consolidation system), consuming much time and manpower. The basic personal data in the computer, however, come from the Department of Civil Affairs of the Ministry of the Interior, whereas extraction of the information must go through the DOH Information Center, which, in doing so, has to ask the Ministry of the Interior to transmit the information of changes to the regional information center (RC) every two weeks for distribution to health stations. The health stations use this way to connect with the domicile registration system to enable health workers on the base level to know the number of individual cases and the information (birth date, moving out or moving in the domicile district) for use as the basic materials for administrative analysis. Because it does

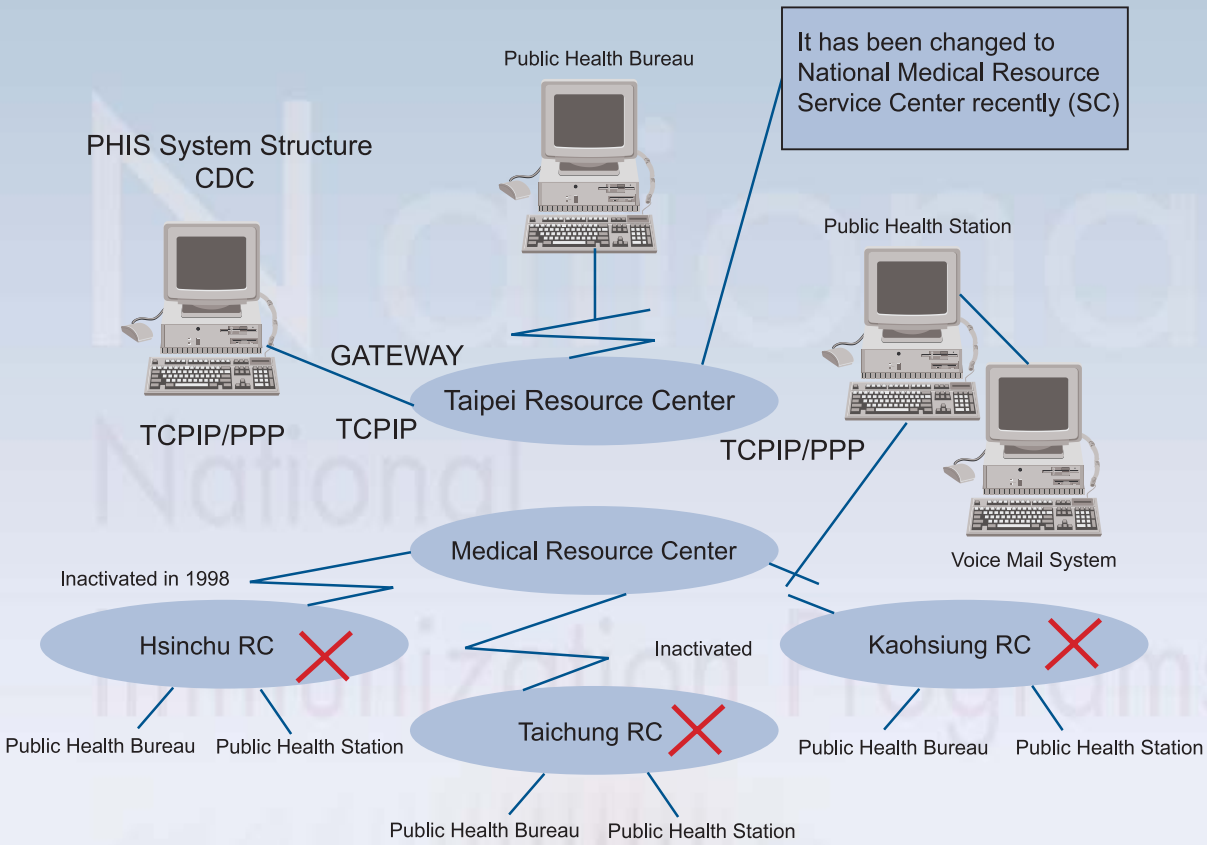


Figure 1. PHIS structure

not have an official specifically in charge of this business and also because the problem arising from line connection with the RC, the domicile department cannot transmit the data on domicile changes within the required two weeks. Therefore, there is often delay in mailing the referral slips, sometimes for as long as one or two months. The mode of PHIS operation is show in Figure 1.

Taking into consideration of the untrammelled movement of people, the convenience for keeping the health data, and the fact that immunization is a nationwide demand, the CDC hopes to use the current information technology to develop and set up a National Immunization Information System" based on the existent network for health departments and medical institutions. This system can be used to integrate the current administrative health organizations, the hospitals contracted for administering vaccination and the database of domicile department so that they can take advantage of the system function of automatic referral and consolidation to keep the immunization data in whole and reduce the workload of the staff of the health station. Figure 2: Operational mode of NIIS

Goals and Strategies

1. Health departments in county and city may continue to use NIIS to put online their contracts signed with hospitals. The usage rate has topped 93%, which may be taken as part of the basis of performance review and evaluation.

2. Domicile data may be obtained from the Department of Civil Affairs of the Ministry of the

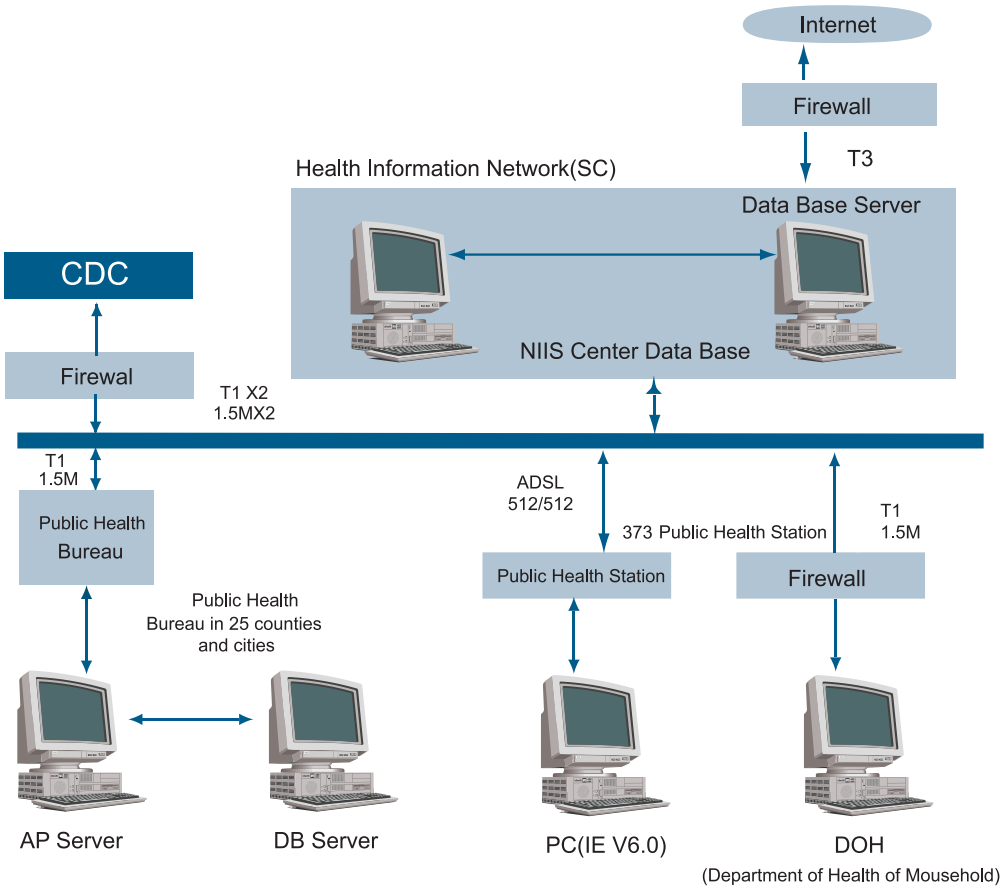


Figure 2. NIIS Internet structure

Interior. The information on daily changes can be collected from the data by using a computer program for transmission to the databank of the National Immunization Information System, which may be connected with the NIIS domicile databank. Then, the data (including moving in, moving out, birth, and death information) can be passed down to health stations for use in referral consolidation. Thanks to this referral-consolidation mechanism, the immunization data scattered in the health stations of various places can be integrated to reduce the use of human labor for registration, to eliminate the need for keeping the data, to cut down on the expense for referral consolidation, and to attain the goal of cost-effective operation.

Achievements

1. Local Database System of the National Immunization Information System

(1) By the end of 2004, the average NIIS online rate of contractual medical institutions had reached 93% (see Figure 3)

(2) The use of magnetic disks for reporting immunization data to the health stations and for entering the contractual medical institutions into the computer by taking advantage of the NIIS function of referral consolidation has eliminated the need for people to fill out the referral form, a practice when PHIS was in use, and therefore health stations no longer need to screen the data for mailing, saving manpower and mailing cost as well. Figure 4: Total manpower cost for processing referral slips

2. Central Database Subsidiary System of the National Immunization Information System

The system has the following features and can help the competent departments at central level in many ways for supervising local immunization affairs and for making policies:

(1) Using the data extracted from the databank of the Ministry of the Interior to establish the basic data for all the people in the nation and the complete immunization data of the nation

(2) Automatically updating the NIIS databank, the basic data of the national databank, and the immunization data of individual cases

(3) Grasping in time the stockpile of vaccines in the nation through the use of the national vaccine stockpile system

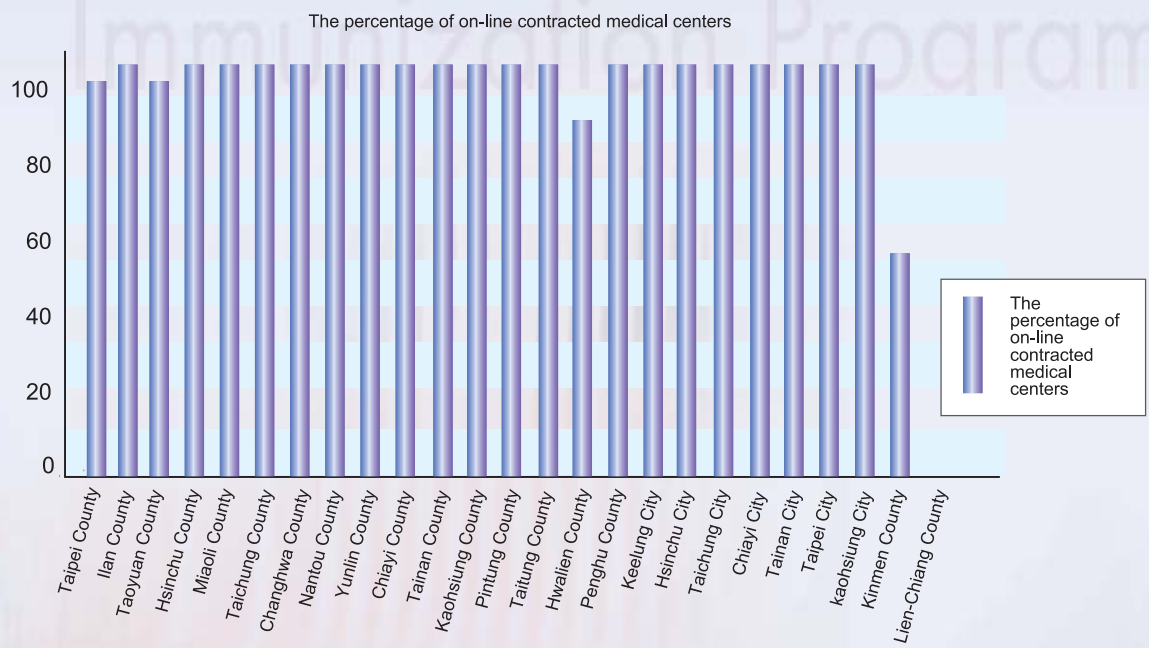


Figure 3. The percentage of on-line contracted medical centers

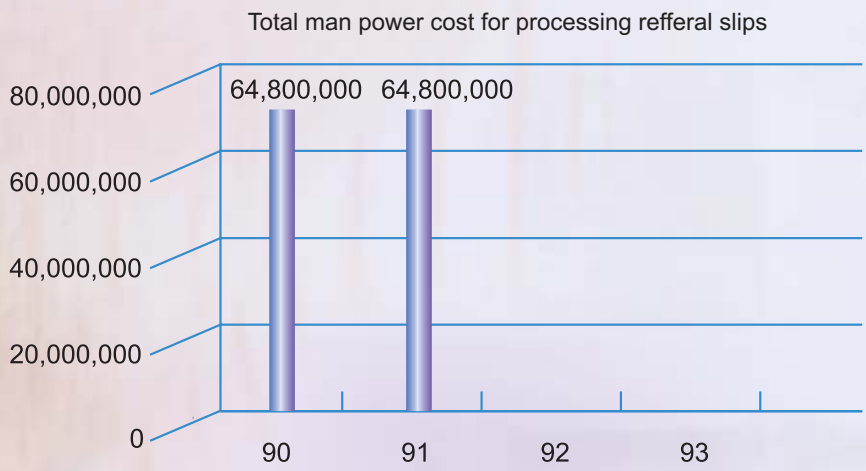


Figure 4. Total man power cost for processing refferal slips



(4) Including the mechanism for controlling the time and process for sufferer to receive relief so individual cases can be monitored

(5) Reading the data on the Communicable Disease Notification System, completing the data on people having chronic diseases in the nation, flu immunization for the elders and its percentages to the people having chronic diseases

(6) Auditing the various NIIS reports filed by local organizations and providing the information to the appropriate departments and policy-makers

(7) Establishing a website for staff members of health departments and stations to enquire about the educational and publicity materials on immunization and for discussing immunization problems. The system will be open to the public in the future.

3. Immunization Research System

The system is established for staff members of health departments and stations to check the immunization data of people not living in their locality.

Future Prospects

Since the completion of the National Immunization Information System, the domicile departments, health agencies, and medical institutions have comprehensive online connections for rapid transmission of data. The digitalization of operations for referral consolidation has saved people from filling out the referral slips (the so-called yellow card), reduced the workload of health personnel on base level and provided convenience for the people. The function for pushing people to receive immunization can remind these people of the time for immunization and can secure the work of disease control.

In the long run, the Central Database Subsidiary System can be used for supporting policy making, for evaluating the effectiveness of vaccines, for reporting on isolated cases of ill effect, for supervising the control of disease through immunization, and for immediately getting the information needed by disease control. In the future, Taiwan health and medical operations will move toward the goal of internationalization. Information web is the center of the 21st century for integrating health and medical information as required in the promotion of various health policies.

Expanded Program on Immunisation(EPI)

Background

Vaccination is one of the most cost-effective strategies adopted by health authorities to fight against vaccine-preventable diseases. Since 1948 when Diphtheria Toxoid was firstly introduced to Taiwan, an Expended Program on Immunization (EPI) strategic plan has been implemented to prevent children from diseases' threats. Nowadays, DTP, BCG, OPV, and vaccines against Japanese Encephalitis, measles, hepatitis B, mumps and rubella (MMR) are recommended to infants and children.

With the intensified efforts taken by the central and local governments as well as local health organizations, many once-common vaccine-preventable diseases have been under controlled. Smallpox was eradicated in 1955, and poliomyelitis was also eradicated in the Western Pacific Region where Taiwan is located in 2000. Furthermore, measles and rubella have been effectively controlled.

Strategies

1. To continue the routine immunization services, and follow the goal of the global disease control strategy to strengthen the immunization system and promote a supplement plan.
2. To increase the immunization coverage and quality of service.
3. To develop a high-quality supply and vaccine management program.
4. To provide an appropriate evaluation program for the routine promotion of EPI program.
5. To review and modify the EPI strategic plans to face the current need for the national and international control of infectious diseases as well as the ongoing immunization needs and capabilities.

Objectives

1. To initiate a chicken pox immunization plan for infants. Starting from January 1, 2004, the chicken pox vaccine is compulsory for infants born after January 1, 2003. It has been included to the EPI-recommended vaccine list. It is estimated more than 200,000 babies get the protection.
2. To manage and maintain the purchase, distribution, and cold chain system of vaccines recommended by the EPI program.
3. To increase the immunization coverage by strengthening the immunization services and to promote the supplement plan.
4. To hold training seminars on cold chain system, storage management and immunization practice, in order to ensure the quality of vaccines and the professional knowledge of medical personnel.
5. To continue the flu vaccination program. Given the urgency of flu control and the need of the whole epidemic control program, the program was expanded in 2004 from old people above the age of 65 to children between the ages of six months and two years and people who are involved in raising or disposing poultry and animals.
6. Plug the possible loophole in the network of disease control. The CDC has urged parents to take with them the passports and IC cards of their babies when they take them to contractual hospitals or health stations for vaccination.

Future Perspects

1. To build up a plentiful and safety vaccine supply system and to increase the immunization coverage for all kinds of vaccination by implementing the immunization services, in order to reach the goal of eradication or elimination of some vaccine-preventable diseases.
2. To consider including a new vaccine to the EPI-recommended vaccine list by reviewing the current situation of communicable disease control; assessing their impacts on the public health, social economics and medical costs; updating information on the vaccine R&D, production and supply; allocating the health fiscal budget for vaccines purchase.
3. To develop and promote an appropriate immunization program for the elderly, in order to reduce the mortality and morbidity that caused by the severe complications of the vaccine-preventable diseases.

Hepatitis Control Program

Background

Starting from June 1995, 15-month-old babies in the mountain region will be given free vaccination of hepatitis A. In 2002, the targets of vaccination were changed from babies over 15 months to babies of and over two years of age. To cope with the increasing number of people traveling between Taiwan and the mainland China after the establishment of the mini-Three Links, free hepatitis A immunization is provided for children aged between 2 years and 12 years in Kinmen and Lienchiang (Matsu). Considering that blood transfusion is accompanied with the danger of hepatitis A infection, the CDC provides hepatitis A immunization for domestic hemophiliacs with negative anti-HAV, beginning on December 15, 2004. It is expected that this service will be continued until the end of 2005.

Hepatitis B virus (HBV) infection is an important cause of chronic hepatitis, cirrhosis and hepatocellular carcinoma in many parts of the world, including Taiwan. Up to 15% to 20% of the general population in Taiwan are chronic carriers of hepatitis B surface antigen (HBsAg). Most chronic carriage of HBV results from infection in early childhood, especially before 2 years of age.

Chronic hepatitis, cirrhosis and liver cancer have been the major causes of death in Taiwan for a long time. 95% of chronic hepatitis, cirrhosis and liver cancer have been the sequelae of infection of hepatitis viruses in Taiwan and among there is approximately 80% was infected by hepatitis B.

According to the past surveys, the average rate of hepatitis C infection in Taiwan is 0.9-1.6%. This is to say that there are 200,000 to 400,000 chronic hepatitis C patients in Taiwan. Geographically, most of the patients are living in the coastal area and in some aborigine communities. For instance, 24.3% of the residents of Baisha Village in Penghu County aged 30-64 have the disease. Other seriously infected areas are Taisi in Yunlin County, where 55.1% of the residents above the age of 40 are infected, and the infection also runs as high as 30% in some communities at Shuishang. The disease is also rampant in Chiayi City and County and Tainan County etc. Since July 1992, it has been stipulated that blood transfusion should be test anti-HCV and, therefore, blood transfusion is now a rare source for hepatitis C infection. Hepatitis C will turn into a chronic disease for about 85% of the patients, of whom 20-30% will have liver cirrhosis in 20 to 30 years and 1-4% of them develop hepatocellular carcinoma each year.

During 1982-2002, the five-year-plan for Hepatitis Control Program has gone through the first, second, third and fourth stage. The fifth five-year-plan of Hepatitis Control Program started in 2003 and will last until the end of 2007. The priorities are to strengthen the surveillance system for acute hepatitis cases, sever the route of hepatitis A infection, tighten the health education on hepatitis control, enhance blood transfusion safty, and raise the quality of hepatitis examination. The CDC will move in the following directions: developing the vaccine-manufacturing technology, screening for the early detection of hepatocellar carcinoma, and seeking effective treatment for hepatitis.

Goals and Strategies

Goals and strategies are mainly included to raise the immunization coverage rate of hepatitis B over 95%, to increase the pregnant women screen rate for hepatitis B up to above 90%, to promote immunization coverage rate for hepatitis A for 2 year old in the mountain regions and drop mountain regions incidence rate to 5 of 100,000 population, strengthen the quality control of hepatitis diagnosis and make the accurate hepatitis diagnosis up to over 90% .

Achievements:

1. Immunization:

(1) Hepatitis A

The confirmed cases of acute hepatitis A in mountain regions have been diminished to 1 confirmed case in 2004 from 183 cases in 1995 and the incidence rate was lowered from 90.7 per 100,000 populations in 1995 to 0.5 in 2004.（fig1）

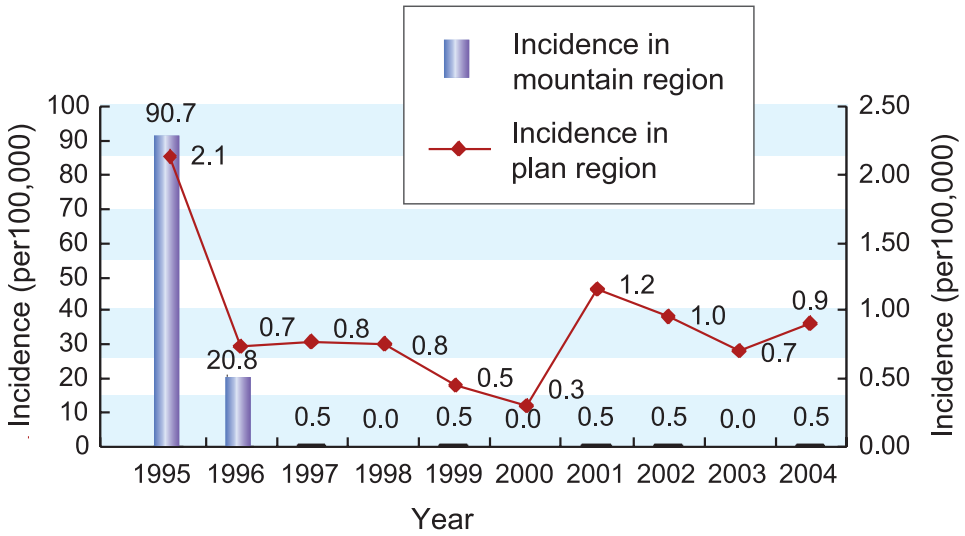


FIG1: Incidence of Hepatitis A in Mountain and plain Region in Taiwan, 1995-2004

(2) Hepatitis B

(A) A seroepidemiology study, of 1500 children at age six in 1990, 1992, and 1994, were conducted by the Department of Health. This study shows that the carrier rates of each year have declined significantly from 10.5% in 1990 to 1.7 % in 1994 respectively. (fig2)

(B) During the 15 years since the vaccination program was implemented, the prevalence of HBsAg among persons younger than 15 years of age decreased from 9.8% in 1984 to 0.7% in 1999。

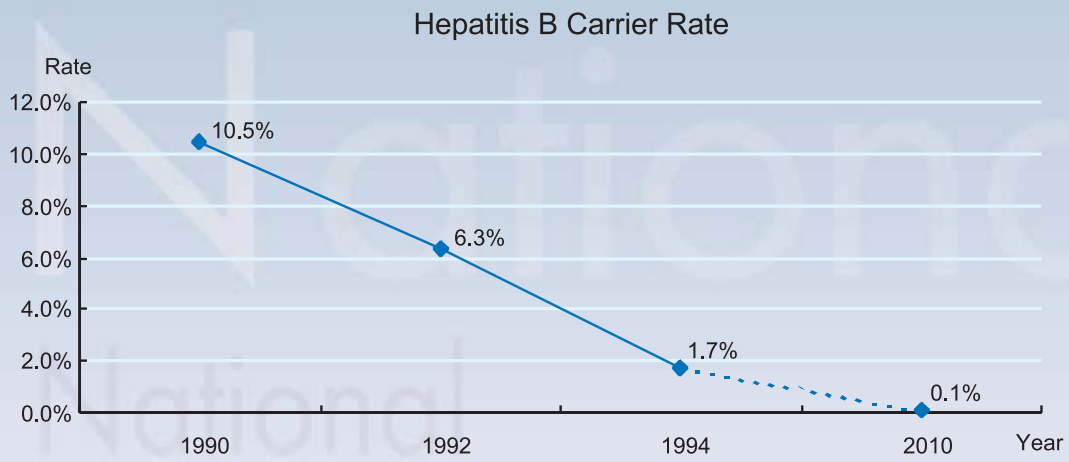
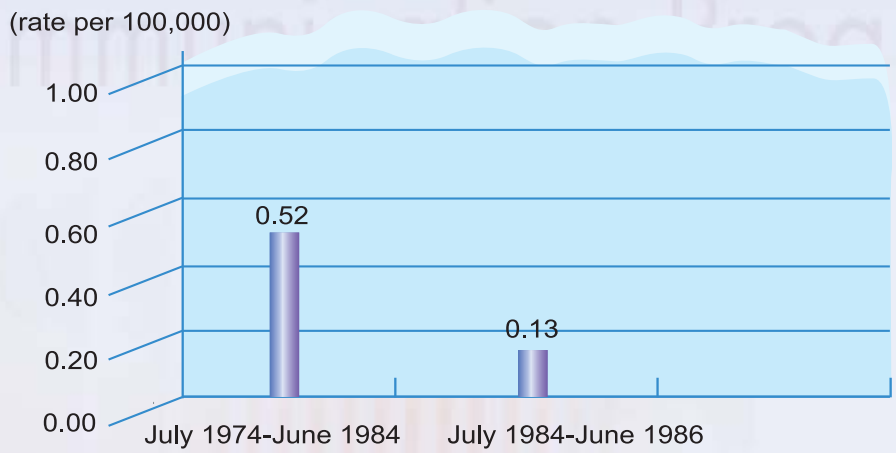


FIG2: HBsAg Positive Rates among Three Cohorts at Age of Six



Source: Mei-Hwei Chang, et al. N Engl J Med 1997: 336:1855-9

FIG3: Average Annual Incidence of Hepatocellular Carcinoma in Children 6 to 9 Years of Age, Taiwan

(C) A recent study of the hepatocellular carcinoma in children conducted by the National Taiwan University Hospital also shows that the average annual incidence in children six to nine years of age has declined from 0.52 per 100,000 children for those born before the immunization program to 0.13 for those born after the program. (fig3)

(D) The seven-year follow-up immunogenicity and protection of universal hepatitis B vaccination in children . The percentage of protective anti-HBs (S/N >= 10) droped from 58 % at age 7 to 24 % at age 14. The decay of anti-HBs showed one year of increase in time induces a 1.4-fold reduction of geometric mean titer during age 7 to 15 years. The protection against infection with isolated anti-HBc seroconversion is not complete especially when serum anti-HBs titer falls to low levels. Yet routine booster vaccination may not be needed before age 15.

2. Health Education: Educate the general public through the publicized printouts and electronic broadcasting media. Design different types of publicized and educational methods for different targeted general public to reinforce knowledge and prevention of hepatitis.

3.Quality Control of Hepatitis Diagnosis: Supervise and monitor the quality control of hepatitis diagnosis in order to keep diagnosis of HBsAg correct rate over 95%.

4.Study and Research of Hepatitis: Proceed with the study of prevention of all types of hepatitis to understand the related problems with the incidence rate, infected residual defects, mechanisms, and treatments as well as providing the study result as references for hepatitis prevention measurement.

5.Promotion of Enforcing Hepatitis B and C Trial Treatment Program of Bureau of National Health Insurance: There are approximately 2.5 million of carriers of hepatitis B and 300,000 of hepatitis C. In order to give treatment to the infected population, and lower the incidence rate of cirrhosis and liver cancer, Bureau of National Health Insurance has put into 1 to 2 billion NT dollars to promote Enforcing Hepatitis B and C Trial Treatment Program of Bureau of National Health Insurance which is also the first time anywhere in the world has provided such plan for patients of hepatitis B、C with free medication treatment. From October of 2003 to December of 2004, the program has already treated 9,130 and 5,254 of hepatitis B and C patients respectively.

Future Goals:

Promote public awareness about hepatitis risk factors, increase the immunization coverage rate, and strengthen the study on diagnosis and treatment for hepatitis to further reduce the incidence rate and mortality rate of all kinds of hepatitis.

Eradication Program of Polio, Measles, congenital Rubella Syndrome and Neonatal Tetanus

Background

Taiwan launched the eradication program for polio, measles, congenital rubella syndrome and neonatal tetanus in 1991. The goal for polio eradication by 2000 was attained on October 29 that year. However, the eight nations in Central and West Africa that were declared as polio-free were affected again by polio rampancy in neighboring Nigeria and Niger in 2003 and 2004, registering 63 imported cases. In Taiwan, more than 95% of the babies have completed three doses of polio immunization but there are still 5% of them failing to get the protection in time, constituting a loophole in the net of polio control. Before the virus is eradicated in the whole world, it is still possible for it to invade Taiwan. Although Taiwan has eradicated polio, it still needs to strive to maintain the fruits of the eradication effort.

Measles can be eliminated through vaccination, which will follow polio as the next target of endeavor. In recent years, a single-digit rate of measles incidence has been registered except in 2002 when 24 cases were reported. As for neonatal tetanus, no cases have been reported since 1995 except in 2001 when a case was reported but established as an isolated case of a child

born by a foreign mother. Since 1994, three cases of congenital rubella syndrome have been confirmed, all in 2001, of which mothers of two patients were foreigners. This indicates that the latent danger of the epidewic of communicable diseases cannot be overlooked in view of the brisk business exchange, boom of tourism, introduction of alien labor, and increasing number of marriages with foreigners and chinese mainlanders. So, it is necessary to continue the eradication program for polio, measles, congenital rubella syndrome and neonatal tetanus.

Goals and Strategies

1. Maintaining the high rates for all immunizations

This involves the maintenance of coordination with contractual immunization hospitals and clinics and enhancement of the quality of their service, conduction of surveys on the completion rates of immunization, so that appropriate remedial measures can be taken to ensure that all women of child-bearing age (foreigners in particular) are protected from rubella. The cold chain system should be continued and the immunization information system should be improved.

2. Strengthening the surveillance on diseases

This involves constant surveillance on AFP, measles, rubella, and congenital rubella syndrome and instant analysis of the data; strengthening of the reporting and tracking system for babies not born in a hospital so as to grasp neonatal tetanus cases for newborns; continuation of the “zero-case reporting system and telephone interviews”; regular evaluation the surveillance operations of the counties and cities. If shortcomings are found in the evaluation, the local health authorities will be asked to propose a plan for improvement. Besides, a plan should be mapped out to award reporting.

3. Raising the capability of lab examination

Besides the use of serum method for the determination of clinical cases, Taiwan should establish the technology of molecular biology for diagnosis by cultivating the virus in keeping with the WHO strategy for the stage of measles eradication. To examine the antigen and separate the virus in the samples, the types of samples needed to be collected in a reporting case and the number and timing of samplings all should be regulated.

4. Enhancing the completeness and correctness of case survey

Besides correctness in sampling, the essentials for a case survey also include history of immunization, history of travel, and information whether the contacted persons also have suspected symptoms. All these should be included in the standard operational procedure in order to strengthen the training for local health workers.

5. Conducting health education and publicity

This should be done through different channels to remind people, especially the spouses from the Chinese mainland, of the need to take their babies for immunization.

6. Engaging in research and survey

This involves enlarged study of virus separation and assessment technology for measles and rubella, molecular biological study of the genomic sequence, evaluation of serum epidemiology, cost-effect study of the immunization information system, and the completion rate of immunization.

Achievements

1. In 2004, 63 AFP cases were reported and investigation was made for all of them. The investigation was completed within 48 hours for 95% of them. Clinical data showed none of them were polio cases.
2. In 2004, two meetings of polio certification committee were held. Between 2003 and June 2004, after the national bio-medical laboratory had destroyed its polio virus and samples, certification was completed for AFP in keeping with the lab test and clinical judgment.
3. In 2004, 36 measles cases were reported. The investigation rate was 100%, and the sampling rate was 92%. None of the cases were confirmed.
4. Two cases of congenial rubella syndrome were reported in 2004. Investigation and complete sampling were made, but either of them was proved in lab test.
5. There was no report on neonatal tetanus in 2004. The two cases involving babies not born in hospital were tracked down but were found not being infected by tetanus.
6. Since 2002, female spouses from foreign countries and the Chinese mainland have been required to have a rubella certificate or an immunization certificate.
7. The immunization rates were 91.5% for measles, 95.5% for MMR, and 99% for polio.

Future Prospects

1. The fruits of polio eradication will be maintained by preventing import of the disease.
2. Strategic planning will be completed in the tail stages of the world's polio eradication program.
3. Efforts will be made to monitor measles and to discover cases of measles infection on the basis of the samples collected from the CDC's contractual laboratories.
4. Certification for measles eradication will be completed in accordance with the WHO's schedule for the eradication of the disease.
5. The effort will be continued to maintain zero cases for congenital rubella syndrome and neonatal tetanus.

International Cooperation to Combat Communicable Diseases

Background

Health has no boundary. In today's world, globalization facilitates the spread and transmission of communicable diseases. To build a responsive worldwide disease surveillance and prevention network is a critical need for protecting the health of Taiwan's people. As a member of global village, Taiwan CDC has responsible to cooperate with international partners as well as to provide adequate resources to needed countries to promote the quality of human's life.

In recent years, Taiwan has made a lot of efforts on strengthening the international exchange in health, for instance: increasing disease prevention cooperation with advanced nations, assisting allies to raise the quality of medical care, fulfilling the responsibilities as a member of international community, vigorously participating the international conferences, learning and introducing advanced medical technology from other countries and winning the worldwide understanding and supporting etc. As a result, many impressive achievements on disease control have been accomplished. And Taiwan is able to contribute its characteristic experiences to the world to attain the ideal of Health for All.

Objectives

Actively participating the international health programs, strengthen bilateral and multilateral relationship in an attempt to promote Taiwan's efforts on disease control and prevention. Develop and sustain vital relationship with allied Asian, European and American countries.

Achievements

Participating in international conferences and workshop programs

In order to research the global infectious diseases prevention

resources and pursue advanced studies, CDC vigorously participated in international conferences and workshop programs. For instance, 2004 National Disaster Management System Conference, The 1st Symposium on World Influenza Vaccine, the 15th International Conference on AIDS Prevention, 2004 Symposium on Global Application Epidemics, the 4th International Conference on Chemical & Biology Disaster, and attended CSIS for Anti-Bioterrorism Contingency Program.

Providing international healthcare assistance

To provide public health assistance to allies aids such as, aids to the Care France for the AIDS of Chad, AIDS assistant programs and donated medical materials to Vietnam and Malawi, a malaria control project in Sao Tome& Principe and so on.



Promoting bilateral and multilateral cooperation

1.Training and education programs

Training and education programs have been developed around the US

CDC and medical institute, National Institute of Infectious Diseases in Japan, Belgium ITM, London School of Hygiene and Tropical Medicine, Leiden Medical Center University in Holland. Many specialty staffs of Taiwan CDC were trained in the fields of laboratory diagnosis and epidemiology of vector-borne diseases.

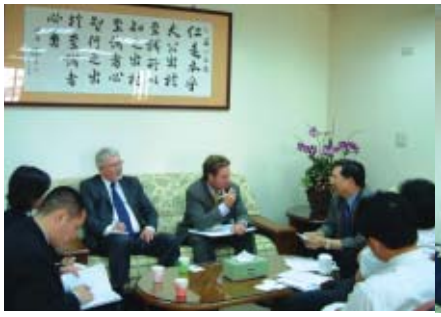
2. Asia Pacific Economic Cooperation (APEC)

Since 1995, when the importance of fighting emerging infectious

disease was addressed in the APEC meeting of ministers of science and technology, Taiwan has been participating in activities of APEC Industry Science Technology Working Group, ISTWG. Through bilateral and multilateral communication, Taiwan continued to afford its contribution to the APEC Health Task Force and was placed on the frontline to combat against any emerging diseases. Furthermore, CDC constantly cooperated with international partners, like Japan, European Union, China, Vietnam, Hong Kong and Singapore in SARS-related research projects and keenly involved in communicable diseases prevention projects, including attending the international conferences.

Future Prospects

With the frequently international exchange and transportation, the issue of global cooperation becomes more important than ever. CDC will do its best to strengthen cooperation with other countries as well as other international healthcare institutes. Based on some achieved programs of training and education, international cooperation on infectious disease prevention will continually focus on setting up a globally surveillance network. In addition, training experts in international public health, infectious disease prevention, tropical medicine and fully involved in international communicable disease prevention project will also be the next target of development. The detailed future prospects are listed as follow:



To continue constructing the collaboration platform and channel with international healthcare organizations

1. To work with international healthcare organizations such as APEC and health authorities in various countries in order to set up the defense network.
2. Actively participate in international conferences in order to build up a health network and share the experiences on disease control and prevention.

To train experts in international public health, infectious disease prevention and tropical medicine

1. To train experts in tropical medicine in terms of clinical diagnosis, infectious disease investigation, vector and its natural habitat, laboratory techniques, and practical control formulation.
2. To set up a tropical medicine consultation team through recruiting both domestic and international tropical medicine experts and organizations in an attempt to improve the quality of tropical medicine related service.
3. To reinforce public health related personnel training at various medical schools, public health schools, Department of Health, Ministry of Foreign Affairs, Ministry of National Defense, International Cooperation and Development Fund.
4. Additional public health practice related classes should be opened at various graduate schools.

Getting involved in international communicable disease prevention projects

To organize academic conferences with nearby countries like Japan, Malaysia, Singapore, and Thailand…etc.

1. Domestic and international expert will be invited to attend the aforementioned conferences.
2. To provide assistant and support to other countries in case there is any outbreak occurred.
3. To assist medically laid back countries by carrying out communicable disease prevention collaboration plan

Research and Development

Manufacturing of Serum and Vaccines

Center for Research and Diagnostics

Integration of Resource Management

Manufacturing of Serum and Vaccines

Background

The Vaccine Center has 50 years of experience in producing biological products. It is the first government-approved pharmaceutical factory in Taiwan that complies with the GMP regulation. The Center follows the current Good Manufacturing Practice (cGMP) guidelines to ensure the quality of its products. It continuously supplies about ten biological agents, including BCG, tetanus toxoid, absorbed diphtheria and tetanus toxoid, absorbed tetanus and diphtheria toxoid (adult use), cholera vaccines and anti-snake venoms biological products to partially fulfill the demand of communicable disease control in Taiwan.

Strategies

Three strategies are executed at the Vaccine Center: 1. Stably manufacture and supply biological products. 2. Comply wth the third stage of cGMP validation regulation. 3. Focus on the research and development of serum and vaccines against indigenous and specific regional diseases.

Achievements

1. In 2004, the Vaccine Center manufactured the following biological products: 391,200 doses of freeze-dried BCG, 51,701 doses of cholera vaccine, 537,916 doses of absorbed tetanus and diphtheria toxoid(Td), for adult use, 40,248 doses of absorbed diphtheria and tetanus toxoid(DT), 550,840 doses of alum precipitated tetanus toxoid (TX), 2659 doses of lyophilized tetanus antitoxin, 2,540 doses of lyophilized bivalent antivenin of Tr. mucrosquamatus and Tr. stejnegeri, 398 doses of lyophilized antivenin of D. russellii, 15651 vial of 3ml reconstitution fluid of smallpox, 5651 doses of 20ml diluents and 3063 doses of 5ml diluents.
2. Completed inspection on 22 lots of biological agents, 16 lots of bulks, 146 lots of ingredients, and 43 lots of materials.
3. Completed quality control and validation for bulks: completed the analytical and cleaning validation for three lots of antivenin of D. acutus, three lots of antivenin of B. multcincutus and N. atra, three lots of antivenin of Tr. mucrosquamatus and Tr. steineger, three lots of diphtheria toxoid, three lots of diphtheria antitoxin and three lots of tetanus antitoxin.
4. Finished the third phase cGMP validation, and analytical validation of computer equipment for total organed carbon analyzer, pyrogen analyzer and UV/Vis spectrophotometer and completed the IQ/OQ/PQ validation reports on these three apparatuses
5. Completed associated-equipments computer validation for repackaging equipments.

6. Constructed the manufacturing room for tetanus toxoid and the processing system for pure water used in pharmaceutical manufacturing.

7. Continued the production of anti cobra IgY using duck eggs, completed the nontoxification inspections and comparisons for the cobra immunization program and the modification of purification techniques for IgY△Fc, and set up IgY△Fc condensation techniques and IgY△Fc lyophilized techniques.

8. Improved the manufacturing and bioassay system for enteroviorus-71 vaccine, completed the manufacture and purification of the IgY Ab, established ion channel exchanged purification system for EV-71, evaluated the immunized dose, and completed the improvement of the manufacturing and inspection process and the assortment and analysis of lab data.

9. Engaged in bioagent technique transfer to ADImmune Corporation, dispatched technicians to the company to conduct training in the manufacturing of diphtheria toxoid and to do cross alignment.

10. Completed the clinical trial and applied for the registration for lyophilized antivenin of D. russellii.

11. Enhanced users' satisfaction rates for the products, which are evaluated through questionnaires and regular telephone interviews.

Future Prospects

1. Set up a risk management mechanism during the process of vaccine manufacturing and validation to meet the cGMP.

2. Construct a national pilot plant to meet the US FDA standards and provide assessment for scale-up processes and commercialization of the results from the academic and private industry.

3. Effectively integrate the research results and resources of industry, government and academia and to set up a cross platform and vertical cooperation model; focus on the development and application of pilot production and transfer the technology to the down-stream manufacturers.

4. Play a leading role in the development of local and specific biological products .

Center for Research and Diagnostics

Foreword

The primary objectives of the Center are to conduct researches to develop more efficient and comprehensive diagnostic methods, to perform laboratory-based epidemiological study, and to study the pathogenesis of communicable diseases. Another major role of the Center is to establish national reference laboratories and carry out diagnostic services and technical support of notifiable and reportable communicable diseases to aid national and international health agencies in the consolidation of control strategies and policies. In 2004, the Center's budget was $ 6.5 Million USD and encompassed 102 employees. The diagnostic amount of 2004 was 28,649 specimens. Facing the challenge of the continuously emerging and re-emerging communicable diseases, the Center put great value on international collaboration with special emphasis on information exchange and the introduction of new and advanced laboratory technology. In addition, laboratories of the Center regularly participated in proficiency tests such as CAP tests to assure the quality and consistency of their diagnostics. The Center is divided into seven laboratories, namely Virology I, Virology II (Vector-borne), Bacteriology, Mycobacteriology, Vector Entomology, Parasitology and Mycology. The focuses and accomplishments of the Center in 2004 are listed as following:

2004 Focuses

Virology Laboratory I

1. Utilization of highly conserved genetic fragment to design real-time PCR primer and probe to enhance of the specificity of lab tests on flu virus
2. Establishment of RT-PCR and virus-culture methodology targeting on human metapeumovirus (Hmpv) to survey respiratory disease and provide reference in the formulation of disease-control strategies
3. Enhancement of real-time PCR sensitivity for type-A flu (H1 and H3) in order to detect the possible incidence of new flu in the surveillance of emerging influenza
4. Surveillance on the changes, including the variations on antigenic-determining site and subtype, of Taiwan's circulating flu virus in order to understand the incidence of its prevalence
5. Delivery of Taiwan's current flu virus to the WHO Collaborating Center for Surveillance, Epidemiology and Control of Influenza, for its reference to determine the vaccine strain
6. Analysis and confirmation in May 2004's the first case of HIV infection caused by blood transfusion in May
7. Discovery of HIV-1 BC recombinant virus in the body of a drug-addicted prisoner who made intravenous injections of drug in March-June 2004

8. Participation in the XV international AIDS conference, Bangkok 2004
9. Analysis and confirmation in August 2004 of the second HIV infection case caused by blood transfusion
10. Participation in the US CDC workshop on detuned assay for HIV infection
11. Analysis and confirmation in December 2004 of the third HIV infection case caused by blood transfusion
12. Development of anti-enterovirus CA4 polyclonal antibody for CDC contract laboratories and routine diagnosis
13. Participation in the BNHI trial program for the enhanced treatment of hepatitis B and C by taking blood specimens during the different stages of treatment, used for follow-up study and the evaluation of the effectiveness of medication.
14. Set up of standard real-time RT-PCR to diagnose and differentiate subtypes of Norovirus and Rotavirus, successfully providing prompt outbreak warnings during the cold season last year.
15. Built gene sequence databases of HIV virus, Entero viruses, Influenza virus and Hepatitis viruses.

Virology Laboratory II (Vector-borne)

1. Established a Flavivirus reference laboratory to provide laboratory reference and diagnostic services to national and international health agencies
2. Established a Rickettsia reference laboratory to provide laboratory reference and diagnostic services to national and international health agencies
3. Carried out routine diagnoses of dengue, Japanese encephalitis, yellow fever, Hantavirus, scrub typhus, typhus fever, and Q fever based on rapid diagnostic systems using ELISA and real-time PCR technologies.
4. Built genomic databases of dengue virus, Japanese encephalitis virus and *Orientia tsutsugamushi*
5. Applied the rapid diagnostic system to the fever screening program at airports for early identification of imported dengue cases
6. Held the 2005 APEC workshop and training course on “Virological surveillance, diagnosis and molecular epidemiology of dengue”

Bacteriology Laboratory

1. Finish of the electro-microscopy photography of main infectious pathogens of human disease.

2. Development and application of *Yersinia pestis* detection methods.

3. Completion of molecular typing of *Bordetella pertusis* by amplification of DNA fragment surrounding rare restricted sites.

4. Development of Quantitative PCR and Multiplex PCR for *Clostridium botulinum* type A, B and E in Taiwan.

5. Completed the epidemiology of invasive *Streptococcus pneumonia* infection and its carry rate of children in Taiwan.

6. Completed the molecular epidemiology of scarlet fever caused by group A streptococcus in northern Taiwan.

7. Study of the Topoisomerase and Efflux Pump-Mediated resistance to Fluoroquinolones in *Shigella spp*.

8. Established the reference laboratory of *Campylobacter*.

9. Studied the drug resistance of *Shigella spp*. in Taiwan.

10. Completed the detection methods of rat bite fever.

11. Established the Pulse Net of bacterial pathogen in Taiwan area.

12. Studied the molecular epidemiology of Salmonellosis.

13. Established the group B streptococcus infection rate in perinatal stage of pregnancy women in northern Taiwan.

Mycobacteriology Laboratory:

1. Diagnosis and identification

- Standardized conventional and molecular diagnosis methods (GenProbe, PCR, real-time PCR, PCR-RFLP, etc.)

2. Outbreak and pseudo-outbreak investigation

- Including schools, hospitasl, long-term care facilities, etc.

3. Molecular epidemiological investigations

- Surveillance of Beijing strain, 2002-2004
- Transmission dynamics in aboriginal villages
- Surveillance of multiple-drug resistant *Mycobacterium tuberculosis* strains

4. Genetic database

- Molecular genotyping of *Mycobacterium tuberculosis* using RFLP, Spoligotyping and VNTR-MIRU

- Sequence analysis of nontuberculosis mycobacteria
- Establishment of mycobacteria strain bank

5. Training and education

Parasitology Laboratory:

1. Construction of a molecular diagnostic system for the enteric amebiasis examination, facilitating case reporting and alien worker health examination and eliminating approximately more than 90% of non-pathogenic cases, thus reducing unnecessary spending on medication, disease control measure and repatriation of alien workers to a minimum
2. Initiation of the molecular epidemiology project of amebic infection for the high-risk group, such as institutional psychiatric patients
3. Establishment of a molecular surveillance system for malaria to assist microscope examination if mixed infection is detected
4. Organization of two enteric amebiasis and two malaria laboratory training short courses for lab workers from local health departments and hospitals allowed to execute health examinations for alien workers.
5. Receipt of full marks on the CAP tests, “Parasitology Survey” and the “Blood Parasite Survey”.

Mycology Laboratory:

1. Conduct of routine fungal diagnostic services such as *Cryptococcus neoformans* and *Candida spp*.
2. Comparison and standardization of PFGE molecular typing method of *Candida albicans*.
3. Molecular Surveillance by PFGE genotyping of *Candida spp*. in Taiwan.
4. Molecular epidemiology study of *Candida albicans* infection for high-risk groups, such as HIV patients.
5. Building PFGE fingerprint as well as MLST databases of *Candida spp*. in Taiwan.
6. Application of the real-time diagnostic system to the diagnosis of fungemia patients.
7. Conduct of routine diagnosis of *Chlamydia pneumoniae*, *Mycoplasma pneumoniae* using MIF, ELISA and real-time PCR technologies.
8. Development of Quantitative PCR and Multiplex PCR for *Chlamydia pneumoniae*, *Mycoplasma pneumoniae*.
9. Development of new genotyping methods such as rep-PCR, MLST and AFLP for *Candida spp*.

Vector Entomology Laboratory:

1. Density surveillance of vectors of rodent related diseases (Tick, Mite, Flea and Louse).

2. Identification of vector species.

3. Detection of pathogens in vectors of rodent related diseases.

Major Achievements in 2004:

1. Development of a rapid diagnostic system for flavivirus infection:

A rapid diagnostic system for the detection and differentiation of various flaviviruses was developed. For serological diagnosis, various forms of ELISA were applied that can be easily and reliably used to differentiate (1) Japanese Encephalitis and dengue virus infections, (2) Japanese Encephalitis vaccination and infection, (3) primary vs. secondary dengue virus infection, and (4) dengue virus serotyping. For molecular diagnosis, an automated real time one-step RT-PCR system was developed. Based on the combined analyses of real time one-step RT-PCR and E/M-specific capture IgM and IgG ELISA, the rapid diagnostic system can be used to detect and differentiate various flavivirus infections within 24-48 hours. Studies from a total of 959 acute- and convalescent-phase sera from 799 confirmed dengue patients showed that 95% of them could be identified as confirmed or probable cases by acute phase sera based on these two assays.

2. SMYF (San-Ma Yi-Feng) Program continues:

The WHO is determined to eradicate measles after the polio eradication. The USA and various countries in Europe and the Mediterranean have all set a targeted measles elimination date in 2000, 2007 and 2010 respectively. The CDC has been actively promoting the SMYF program in Taiwan since July 1991. The number of confirmed measles cases has been decreasing and it is now controlled within ten cases. To keep up with the goal of measles eradication in USA and Europe, the transmission of endogenous measles must be stopped, and the number of infectied population controlled. The laboratory has been participating assiduously in the measles eradication. The laboratory uses the ELISA test for measles-specific IgM and IgG in serum for early detection and has set up ways to conduct measles strains isolation and molecular biological sequencing in order to cooperate with the global measles virus molecular epidemiologic surveillance. There were 6 cases that were detected by the serological diagnosis in 2003 and 0 confirmed cases in 2004. Two measles strains were isolated in 2003, one from blood and the other from a throat swab. After a comparison between 456 nucleotides at the measles NP protein COOH- end and the genetic sequencing of standard measles strains posted by the WHO, one of these two isolated strains was found to belong to H1 genotype, and the other - to the D3 genotype, which can be traced to the source from China and the Philippines by traditional epidemiological investigation.

3. Nosocomial transmission of Mycobacterium tuberculosis found through screening for Severe Acute Respiratory Syndrome--Taipei, Taiwan, 2003. MMWR, 2004, 53(15): 321-322.

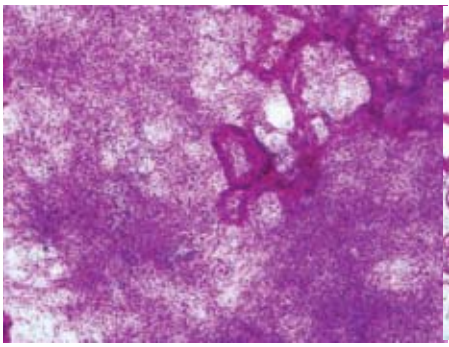
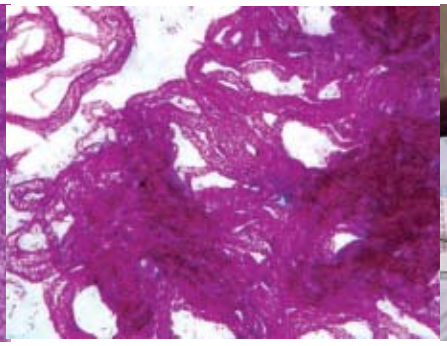
The emergence of Severe Acute Respiratory Syndrome (SARS) has highlighted the importance of hospital-infection control programs. Prevention of Mycobacterium tuberculosis transmission also requires effective infection control in health-care facilities. In Taipei, Taiwan, an area with moderate to high incidence of tuberculosis (TB) (50-74 cases per 100,000 population), health-care workers (HCWs) are at increased risk for M. tuberculosis (Taiwan Center for Disease Control, unpublished data, 2002). In April 2003, SARS-related screening in a hospital in Taipei resulted in the detection of suspected TB among HCWs. This report summarizes how SARS screening led to the discovery of 60 cases of TB. HCWs in Taiwan should remain vigilant for cases of TB so persons suspected of having TB are evaluated and treated promptly.

4. Studies on the vectors and pathogens of scrub typhus on murine-like animals in Kinmen County.

Five species of murine-like animals were obtained from five towns of Kinmen County, Taiwan from August 1999 to June 2000. The total capture rate of murine-like animals was 28.11%. Among these specimens, *R. flavipectus* was dominant, representing 91.67% of the collected animals, followed by *S. murinus* (3.57%). The percentage of animals infected with chiggers ranged from 55% to a peak of 98%, while the mean number of chiggers per animal ranged from six to 382. The study showed that the seasonal variation in the mean number of chiggers per animal slightly correlated with the seasonal incidence of human infection. Eight species of chiggers were identified, including *Leptotrombidium deliense* (53.40%), *L. scutellare* (33.43%), *Walchia chinensis* (12.06%), *L. yui* (0.70%), *Odontacarus majesticus* (028%), *Ascoschoengastia indica* (0.08%), *Helenicula sp*. (0.04%), and *L. imphalum* (0.01%). The survey showed that *L. deliense* appeared from April to November, with a peak occurring in August, whereas *L. scutellare* appeared from November to April, with a peak occurring in December. The state of *O. tsutsugamushi* infection was demonstrated by the minimum infection rate (MIR). The MIRs of *L. deliense* and *L. scutellare* were 12 and 5, respectively. These results indicate that *L. deliense* may be the vector in summer, while *L. scutellare* may transmit disease in winter. In this study, the nested polymerase chain reaction (nested-PCR) was followed by digestion with the restriction enzymes *HhaI* and *SfaNI* to classify serotypes of *O. tsutsugamushi*. Karp and Gilliam were found to be dominant, but that other different local strains were found to already exist.

Future Prospects:

1. To establish the diagnostic network in preparation for the potential upcoming avian-influenza pandemics.


2. To set up an internationally recognized flavivirus research center. The final goal is to establish a dengue network with laboratory-based surveillance systems among all APEC member economies. A standardized information exchange system will be implemented to facilitate the communication of member economies in dengue surveillance, clinical and laboratory diagnoses, prevention, clinical treatment and control.
3. To build up a standardized SOP of diagnosis of epidemic diarrheal pathogen in Norovirus and Rotavirus, which will provide prompt surveillance and warning as well as aid formulation of prevention methods based on the massive outbreak of the disease and scientific evidence.
4. To launch a high-throughput microarray system for more comprehensive and efficient diagnosis and typing of pathogens.
5. To conduct gene sequence data bank projects to continuously monitor temporal and spatial changes of pathogens at the genetic level.

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[2] Shu PY, Huang JH. Current advances in dengue diagnosis. Clin.Diagn.Lab Immunol. 2004;11(4):642-50.

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[7] Wu FT, Tsai TY, Hsu CF, Pan TM, Chen HY, Su IJ. Isolation and identification of Escherichia coli O157:H7 in a Taiwanese patient with bloody diarrhea and acute renal failure. J Formos.Med Assoc. 2005;104(3):206-9.

[8] Shu PY, Chien LJ, Chang SF, et al. Fever screening at airports and imported dengue. Emerg.Infect.Dis. 2005;11(3):460-2.

[9] Jou R, Chen HY, Chiang CY, Yu MC, Su IJ. Genetic diversity of multidrug-resistant Mycobacterium tuberculosis isolates and identification of 11 novel rpoB alleles in Taiwan. J Clin.Microbiol 2005;43(3):1390-4.

[10] Chen KW, Lo HJ, Lin YH, Li SY. Comparison of four molecular typing methods to assess genetic relatedness of Candida albicans clinical isolates in Taiwan. J Med Microbiol 2005;54(Pt 3):249-58.

[11] Jou R, Chiang CY, Huang WL. Distribution of the Beijing family genotypes of Mycobacterium tuberculosis in Taiwan. J Clin.Microbiol 2005;43(1):95-100.

Integration of Resource Management

Since 2004, Division of Resource Management has given priority to biological safety, Management Information System (MIS) of Stockpile, and Establishment and Application of A Pathogen Molecule Sequence Database in Taiwan. All are described as follows.

Biosafety

By the end of 2003, only Taiwan CDC had two and the Medical College of National Taiwan University had one biosafety level-3 (BSL-3) laboratory, while the Institute of Preventive Medicine of National Defense Medical Center had one biosafety level-4 (BSL-4) laboratory. They were legally allowed to conduct pathogen cultivations and identifications of high-risk microorganisms such as SARS corona virus (SARS-CoV) in Taiwan. To prepare for the possible recurrence of SARS epidemic as well as a wide range of possibilities of emerging infectious diseases, Taiwan CDC took the initiative to subsidize nine contract laboratories in diagnostic virology across Taiwan to each set up a BSL-3 laboratories during 2004. Besides, some other government organizations, academic institutions, and members of the industrial sector also wanted to build BSL-3 laboratories. It is foreseen that approximately twenty BSL-3 laboratories will be in operation in Taiwan by the end of 2005.

In light of the outbreak of Taiwan's first SARS infection in a laboratory setting mid

December 2003, Taiwan CDC acted prudently to enforce the biosafety management of BSL-3 laboratories with the following measures: (1) formulating a set of "Regulations Governing Infectious Biological Materials Management & Infectious Patient Specimen Transportation" (a draft) and a "Biosafety Level 3 Laboratory Safety Guideline" (version one); (2) training courses being offered to BSL-3 laboratory operators; (3) making sure every BSL-3 laboratory has a functioning biosafety committee installed and every function of the laboratory is properly verified; (4) compiling and registering a name list of laboratory personnel working on SARS corona virus diagnosis and research; and (4) setting up a "Cross-departmental Biosafety Committee" in Department of Health.

The future management and planning for BSL-3 laboratories in Taiwan is proposed in the follows: (1) assuring all BSL-3 laboratory personnel are well educational trained before carrying on the job, in order to prevent similar laboratory infections from occurring; (2) building up a correct mentality of biosafety protection and operation among lab workers, in order to avoid unnecessary worries and mental burden; (3) integrating the biosafety capacity of private organizations in order to improve overall domestic biosafety level; (4) actively participating in international organizations and meetings regarding biosafety issues, so as to conform ours to the world's biosafety standards; and (5) building up a safety testing accreditation system for BSL-3 laboratories, so as to warrant high quality of testing and reporting.

Management Information System (MIS) of Stockpile

After SARS broke out in early 2003, there happened to be a serious shortage of supplies of epidemic prevention importance, such as gauze masks, protecting clothing for health workers, etc. in Taiwan. However, as the epidemic gradually drew to an end, large quantities of such goods and materials left behind and needed to be sorted out and taken care of. It is one big important part of the post-SARS task of Taiwan CDC to review the current epidemic prevention systems and proceed with the hope to better respond to any possible future crisis of similar new infectious diseases. Thus, a revised reorganization plan have been promulgated and set forth on June 23, 2004 and the Resources Management Section, among others, was established on July 1, 2004. It is responsible for details such as the logistic storage and transportation of epidemic preventing materials, relevant information integration, ongoing planning and inspection, and educational training.

2004 was definitely a decisive year for improving our epidemic preventing material handing both policy and strategy wise, and there was obvious good progress in the following four major aspects, i.e. establishing a safe stock of epidemic preventing materials, formulating and setting up a MIS, swift delivery, and medium and long range plannings.

1. About the safe stock, we channeled those large quantities of the surplus materials handed over by Department of Health into a three-level stockpiling system, i.e. the central, local, and

individual hospital levels. In this way, not only does it render the responsibility evenly to every concerned user but also asks each user to maintain enough quantity for at least one month's supply. Currently, some domestic total figures of key items, for instance, are 3,850,000 pieces of N95 gauze mask, 4,880,000 pieces of medical protecting clothing, and 22,130,000 pieces of surgical gauze mask, which are all considered beyond safe levels.

2. The newly established MIS website posts regularly updated information of their epidemic preventing materials at 566 hospitals, 399 health bureaus, and 24 CDC offices. According to a recent survey, there is an average of 465 persons viewing the MIS website every day, which means a total of 170 thousand person-times per year. The latest version of it is having the content divided into four categories or subgroups including the conventional epidemic preventing materials, anti-snake venom plasmas, anti-virus drugs, and anti-disease vector drugs. It has proven to be a more effective way of integrating the current information.
3. All above-mentioned epidemic-preventing materials are kept in the air-conditioned storehouse, and transferred effectively with modern and professional storage logistics. Materials are delivered to users located anywhere in Taiwan and Penghu within 24 hours after the order is received, and to Jinmen and Lianjiang within three days.
4. On our draft board there is a four-year medium range plan, starting from some time in 2005 to 2008. The purposed of this very plan is to gradually establish a high level biosafety capacity to fill with the needs to confidently respond to newly emerging infectious diseases and equip us with the preparedness for possible bio-terrorism incidents in the future.

Establishment and Application of A Pathogen Molecule Sequence Database in Taiwan (2004)

The purpose of this center to establish a pathogen molecule sequence database is to fulfill our obligation as the leading disease prevention and control organization in the country by providing research resources to domestic professional laboratories of pathogen research, thus to collect, store, file, integrate and analysis the genetic sequence information of important domestic and international disease-causing agents. These reference databases will be mainly used as important information to sustain policy making in preventive and control infectious diseases in the future.

Besides, the genetic information established in this program will be accessible, through an effective management approach, to the biotechnological industry for use. They may take advantage of the local and important communicable disease data combined with the pathogen genetic evolution and epidemiological information to develop relevant vaccines and diagnostic reagents. By such the genetic database can indirectly improve the competitiveness of domestic biotechnological companies.

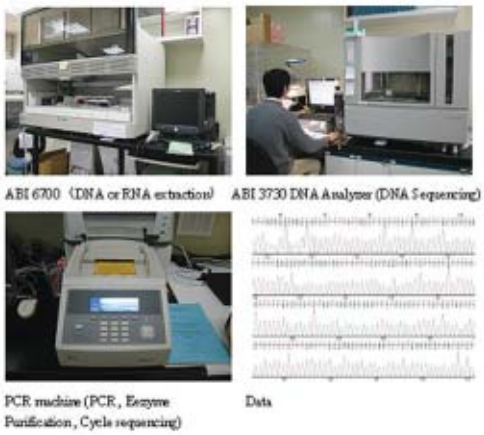
What was achieved by this project in 2004 has three parts. First, we established a sequence laboratory successful in many aspects, such as to save funds, to training people, to provide sequence service for our own laboratories as well as some contract laboratories, to integrate sequence results to announce at the weekly meeting of our center, and to send sequence results to our contract laboratories also weekly. Figure 1.

Second, the database collected lots important information about special sequences of viruses or bacteria, epidemiological information of cases and analysis tools of genetic information of viruses or bacteria. This year we are going to maintain the genetic database of enterovirus, influenza virus, dengue virus and Mycobacterium tuberculosis, and build others for Japanese B Encephalitis, HIV, adenovirus and rotavirus in 2004.

Finally, the whole database was rebuild to improve TPMGD (Taiwan pathogenic microorganism genome database) infrastructure from re-design and establish of database schema and system architecture. Figure 2. We would focus on the improvements of extension and flexibility in the first version. The second version can accept the whole genome sequences and other genome information from other different pathogens, such as bacteria or different experiment formats. It also added the function of user authority controls and browsing interface.

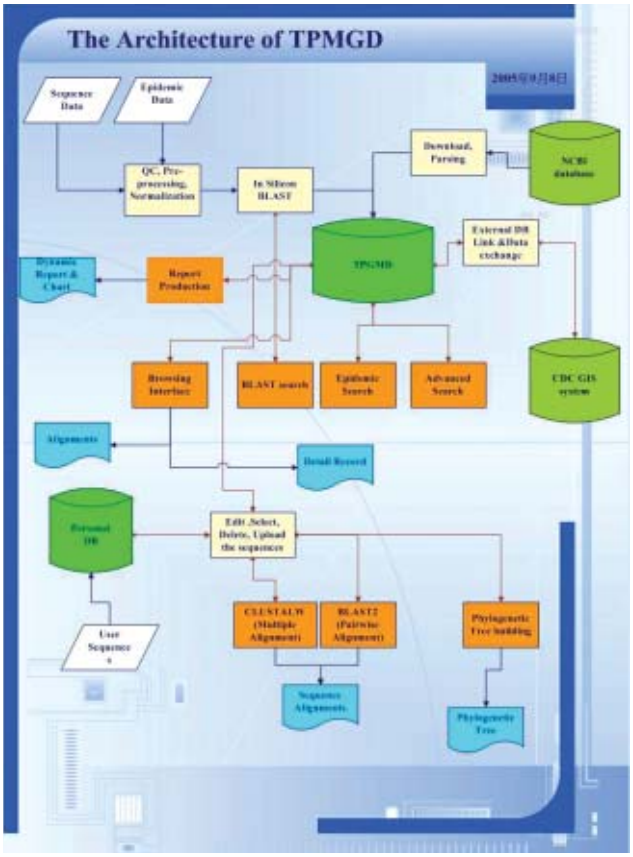
The database is able to exchange information with other external database such as CDC GIS system dynamically and additional powerful analysis programs, which are specific to some pathogens. The main architecture of system is finished and eight topics have been added to the items of main page. The system test is ongoing nevertheless.

Figure 1 Genome Sequencing Laboratory



- In 2004, the lab produced more than 4000 sequence data for spacemen collected by Taiwan CDC from three common pathogens: influenza virus, enterovirus and adenovirus.
- From April 2004, the lab has started to provide sequencing service for our own laboratories and produced more than 2500 sequence data .

Figure 2 The Architecture of TPGMD



Major Challenges for the future

Major Challenges for the future

In the 21st century, diseases spread far and wide with the increase of international exchanges. Mandated as the guardian of people's life and health, the CDC will stick to these ideals: “mobilized,” “informed,” “professional,” “all-involved,” and “international” in the establishment of its disease surveillance and defense systems to cope with the emergencies and challenges lying ahead. While the spark of disease is still flickering, the CDC can immediately grasp the whole situation and stamp it out before it turns into a conflagration. The CDC will fulfill the following tasks to maximize its kinetic energy in the face of the challenge to the health of the people:

1. Develop a perfect disease surveillance network

This includes the perfection of the Notification Disease Surveillance & Reporting System and the detection system in order to instantly detect the disease and stop its spread for the protection of people's health.

2. Enhance the network of border quarantine

This calls for an increase of quarantine facilities at the airports and in the harbors to fortify the border defense against the import of diseases, the enhancement of the capability of handling emergency cases so as to effectively screen suspected disease and stop its spread.

3. Perfect the hospital infection control network

(1) To thorough raise the quality of the system of hospital infection control and medical lab tests, reduce hospital infections, improve medical treatment, institutionalize the temperature-screening stations to avoid the breakout of cluster infections, and protect the rights of the people seeking medical treatment and the health of medical workers.

(2) To strengthen the functions of the Hospital Infection Surveillance System by making it more convenient and accurate, ensuring the completeness of the reporting, and streamlining or adding the key-in, data-exchange, and feedback functions

4. Establish a communicable disease prevention network

(1) To construct a disease-control system that gears infection treatment to public health and divides hospitals into national level, regional level, and county/city level for admitting patients when they are activated to cope with the emergencies

(2) To set up special isolation wards to cope with the reemergence of infections and bio-terrorism

(3) To plan to entrust medical centers to run "DOH infection control centers" so they can become the national citadels in the treatment of infections

(4) To construct a high-level bio-safety system and use related resources for bio-warfare training in order to increase across-the-board the defense capability against bio-terrorism incidences and reduce their impact

5. Establish a disease-control lab network

(1) To augment the capacity of lab test and establish an international-level lab-testing network to detect early a bio-terrorist attack or the re-emergency of SARS and other emerging diseases

(2) To construct a perfect management system for infectious biological materials and follow the regulations governing safety management of laboratories and transportation mechanism to ensure the safety of lab workers and the general public

6. Strengthen the network of international exchange

To establish a platform for international exchange, vigorously cultivate international health and disease-control talent, and set up a regional joint defense system for effectively use of international resources and for augmentation of the totality of the nation's disease-control capability

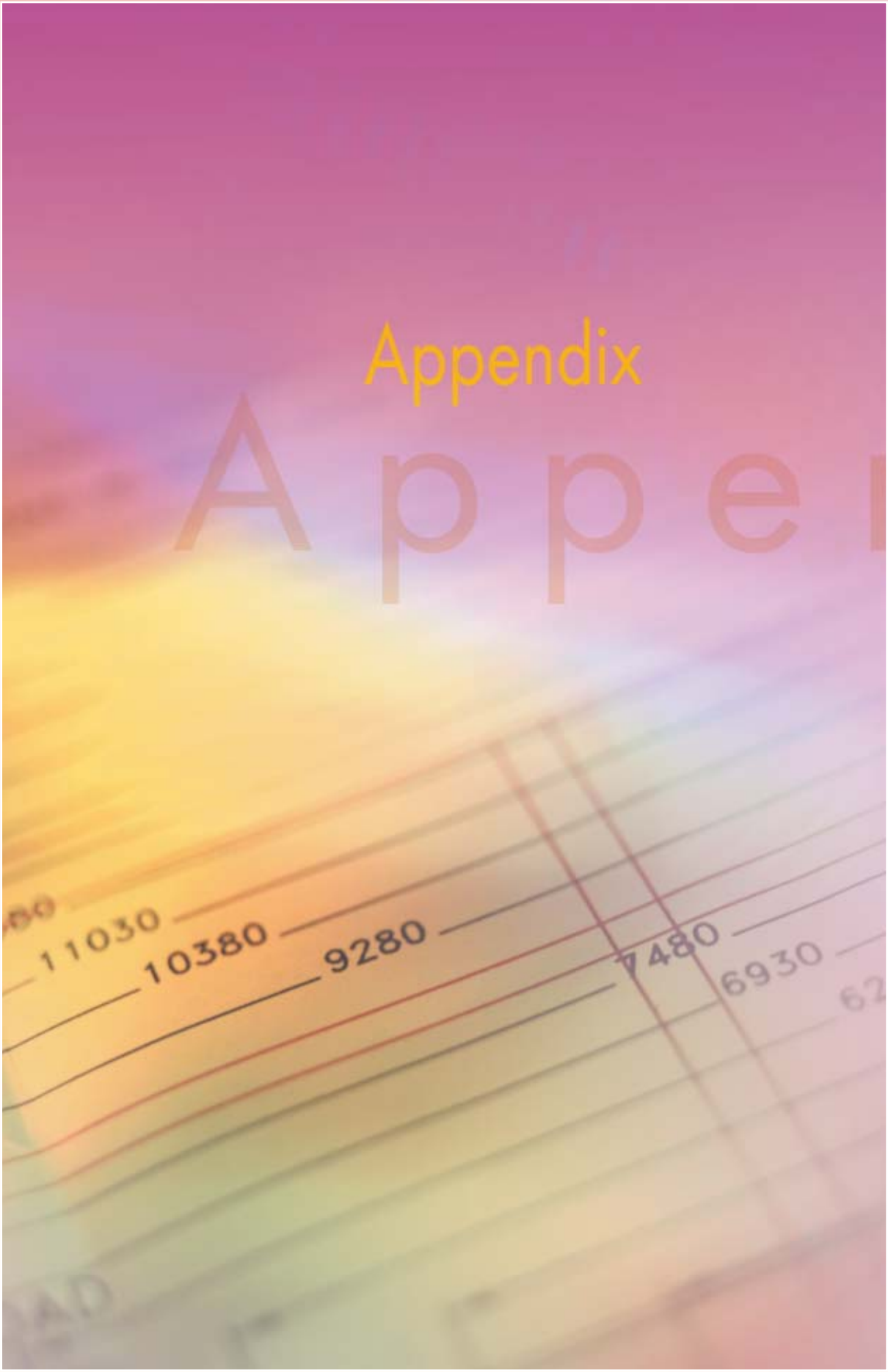
7. To construct a real-time information network for disease control

To construct a command center for disease control and an information-exchange network, strengthen the software and hardware platform and use broad frequency for communication between the central government and local government, seek flexibility, uniformity and mobility for transmission and analysis of disease-control information to allow real-time exchange of information between communities and medical and health institutions, and integrate the disease-reporting systems in hopes of storing the local and global information for reference by policy-making authorities and for quick control of the disease

8. Construct a community disease-control network

A perfect disease-control system must be based on the correct concept of the general public, so it is important to popularize the concept of disease control and the education on self-management of health. This can be done through a digitalized platform of learning by taking the knowledge of disease control deep into the community in hopes all can be mobilized for the protection of their health.

Appendix



Major CDC Timeline, 2004

January

1 – Announces measures for Stage A SARS control

13 – Formulates the “ Health Examination Regulations for Foreigners Hired in Taiwan ”

16 – Compiles “ Health Education Express ” as guidelines for county/city departments of health to conduct health education for poultry and hog farmers and handlers

20 – Opens Starts antiviral medication for use by suspected avian flu patients

28 – Documentary notify the hospitals above regional level to strengthen avian flu screening and avian flu notification

30 – Prints “ Recognize Avian Flu H5N1 ” leaflets for distribution at airports and seaports

February

1 – Conducts twice a week telephone interviews with sentinel physicians and health stations in rural townships that each has more than five poultry farms to response to Avian Flu in the period of February 1- March 31

5 – Procures additional 10,000 doses of vaccine, the only amount in the hands of domestic suppliers, for use by counties and cities where the vaccines were in short supply

11 – Makes a special report on avian flu at the Cabinet meeting

17 – Starts the use of antiviral medication in the military

19 – Announces the items of physical examination to be included in the health certificate required for a foreigner seeking employment in Taiwan

– Inspects and checks tuberculosis control in 36 medical institutions

24 – The Execution Yuan approves the revised Plan for Recruiting Hospital Infection Control Personnel

– Entrusts Chunghwa Telecommunications to set up the Epidemic Reporting and Consulting Center

26 – Plans the second stage of the infectious prevention network. The Armed Forces ’ Tainan Hospital, Taipei Heping Hospital, DOH Hualien Hospital, Kaohsiung Minsheng Hospital, DOH Taichung Hospital, and DOH Taoyuang Hospital are designated for the purpose.

28 – Revises the Rules on Designation of Hospitals for Treatment of Quarantined Patients

March

5 – Announces that an inbound traveler should fill in a disease questionnaire

8 – Formulates the “ Guidelines for the Control of Avian Flu ” based on the WHO-provided information

14 – Holds educational training for the sentinel physicians in central Taiwan

15 – The BSL3 Mycobacterium reference laboratory begins operation as approved by the Bio-Safety Committee

18 – Collects ER information from 230 hospitals for RODS operation

24 – Conducts accuracy test for contractual laboratories

25 – Invites related government agencies and county/city departments of health to discuss emergency disease control measures in response to rampant dengue fever in Vietnam and Indonesia

31 – Constructs a Field Disease Survey System

– Completes seven educational training courses and SARS-related information systems

April

1 – Completes the “ Rules on the Process and Execution of Increasing, Re-categorizing, or Abrogating Communicable Diseases ”

5 – Uses electronic bulletin to supply international epidemic information to related agencies to remind them of travelers' safety

16 – Announces revision of the scope of people required of receiving immunity-deficiency examination

22 – Establishes the preparatory unit for the DOH Communicable Disease Control Center

23 – Announces the start of A-level mobilization beginning on April 24 and measures for coping with the deteriorating situation of SARS

26 – Announces the guidelines for self-management of health for those who have contacted SARS patients

– Announces the number of days for home quarantine for those who have contacted SARS patients

29 – Beginning on April 30 people return to Taiwan from the mainland via Kinmen or Matsu are demanded to fill a questionnaire used to be filled by people who have visited Beijing or Annuli in the previous 10 days

May

– Decides the process for local competent agencies to apply for an agreement on announcing the assault or end of an epidemic and on defining the scope of prevalence

7 – Submits to the Executive Yuan for approval the revised plan for the establishment of communicable disease command centers on central and local levels

10 – Announces the improvement of SARS prevalence on the mainland and cancels the requirement for people returning to Taiwan from the mainland via Kinmen or Matsu to fill the questionnaire used to be filled in by travelers to Beijing and Anhui in the previous 10 days

10 – Submits for Executive Yuan for approval the plan to increase subsidies for hospitals contracted for the control of communicable diseases

13 – Announces the plan for a large-scale indoor assembly during the prevalence of SARS

14 – Assists with the completion of the RODS system to allow189 hospitals charged with the responsibility for rescue work to transmit reports to the CDC

19 – Distributes a leaflet showing the definitions of notifiable diseases to the health departments and medical institutions in 25 cities and counties

31 – Compiles “Infectious Disease Information for International Travelers”

June

10 – Downgrades the level of disease control from A to 0 (preparatory stage), but the measure on self-management of health for passengers from Hong Kong, Macao, and Chinese mainland is maintained

17 – Replies to Prof. Tony Adams of WHO Regional Commission for the Eradication of Poliomyelitis in the Western Pacific that the fruits of eradication have been maintained.

23 – Holds a cross-ministerial conference on coping with a major prevalence of avian influenza

July

1 – Implements the revised CDC Constituent Act

17 – Holds the 7th International AIDS symposium at Taipei Grand Hotel

22 – The Executive Yuan agrees to the CDC's request for changing the Armed Forces' Tainan Hospital into a DOH Communicable Disease Control Center

23 – Designates the Beimen branch of DOH's Xinying Hospital to serve as a county-level hospital for the treatment of communicable diseases for the period from August 1 to December 31

– Announces the names of medical institutions eligible for claiming the “subsidy of self-borne medical expenses for TB patients” provided in coordination with the “enlarged plan for subsidizing the self-borne burden of premium of TB patients and uninsured TB patients”

August

12 – Suspends cholera quarantine for maritime imports from the zero hour and consigns the duty to the Ministry of Economic Affairs’ Bureau of Standard, Metrology and Inspection

15 – Participants in the 2004 Training in Tropical Medicine and for Cultivation of Disease Control Talent leave for Bangkok for 10 days' practice

19 – Holds a meeting to evaluate the plan for malaria control in Sao Tome and Principe

20 – Holds a workshop on the use of disease prognosis modal and the GIS, with 250 people attending

26 – Announces the “Key Points for DOH Subsidy to TB Patients” effective on September 1, 2004

– Compiles with ROC Dentists Association an SOP handbook for preventing infections in dental clinics

30 – Holds a Transfer Ceremony for the DOH Communicable Disease Control Center

September

1 – Names the hospitals eligible for DOH subsidy for treating uninsured TB patients

4 – Holds in conjunction with Taipei City Department of Health an “International Symposium on Anti-bioterrorism for Asia-Pacific Cities”

8 – Opens at Grand Hotel the “Taiwan-Japan Bilateral Surveillance on Avian Flu in Post-SARS Era

15 – Starts vaccination service to the third group of targets, medical and disease-control workers

22 – Joins Taipei City Government in an anti-bioterrorism drill in coordination with the Wan An Civil Defense Exercise

– Starts the 2004 program of flu vaccination for babies to reduce their chances of infection and cut down on medical expenses

October

Launches the 2004 flu vaccination program for people above the age of 65 and for poultry and animal workers, beginning on the 15th

11 – Participates in Malaysia an international symposium on smallpox bio-safety preparedness, including a table-top exercise as well as discussions

28 – Promulgates the revised “Regulations Governing Large-scale Indoor Assembly”

– Promulgates measures for downgrading disease control from the preparatory level to zero level

November

1 – Beginning from the midnight of November 1, the SARS control is downgraded to level zero but surveillance is continued to prevent its comeback in the winter

4 – Taiwan Medical Society exhibits the “Network for the Control of Infections Diseases” at the bio-medicine exhibition held at the Taipei Trade Center

14 – Organizes with the Taiwan Urbani Foundation a mission to inspect SARS and avian flu control in Beijing, Guangtong and Hong Kong, starting cross-strait exchange on disease control

16 – Promulgates the revised “Regulations Governing the Operations of the Fund for Compensating Vaccination Victims”

20 – Dr. Thomas G. Ksiazek from the US Center of Disease Control and Dr. Kazuyoshi Sugiyama from Japan's Infectious Disease Institute arrive in Taiwan to assist with the establishment of BSL-3 laboratories

28 – CDC and non-CDC specialists go to Vietnam to inspect SARS and avian flu control there and exchange experience with the nation's specialists

30 – Holds the “2004 World AIDS Day Press Conference” to announce nationwide HIV screening for pregnant women

December

1 – The second time to enlarge the 2004 flu vaccination program

– Calls off the measure for demanding incoming traveler to fill in the infectious disease questionnaire

27 – Promulgates the Key Points for the Organization of DOH’s AIDS Control Committee

29 – Announces the DOH plan for nationwide AIDS screening for pregnant women, starting on January 1, 2005

– Announces the procedure for claiming medical compensation for AIDS screening for pregnant women to be paid by the Bureau of National Health Insurance

– Announces the inclusion of emerging flu as a notifiable disease

30 – Completes the development of the information system and the software for supporting the decisions making used by NHCC

– National Health Command Center is activated in response to the effect of south Asia's tsunami

31 – holds Holds a press conference on the start of nationwide screening for pregnant women against AIDS

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