2009 Taiwan Public Health Report

Department of Health R.O.C. (Taiwan)
March 2010

Foreword

The responsibilities of the Department of Health, the Executive Yuan (hereafter referred to as the Department) are significant and extensive. They cover the fields of public health, health promotion, National Health Insurance, medical care and rescue, management of pharmaceuticals, food safety, disease prevention and monitoring, research and development of biotechnology, and international health affairs. They are highly related to the health and welfare of the people; and any major decisions thereof should meet the expectation of the people about health.

The Department has always maintained, as its vision for policy implementation, that it be a navigator of the health for all to protect the physical and mental health of the people, to shorten disparities in health, to promote development in biotechnology industries, and thus to become an advanced nation in international health, with a view to protect and promote the health of the citizens to allow them to live longer and happier.

For the better understanding of what the health organizations have done in the past years, this Taiwan Public Health Report is published every year. This volume, the 2009 Taiwan Public Health Report, illustrates in detail of the health status, policy implementation and achievements in 2008. They are summarized as follows.

1. Advancement of medical care systems to maintain the health of the people: a new hospital

accreditation system focusing on medical care quality has been established; work in mental health is strengthened; care of psychiatric patients in community is actively promoted; prevention and control of suicide is intensified; an electronic medical record system has been promoted and criteria of electronic medical records have been formulated and maintained; special medical care is strengthened; community-based long-term care systems are set up, and work is continued to promote the ten-year long-term care plan; a tele-medical care program has been piloted; and the working environment for nursing personnel has been improved.

2. Realization of the preparedness of health promotion and disease control to free the public from threats of diseases: the existing disease monitoring systems have been strengthened; preparedness to face the influenza epidemics has been completed; work in the promotion of the plan to reduce tuberculosis by half in ten years and the harm-reduction program for drug addicts against AIDS has been continued; prevention and control of enterovirus infection and dengue fever have been strengthened; infection control in hospitals is strengthened; a program of hand hygiene is implemented; the overall national immunity has been elevated; more items and target groups have been included in the immunization program.
3. Promoting the core value of the National Health Insurance to assure equality in medical care; reform of the National Health Insurance system has gone underway; work is continued to promote plans to improve payments for medical costs; medical care quality indicators are made public; medical care in remote areas is strengthened, and care of the less privileged groups has been extended; plans to help the economically-deprived groups to pay for their overdue NHI premiums have been implemented.
4. Encouraging the overall participation of the public to realize healthy living: a program, “move to live” , is advocated; health fitness activities such as “walking ten-thousand steps a day” are promoted; health-supporting environments are built, and safe community and safe schools are promoted; a healthy city plan, health promotion at worksites, and health promoting schools are promoted; tobacco hazards prevention is carried out to construct a smoke-free environment; a high-quality supporting environment for reproductive health is built; a comprehensive care system for chronic diseases has been constructed; cancer control is realized to reduce the risks of cancer.

5. Strengthening the management of food and drugs to safeguard their safety: a plan is currently ongoing to integrate the management of food and drugs by creating a Food and Drug Administration; the monitoring and management of the safety of food is strengthened; management of imported food items is strengthened by more intensified border inspection and reporting; safe drug use environment is built; the prevention and control of drug abuse is intensified; management of Chinese medicine and pharmacy is strengthened.
6. Active participation in international health to link with the international community: work has been done to join international organizations, to promote exchange in international health, and to promote medical aid and technical cooperation to share Taiwan's experience in health care.

To care for the patients of Hansen's disease, the Department promulgated on August 13, 2008, a set of Regulations Governing Human Rights Protection and Compensation for Hansen Disease Patients. Action has then been taken to restore the reputation of the patients, to compensate their losses, to protect their rights to medical and nursing care, and to substantially care for their living.

In the summer of 2008, facing the outbreaks on mainland China of incidents of milk powder, ammonia powder and egg white powder being contaminated by melamine, an agreement on food safety was signed. To strengthen the food and drug management systems, in May 2009, the set of Regulations Governing the Organization of the Food and Drug Administration (TFDA) was passed. The Administration is expected to be inaugurated in January 2010. The new Administration can more effectively enforce the management of food, drugs and cosmetics to protect the health of the people.

With the implementation of the amended Tobacco Hazards Prevention Act on January 11, 2009, advancement in public health has moved on one-step forward. Smoke-free Taiwan is no longer a slogan. This is one of the proud moments of the history of public health in Taiwan. On January 22, 2009, the health and welfare surcharge levied on tobacco products was adjusted upward to NT$ 20, effective on June 1.

In mid-April 2008, a novel H1N1 influenza broke out in Mexico. The infection kept on thereafter and gradually spread to all major continents in the world, and Taiwan was no exception. Information of the Centers for

Disease Control of the Department indicates that the epidemic is moderate and stable as yet, however chances of developing into a major outbreak are there. The current disease control strategy is not much so in containment, but the main goals are to avoid large-scale infection and at the same time, to reduce mortality of the severe cases. We, therefore, urge that the public take self-management of health. The health authorities should prepare in advance sufficient amount of vaccines and Tamiflu, and adequate medical care capacities and medical personnel. Over the nears, we are fortunate that Taiwan has built a relatively comprehensive medical care network and the National Health Insurance; system-wise, Taiwan has the capacity to face the epidemic. There is never an end to disease control. There are still outbreaks of enterovirus, dengue fever, avian flu, and seasonal influenza that we are confronted with. Each life is valuable. The Department will continue to do its best in all respects, and the cooperation of the public is highly appreciated.

The National Health Insurance program indeed is a great asset of Taiwan. It makes accessible comprehensive medical care services available to all. The international community has given it high approval. Yet, a small portion of the population is still unable to pay for the insurance premiums. This is the area that more effort is required. To reduce the burden of the low-income families and the marginal families, and to face the ever-increasing number of the elderly and the critically ill patients, we wish to adjust upward the insurance premium rate. This intention comes out from consideration of the welfare of the public. We hope that the adjustment will be supported by all to assure the sustainability of the National Health Insurance, and thus to provide genuine protection to the citizens of Taiwan.

Minister of Heath

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1 Health Policies

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The tasks that come under the responsibility of the Department of Health, the Executive Yuan (hereafter referred to as the Department), medical care, disease control, health promotion, management of food and drugs, research and development in biotechnology, management of health industries, the National Health Insurance, and international health affairs, are closely associated with the health and welfare of each citizen. With limited resources and organization, how to provide the people with all-directional health care services to protect the health of all is a major task of today.

Section 1 Goals and Focuses of Policy Implementation in 2008

The Department has, in accordance with the 2008 policy guidelines of the Executive Yuan, and in coordination with the mid-term work plans and the range of the approved budget, and focusing on the current social conditions and the future development needs of the Department itself, formulated program plans for the year 2008. Their goals and focuses are as follows.

1. To reform the health care systems, to upgrade the quality of care, to promote holistic care, and to construct a community health and medical care system; to integrate and build a long-term care system; to improve the quality of long-term care services; and to advance the reform of the National Health Insurance to make the insurance system more comprehensive.
2. To build healthy life, and to promote self-management; to create a smoke-free environment by promoting an all-directional tobacco hazards prevention; to urge the public to establish healthy lifestyles to stay away from cancer; to promote the screening of some major cancers.
3. To strengthen the disease control systems to avoid the threats of diseases; to strengthen the functions of the current communicable disease monitoring systems; to improve the monitoring and reporting of diseases; to intensify preparedness for influenza epidemics, and thus to minimize the negative impact of influenza epidemics on the health of the people.
4. To strengthen the management of food and drugs to protect the safety of the people; to improve the management systems for food and drugs to ensure the safe use of food and drugs; to plan for the integration and merging of organizations of food and drug management to consolidate management, laboratory testing, and research in one unit.
5. To develop science and technology in medicine

and pharmacy; to promote biotechnology and health information industries; to promote the development of bio-medicine industries; and to develop manpower in health and medical research.

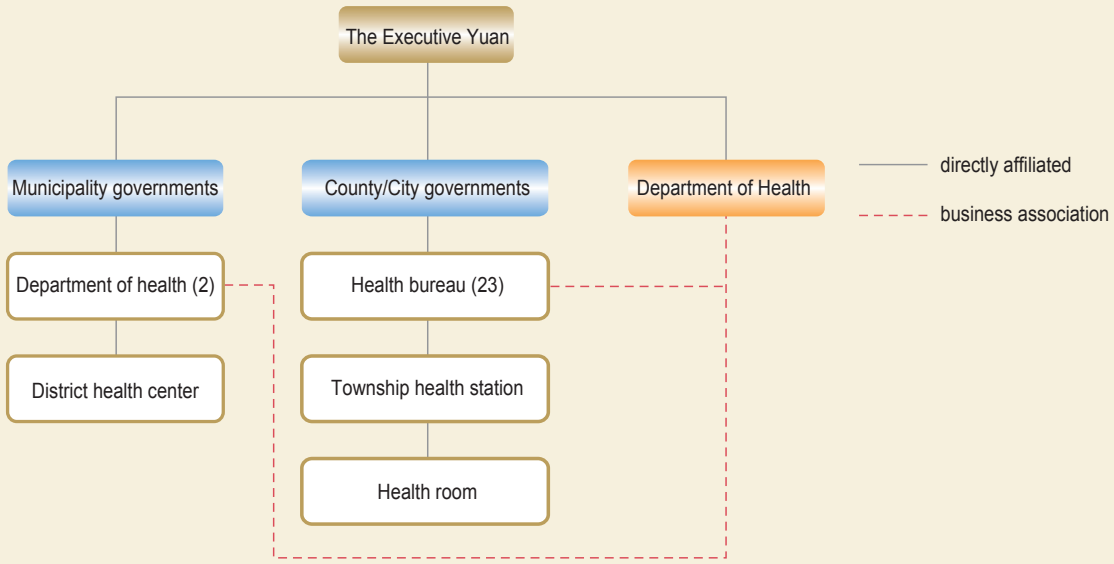
6. To promote international health affairs; to join the World Health Organization; to develop international health networks; and to strengthen international cooperation and exchange in health and humanitarian aid.

Section 2 Health Organization

Organization of health administration came originally in three levels, the central, provincial, and county/city. Since the promulgation of the Local System Act in 1999, the health organization was reorganized into two levels, the central, and the municipality and county/city (Figure 1-1).

The Department of Health of the Executive Yuan at the central level is the highest health authority in Taiwan to be responsible for the health administration of the country, and also the technical assistance, supervision and coordination of local health agencies. In each of the two municipalities, there is one city health department; and in each county/city, there is a health bureau, totaling 25. In each township, there is a health station, totaling 372. They are responsible for the administration of local health affairs.

Figure 1-1 Organization of Health Administration



1. The National Health Administration

There are under the Department, bureaus of Medical Affairs, Pharmaceutical Affairs, Food Safety, Nursing and Health Care, International Cooperation, and Planning, and several task-oriented units such as the National Health Insurance Task Force, Information Management Center, Science and Technology Development, and Hospital Management Committee. Affiliated organizations under the Department include the Bureau of National Health Insurance, Center for Disease Control, Bureau of Health Promotion, Bureau of Food and Drug Analysis, Bureau of Controlled Drugs, Committee on Chinese Medicine and Pharmacy, NHI Supervisory Committee, NHI Dispute Mediation Committee, NHI Medical Expenditure Negotiation Committee, 22 DOH hospitals, six sanatoriums and one chest hospital. In addition, there are also the DOH financially supported units such as the Corporate National Health Research Institutes, Corporate Center for Drug Inspection and Examination, Taiwan Joint Commission on Hospital Accreditation, Corporate Foundation for Compensation for Drug Hazards, and the Taiwan Organ Registry and Sharing Center (Figure 1-2).

2. Planning for the Integration of the Management of Food and Drugs

The safety, efficacy and quality of food, drugs (western medicines, controlled drugs, bio-products, medical devices, Chinese medicines, and new drugs) and cosmetics are highly associated with the daily life of the public and also their medical care and welfare. Their management systems and their efforts in the management of the industries are an important indicator of the health of the people.

In this connection, with reference to the organization and management systems of food and drugs in other countries, the Department has a plan to integrate and merge the Bureau of Food Safety, Bureau of Pharmaceutical Affairs, Bureau of Food and Drug Analysis, Bureau of Controlled Drugs, and the management of emerging bio-medicine science and technology under the Bureau of Medical Affairs to become a Food and Drug Administration (TFDA) of the Department. The new Administration will become an integrated organization responsible for the administration, laboratory testing and research of food, drugs, and cosmetics, and the control of drug abuse. The Organization Act of the Administration was passed on June 3, 2009, and promulgated by the Presidential decree.

Section 3 Health Budget

The health budget accounts for 3.1% of the total central government budget (Figure 1-3). In the last years, the budget of the Department has not increased along with the aging of population and the increased workload. However, the health teams have continued to make all efforts to bring health and safety to the people. In a public opinion survey in 2008, the approval rate of the performance of the Department was as high as 70%.

Figure 1-2 Organization of the Department of Health, the Executive Yuan

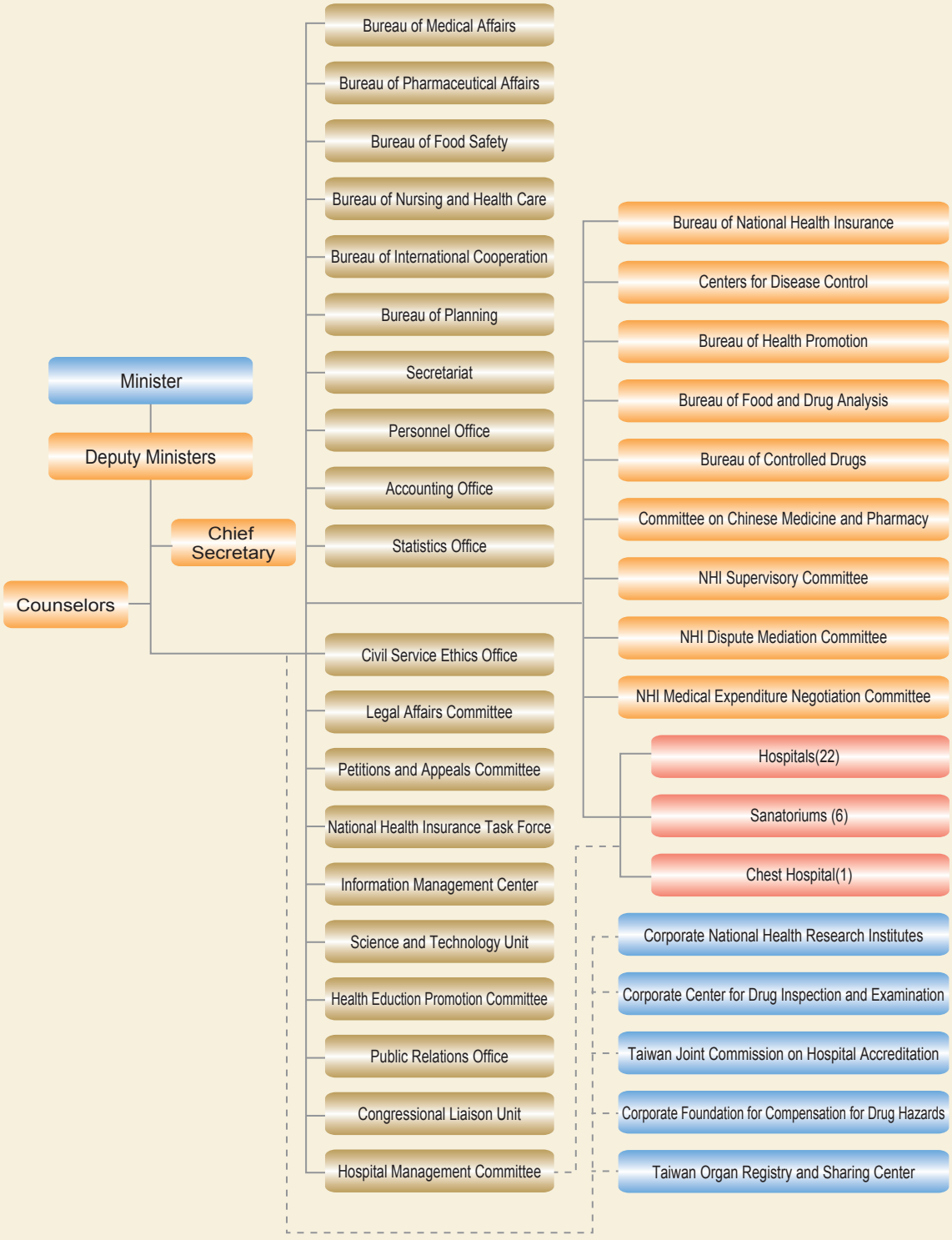
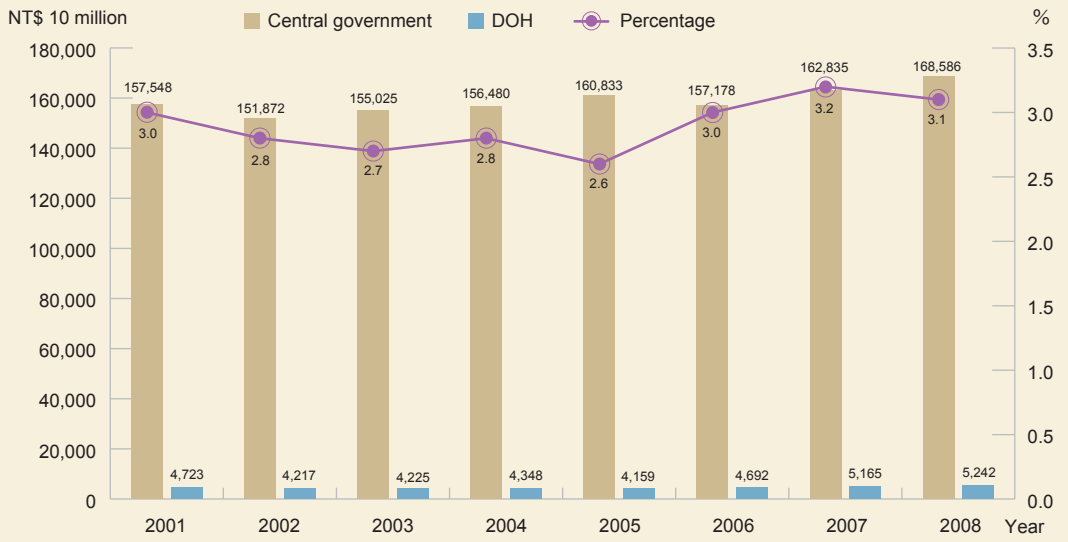


Figure 1-3 DOH Budget as Percent of Total Central Government Budget, 2001-2008



Section 4 Policy Evaluation

The promotion of health and medical care requires the concerted cooperation of the central and the local governments to effectively enforce the relevant policies, and thus to protect the health of the people. The Department's overall evaluation over the achievements of local health departments/bureaus aims primarily at evaluating the annual performances of local health organizations with a view to help them improve quality of services to the public. Since 2008, the Department has, based on the special features of each county and city, integrated and simplified the original evaluation into three categories of “disease control and health promotion” , “food and drugs” , and “medical care” , to be executed by bureaus and divisions concerned for evaluation and reward to upgrade the administrative efficiency and quality.

2 Health Indicators

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Along with increase in national incomes, improvement in living environment and national nutrition, advancement in health and medical sciences, upgrading in health standards, and increase in accessibility to medical care due to the implementation of the National Health Insurance, the average life expectancy of the people has prolonged.

Section 1 The Population

At the end of 2008, the total registered population in Taiwan was 23.04 millions. Of them, 11.63 millions were males and 11.41 millions were females; giving a sex ratio (male population/female population x 100) of 102. The annual growth rate of population was 3.43 .

At the end of 2008, the population density in Taiwan was 637 persons per square kilometer of land area. By county and city, Kaohsiung City had the highest density, and Taipei City came next. Hualien and Taitung counties had the lowest density.

1. Age Structure of Population

The population of Taiwan reached 20 millions at the end of 1989. Upon the impact of the declining birth rate year by year, the age structure of population at the end of 1989 was already a shrinking pyramid of low birth rate and low death rate.

By the age structure of population, the proportion of the aged population above 65 years to the total population reached 7% in 1993, making Taiwan an aged society. The proportion of the 0-14 young age groups had declined from 21.9% in 1998 to 16.9% in 2008. In the same period, the proportion of the 65 years and above elderly population had increased from 8.3% to 10.4%. The aging of population is becoming more significant.

The dependency ratio (0-4 population + 65 and above population / 15-64 population x 100) had declined from 43.3% in 1998 to 37.7% in 2008, due primarily to the rapid decline of the young dependency ratio (0-14 population/ 15-64 population x 100) and the steady increase of the elderly dependency ratio (65 and above population / 15-64 population x 100).

2. Births and Deaths

Fertility in Taiwan has declined year by year. Crude birth rate (total number of live births in the year / mid-year population x 1,000) had declined from 12.4 in 1998 to 8.6 in 2008, a historically low point. Crude death rate (total number of deaths in the year / mid-year population x 1,000) had increased slightly from 5.6 in 1998 to 6.3 in 2008, resulting in the decline of the natural increase rate of population (crude birth rate –

crude death rate) to 2.3 in 2008 (Figure 2-1).

3. Life Expectancy

Life expectancy at birth for both sexes in the last ten years had increased from 75.8 years in 1998 to 78.5 years in 2008, an increase of 2.7 years. For males in the same period, the life expectancy at birth had increased from 73.1 years to 75.5 years, an increase of 2.4 years. For females, it had increased from 78.9 years to 89.0 years, an increase of 3.1 years. The increase in the life expectancy at birth for females is higher than that of the males (Figure 2-2).

Section 2 Vital Indicators

1. Ten Leading Causes of Death

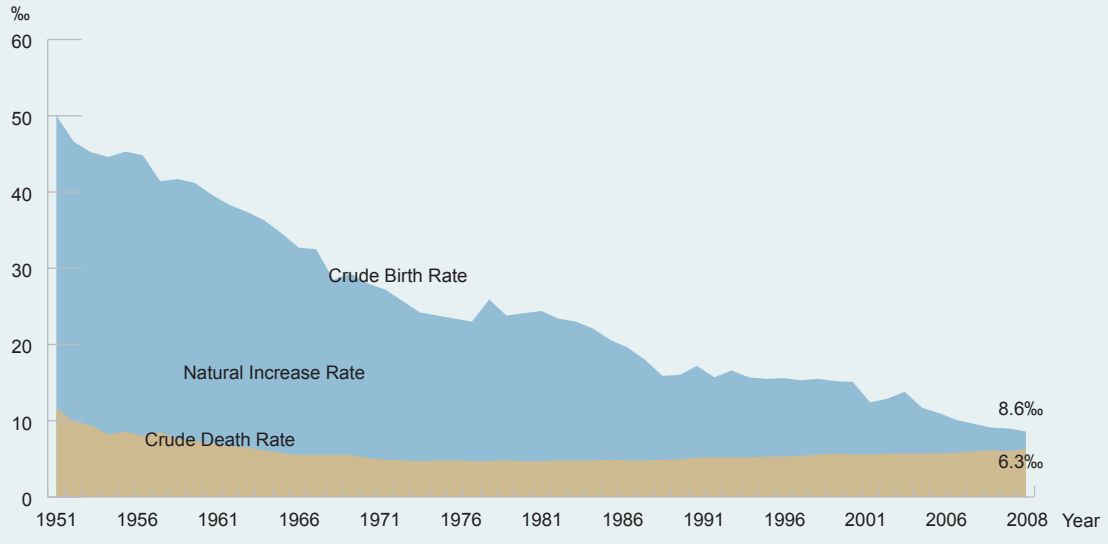
In 2008, the total number of deaths was 142,283 persons, giving a crude death rate of 618.7 per 100,000 population, and was an increase of 1.7% over the previous year. If adjustment is made by the age structure of the 2000 world standard population, the standardized death rate of 2008 is 484.3 per 100,000, a decrease of 1.5% over the previous year. Changes in death rates seem to be significantly affected by the aging of the age structure.

In 2008, the causes of death were coded by the ICD-10. The ten leading causes of death were malignant neoplasms, heart diseases, cerebrobascular diseases, pneumonia, diabetes, accidents and adverse effects, chronic diseases of lower respiratory tract, chronic liver diseases and cirrhosis, suicide, and nephritis, nephrotic syndromes and nephrosis. Malignant neoplasm remained as ever the first leading cause of death; whereas accidents and adverse effects showed the largest decline in mortality in recent years of all causes of death (Figure 2-3).

2. Neonatal, Infant and Maternal Mortality Rates

With the advancement in public health, both

Figure 2-1 Crude Birth Rate, Crude Death Rate, and Natural Increase Rate of Population by Year



infant (deaths of infants under one year of age / number of live births of the year x 1,000) and neonatal (deaths of infants under four weeks of age / number of live births of the year x 1,000) mortality rates have, with the slight exceptional increase due to the practice of the new birth reporting system in 1995, generally declined. In 2008, neonatal mortality rate had declined to 2.7 ; this was about 44% of the mortality rate in 1971. In the same period, infant mortality rate had dropped from 15.5 to 4.5. Furthermore, the maternal mortality rate had declined from 39.7 per 100,000 in 1971 to 6.5 in 2008 (Figure 2-4).

Figure 2-2 Life Expectancy at Birth

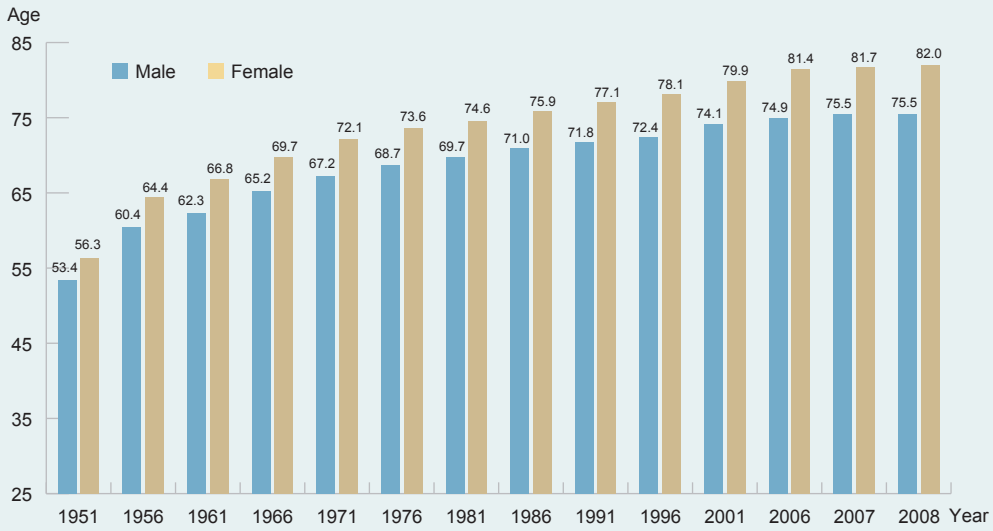
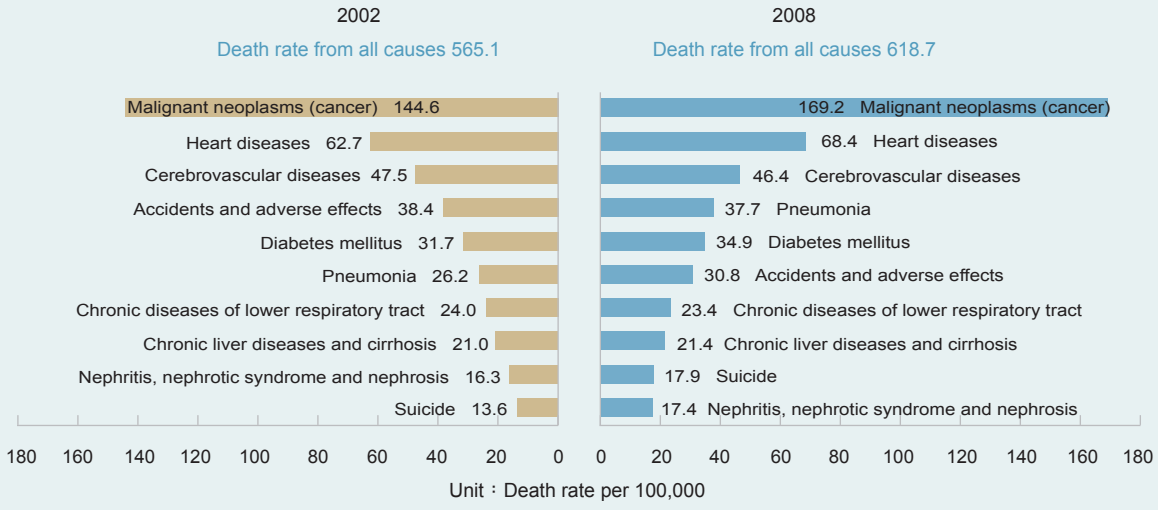


Figure 2-3 Changes in Ten Leading Causes of Death



Note: All causes for 2002-2008 are coded by ICD-10.

Section 3 National Health Expenditures

The total national health expenditures for 2007 were NT$ 771.4 billions. In the year the National Health Insurance was launched in 1995, the proportion of national health expenditures to GDP of that year had increased from 4.9% in 1994 to 5.3% in 1995; and to 6.13% in 2007. In the last ten some years, the average national health expenditures per persons had increased year by year from NT$ 10,821 in 1991 to NT$ 33,661 in 2007, an increase of 211.1% (Figure 2-5).

Figure 2-4 Neonatal, Infant and Maternal Mortality Rates

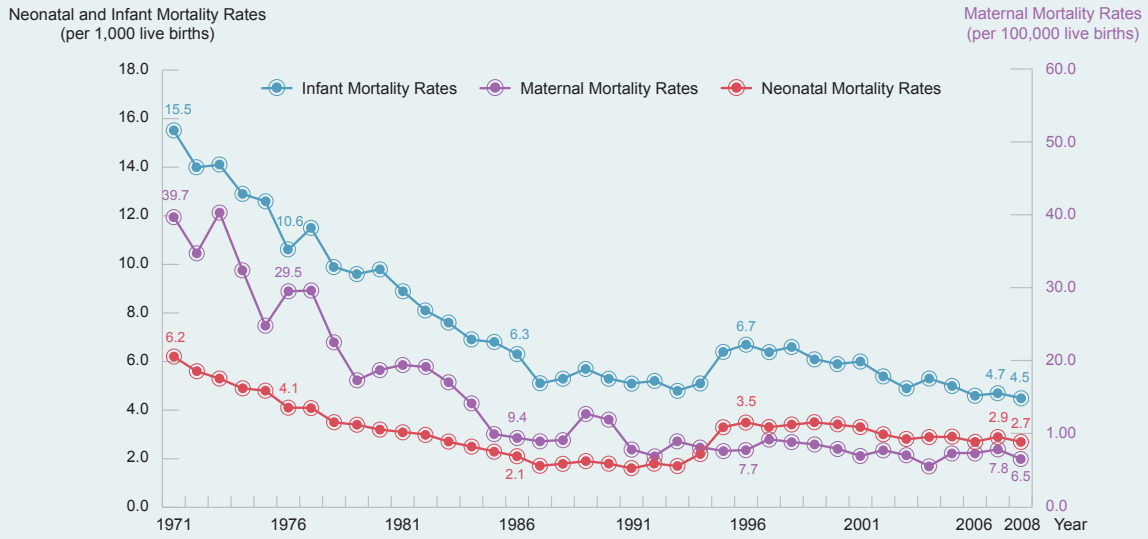
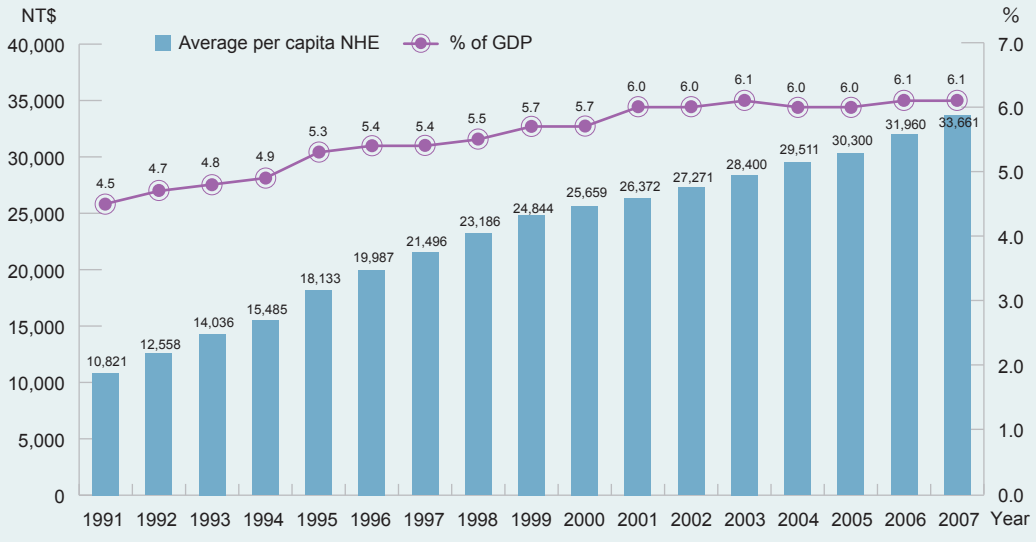


Figure 2-5 NHE/GDP Ratios and Average Per Capita NHE by Year



3 Health Promotion

3 Health Promotion

The World Health Organization advocates that health should not be the mere absence of diseases; it should focus on promoting the development of overall health. The Department has, therefore, promoted actively the building of healthy life, improving self-management of health, constructing healthy lifestyles, and, in coordination with the early screening for diseases, to reduce chronic diseases and their complications, and to minimize diseases, disabilities and mortality, and thus to attain the goal of health for all and improvement of quality of life.

Section 1 Community Health

In the Alma-Ata Declaration in 1978, the WHO strongly urged all nations to promote the health of all and to attain the goal of health for all by realizing primary health and medical care. Ever since, the Department has actively promoted primary care through health stations. Since 1999, the Department has, further in response to the WHO Ottawa Charter of 1986, promoted community health building projects with a view to, through public participation, establish a consensus and mechanism of community self-building of health and to solve health problems of communities.

1. Upgrading the Service Quality of Health Stations

Health stations are the primary operational units in Taiwan's healthcare service systems. At the end of 2008, there were 372 township health stations, including the 12 district health service centers of Taipei City, to provide the public with continuous, integrated and comprehensive primary care services. Some major achievements are as follows.

1) The Third Golden Station Award was organized; the manpower development plan for administrative inspection of health station was implemented. A set of high-quality standard operational procedures for health stations and benchmark learning are promoted to upgrade the service quality.

2) A 2007 Annual Statistical Report of Health Stations by County/City containing information on the current status of service manpower, hardware facilities and services of all health stations is compiled and published.

3) A project is implemented to augment the functions of the health and medical care information systems of health stations and their maintenance to improve the efficiency of the out-patient medical care systems.

2. Physical Activity and Healthy Body

The public is encouraged to take part in physical activities to build healthy lifestyles. Major activities are:

1) Since 2006, November 11 is made the "National Walking Day" . The reason for choosing November 11th is because of its resemblance to two pairs of feet walking together. The public is encouraged to build up a health concept of walking to promote health. The public is encouraged to build up a health concept of walking to promote health. The "Ten thousand steps a day makes you healthier" is advocated to encourage the people for regular exercise.

2) To promote healthy walking in communities and work places, various activities such as a symposium on dynamic community environment, healthy walking, painting and essay contests for children, promotion of healthy walking by enterprises, and physical exercises for office workers have been organized in coordination with enterprises, communities, schools and the health bureaus.

3. Promoting the Community-Based Healthy Life Plan

The "community-based healthy life plan" aims at, through the operation of community organizations, motivating the public to change from the conventional passive acceptance of healthcare service to active participation and care for their own health, and to practice healthy living. Major activities are:

1) To construct community-based health promotion networks: Through diversified strategies of promotion, 861 stores and 1,475 community groups are organized together to jointly promote issues on healthy diet, health fitness, tobacco hazards prevention, betel-nut prevention, health promotion for adults and the elderly, and safe community.

2) To promote healthy city and health promoting hospital projects: By the end of 2008, Tainan City, Hualien County, Miaoli County, Daan, Shilin and Beitou Districts of Taipei City, and Tamshui Township of Taipei County had successfully become members of the WHO Western Pacific Region AFHC (Alliance for Healthy Cities). Taiwan's experience in promoting healthy cities was shared at the 3rd WHO Western Pacific AFHC general meeting and the international symposium.

4. Health Promotion at Workplaces and Management of Health Risks

Facing the globalization of enterprises and diversification of employment patterns, Taiwan's promotion of occupational health has shifted from the control of occupational diseases in the past to health promotion at workplaces. In addition, through cross-ministerial collaboration, comprehensive policies are formulated to tackle the impact of health risks posed by environmental pollutions.

1) 74 workplaces have been given assistance in health promotion and tobacco hazards prevention by professional groups. A project for the self-certification of healthy workplaces is implemented and assessment standards are decided. In total, 1,177 workplaces have been

qualified.

2) To understand the health hazards brought about by environmental pollutions, cross-ministerial coordination and health risk assessment meetings are held. At these meetings, issues related to health risks (such as electromagnetic) and their management are discussed. The matter of electromagnetic is managed through cross-ministerial cooperation.

Section 2 Maternal and Child Health and Reproductive Health

A comprehensive service system in maternal and child health and reproductive health is constructed to ensure every pregnant woman be in good health and every child be born safely and to grow in good health thereafter.

1) To improve the quality of healthcare for pregnant women, pregnant women are offered 10 free prenatal care services. Each pregnant woman is given a health handbook.

2) Breastfeeding friendly environments are set up all around. Work is continued to certify Baby Friendly Hospital Initiative（BFHI）. In 2008, 94 institutions had passed the certification. Communities are encouraged to train breast-feeding promotion volunteers and to organize supporting groups. Free counseling services are offered. Websites on breast-feeding are set up. In coordination with county/city health bureaus, workplaces are encouraged and supervised to set up mother's breastfeeding rooms.

1. Health Promotion for Infants and Young Children

1) To strengthen healthcare for infants and young children, 9 preventive examinations are offered free to children less than seven years of age. Parents are offered a Child Health Handbook to provide them with knowledge on preventive care of children.

2) Taiwan is the first country in the world to conduct mass screening for infant with cholestasis using a “stool color card” . In 2008, computer registration systems had been completed in all health bureaus, medical centers and 74% of district hospitals. In total, 221,823 person-times of children have been screened. Of them, 107 children are reported abnormal in the color of their stools; and of them, 14 are confirmed biliary atresia.

3) To improve the screening of children with developmental delay, a project of developmental screening for children under 3 was conducted in 2008. A total of 323,929 children were screened. Of them, 4,754 children were suspected abnormal; and 3,574 of them had been reported and referred.

2. Reproductive Health

1) The Genetic Health Act was legislated in 1985, with a view to attain the goals of “protecting the health of mothers and children and improving welfare of families.” Measures in promoting reproductive health and examination for several genetic disorders have been planned and promoted throughout the country.

These measures include pre-marital health examination, prenatal genetic diagnosis, screening of the newborns, and genetic counseling, to reduce congenital anomalies in next generations.

2) More than 98.7% of the newborns had been screened for congenital metabolic disorders in 2008, to find 4,082 abnormal cases. In 2008, 33,396 pregnant women had been subsidized for prenatal genetic diagnosis, to find 774 abnormal cases. More than 85% of pregnant women aged 34 and above had received amniocentesis. 11,377 persons suspected of genetic disorders themselves or their family members had been further examined for genetic disorders, to find 4,589 abnormal cases. Costs for such services were either waived or subsidized by the Regulations Governing Waiving or Subsidizing for Costs for Genetic Health Measures. Abnormal cases are followed-up and given health education.

3. Technical Development of Artificial Reproduction

1) To promote the development of artificial reproduction and to protect the rights of infertile couples, the artificial reproduction child, and donors, the Artificial Reproduction Act was promulgated on March 21, 2007. Regulations for Query on Kinship of Artificial Reproduction Child, Regulations for Artificial Reproduction Institution Permit, and Regulations for Artificial Reproduction Information Notification and Administration have been announced one by one. In collaboration with the Ministry of the Interior, a set of Regulations for Verification on Kinship of Sperm/Oocyte Donors and Receptors was announced.

2) To upgrade the service quality of artificial reproduction institutions, and to serve as a reference for infertile couples in identifying institutions for medical care, review for permission of artificial reproduction institutions is continued. By the end of 2008, 75 such institutions had been given permission.

Section 3 Health Promotion for Children and Adolescents

Work is done to strengthen the prevention of accidents and injuries, hearing health, visual health, and sexuality health for children and adolescents. A health promoting school project is promoted. The goal is to allow each child and adolescent to have sound physical and mental development and to lead a healthy living.

1. Prevention of Accidents and Injuries and Safety Promotion

In the last ten years, mortality of accidents and injuries has, with the exception of the September 21 earthquake, declined gradually, to 35.1 per 100,000 in 2006, and to 30.8 per 100,000 in 2008. Achievements in this respect are summarized as follows.

1) Through the health bureaus and community health building centers of the 25 countries and cities, inspection of home safety is conducted. Households are supervised to make improvement.

2) Work has been extended to 20 counties and cities to provide children of the new immigrants with care in the prevention of accidents and injuries.

3) A safe community network is set up. Promotion centers for community safety and four supporting centers in the northern, central, southern and eastern regions have been established since 2006. By the end of 2008, seven communities had passed the international verification.

4) An indigenous safe school model is promoted. By the end of 2008, 15 schools had passed the international verification.

2. Oral, Vision and Hearing Health

1) Oral Health Promotion

Findings of national oral health surveys of children and adolescents conducted every five years show that the DMFT index had declined from 3.31 teeth in 2000 to 2.58 teeth in 2006, and is expected to decline to 2.2 teeth in 2010. The decline is due primarily to the decrease in the number of decayed and missing teeth.

Free fluoride application of teeth twice a year is given to children under five years of age. In 2008, 221,260 person-times of children had been given this service. Mouth-rinsing with fluoridated water for the prevention of dental caries for primary school children is promoted universally. Some 1.75 million school children in 2,651 primary schools in 25 counties and cities had taken part in this project, at a participation rate of 98.5%.

2) Vision Health

Epidemiological surveys of school children 6-18 years for myopia rate conducted every five years show that the increase of the prevalence of myopia for primary school children had slowed down since 2006. However, the myopia rate of the first year primary school children is as high as 20%; prevention of myopia should begin earlier in pre-school age children.

(1) A vision health promotion advisory group is set up to consider strategies for the health education of caregivers of pre-school age children.

(2) A national action plan for the screening of pre-school age children for strabismus, amblyopia and vision has been conducted. In total, 341,796 children have been screened, giving a preliminary abnormal rate of 14.5%. 99% of them have been referred and corrected.

3) Hearing Health

A project to screen hearing of the newborns and to assess their effects is implemented. Four service centers are set up in the northern, central, southern and eastern regions to assist collaborating medical care institutions to provide the newborns with hearing screening services. A project to provide services to the pre-school age children for the screening of hearing and language impairment is also conducted. Young children confirmed of hearing disorders are followed-up for correction and management. Caregivers of children with articulation problems are given counseling.

Health education materials on hearing and language impairment and discs on articulation teaching are offered to pre-school age children.

3. Sexuality Health Promotion for Children and Adolescents

1) A website for children and adolescents on sexuality is set up to provide them with correct information on sex and contraceptive methods. In 2008, the website had been visited 400 thousand person-times.

2) 13 hospitals and the Master Chang Foundation are subsidized to implement a project in eight county/city service areas to provide health promotion services to children and adolescents in the diagnosis, counseling and supervision on physical and mental health problems.

3) A project, children and adolescents-friendly outpatient clinic, is implemented. Medical care institutions are coordinated to set up clinics for the teens to provide them with contraceptive methods; to help them communicate with their parents on issues such as unexpected pregnancy; and thus to promote and protect the reproductive health of children and adolescents.

4) A project for community pharmacies to promote counseling services in sexuality for children and adolescents is conducted. 150 community pharmacies have taken part in this project to provide contraception and sexuality health-related counseling to the youths.

4. Health Promoting Schools

In 2008, 3,868 senior high/vocational schools and under had become health promoting schools. By their own needs, schools promote issues such as tobacco hazards prevention on campus, school safety, betel-nut prevention, vision health promotion, oral health promotion, health fitness, and sex education.

1) The number of health promoting schools had increased from 318 in 2005 to 3,868 in 2008. 25 counties and cities have been supervised to set up local supervisory groups. A pilot project on tobacco hazards prevention on campus was conducted in five primary, junior high and senior high/vocational schools in two counties. Training of manpower and seed workers has been conducted. Indicators for the assessment of project achievements have also been developed.

2) A single-entry website has been set up to provide real-time information and online supervision.

Section 4 Prevention and Control of Lifestyle-Associated Chronic Diseases

Since Taiwan became an aged society in 1985, the problem of population aging is getting worse. In addition, with changes in lifestyles and the westernization of diet, chronic diseases have increased year by year. Diabetes, cardiovascular diseases and kidney diseases are now on the list of the ten leading causes of death. With the aging of the population and the implementation of the National Health Insurance, costs for

hemodialysis are now a heavy financial burden of the National Health Insurance. To minimize the threats of chronic diseases, programs have been implemented following the three-stage and five-level principles of public health. Some major achievements are as follows.

1. Preventive Health

Preventive health care can secure all national health by early disease detection and early treatment. Since 1995, DOH has provided 4 main preventive health care services, which are prenatal examination, children's preventive health examination, cervical Pap smear examination, and adults' preventive health examination. Mammography X-ray examination and fluoridation of teeth for children were added in 2004. Items of the preventive healthcare services are listed in Table 3-1.

2. Health Promotion for High-Risk Groups

High-risk groups of various chronic diseases are early identified to provide them with health promotion activities and thus to avoid or delay the

Table 3-1 Health Screening Services and Utilization Rate in 2008

Category	Target Group	Frequency	Items of Examination	Utilization Rate (%) in 2008
Prenatal care	Pregnant women	10n	Physical, laboratory, Ultra-sound and health education	1.74 millions (97.2%)
Preventive healthcare for children	Children under 7 years	9n	Physical, development diagnosis and health education	1.24 million (68.6%)
Dental fluoridation for children	Children under 5 years	Once/six months	Dental fluoridation by dentists, general oral cavity examination and health education	220,000 (13.2%)
Pap smear test	Women above 30 years	Once/year	Specimen collection, pelvic examination, and pathological examination of cervical cells	1.82 million (26%)
Mammography	Women 50-69 years	Once/two years	Mammography examination	160,000 (6.6%)
Preventive healthcare for adults	Persons of 40-65 years	Once/three years	Physical examination, health counseling, blood test and urine test	1.70 million (34.2%)
	Persons 65 and above	Once/year		
	polio cases and above 35 years	Once/year		

Note: Rates of persons newly detected of blood pressure, blood sugar and cholesterol disorders are 22.7%, 7.8% and 13.1% respectively.

occurrence of diseases.

1) Metabolic Syndromes

Diversified methods and media, such as radios, contests of school teachers, parents and students, workshops for teachers and the printing of educational materials are used to promote the prevention of metabolic syndrome.

2) High-Risk Groups of Diabetes

(1) In coordination with the theme of the 2008 World Diabetes Day of the United Nations, lights were lit at the landmark buildings and fairs were held. Achievements of Taiwan in the l prevention of diabetes were posted on the websites of the United Nations and the International Diabetes Federation.

(2) Work has been done on the health promotion for diabetes high-risk groups by 136 diabetes health promotion institutions and 239 diabetes patients and families self-help groups in 217 communities.

3) High-Risk Groups of Chronic Kidney Disease

A project for the prevention of chronic kidney diseases at the primary care level was carried out. In total, 317 screening sessions for 49,342 persons were conducted. Among them, 2,807 persons were identified as chronic kidney disease patients in phases 1 to 5. 12 training sessions were organized for 942 medical and nursing personnel. Educational materials for chronic kidney disease prevention in Paiwan language were produced. A portable GFR calculator was developed.

4) Health Promotion for the Elderly

(1) Work is continued to promote issues related to the health promotion of the elderly such as health physical fitness, healthy diet, fall prevention, oral cavity and visual health, smoking-cessation, screening for cancer, and prevention of chronic diseases.

(2) Strategies for the prevention of blindness of adults and the elderly have been studied. A simplified screening questionnaire and a tool for eye disease screening in community have been developed. Eight hospitals have been subsidized to conduct visual health promotion projects in areas short of ophthalmologists to screen adults and the elderly for vision, and to give health education on eye diseases.

(3) In two counties and cities, a resource-integrated model for the health promotion of the elderly in community is tried out. In 20 communities in 14 counties and cities, a health promotion project for the elderly in community is implemented.

(4) A four-year plan for the health promotion of the elderly (2009-2012) is developed to promote eight items in health fitness, diet, fall prevention, oral healthcare, smoking-cessation, mental health, social participation, preventive health, and screening services.

(5) Fall prevention and home safety for the elderly are promoted. In 85 community health building centers, work has been carried out to inspect and improve home safety.

3. Upgrading Care Standards

1) Development of Educational Materials

English, Vietnamese and Indonesian versions of the educational materials on diabetes, stroke, kidney diseases and chronic obstructive pulmonary disease (COPD) have been produced for alien caregivers and spouses.

2) Shared Care Network for Diabetes

The shared care network for diabetes is promoted. 1,869 medical care institutions take part in this project. To improve the quality of medical personnel in the care of diabetes, a certification system for physicians, nurses and dietitians has been established. To improve the quality of care for diabetes, field practice of health education personnel has been arranged in diabetes health promotion institutions. Smoking-cessation counseling is provided. Improvement in the pay schedule for diabetes under the National Health Insurance is made. The diabetes patients-supporting system is strengthened to improve the efficiency of 436 diabetes patients self-help groups. The Taiwanese Association of Persons of Diabets has been set up.

3) Care for Cardiovascular Diseases

More blood pressure measurement stations in communities are set up. By the end of 2008, there were 463 blood pressure measurement stations. About 3,000 cases throughout the country are urged to take blood pressure at home for ten days. A stroke registry system is set up; and since 2006, 38 hospitals have joined the project to register 30,000 some stroke cases. A low-salt project is implemented to advocate "no more than 6 grams of salt per day (no more than 2,400 milligrams of sodium)". The public is reminded, before buying packed food, to check the sodium contents on the packing lable.

4) Care for Chronic Kidney Diseases

To slow down the progress of CKD (chronic kidney disease), a multi-disciplinary, cross-discipline care model was developed. 77 kidney health promotion institutions have been set up, and 14,068 new cases were accepted. Throughout the year, 31,074 cases were accepted totally. Among the end stage renal disease patients, 2,104 cases have received treatment including hemodialysis, peritoneum dialysis, and kidney transplantation. Among them, 22.6% of patients have accepted peritoneum dialysis; 38.9% of those who have accepted hemodialysis the first time are served at outpatient but not through hospital care or emergency care.

Section 5 Prevention and Control of Cancer

1. Current Status of Cancer

By the statistics of cancer registry in 2006, the number of new cancer cases (not including carcinoma in situ) in the year was 73,293 (42,017 males and 31,276 females). The crude incidence rates of males and females were 362 and 277 per 100,000 respectively. If adjusted by the WHO 2000 world standard population, the standardized incidence rates for males and females were 310 and 229 per 100,000 respectively. The commonly seen five leading cancers for men and women are shown in Table 3-2 and Table 3-3.

2. Reducing Risks to Cancer

The National Cancer Control Program 2002 of the World Health Organization stipulates that primary prevention of cancer can reduce at least 30% of cancer cases. Therefore, reduction of exposure to carcinogenic factors is one important task of cancer control in all countries.

1) Betel-Quid Hazards Prevention

The incidence and mortality of oral cavity cancer have increased the most drastically in all cancers of men. In Taiwan, betel-quid chewing is the most important cause of oral

Table 3-2 Incidence of Five Leading Cancers in Men, 2006 (not including carcinoma in situ)

Site	No. of Cases	Crude Incidence (per 100,000)	Age-Standardized Incidence (per 100,000)
Liver and intrahepatic bile ducts	7,617	62	54
Colon and rectum	5,793	50	43
Lung, bronchus and trachea	5,756	50	42
Oral cavity, oropharynx and hypopharynx	4,879	42	36
Prostate	3,073	27	22
Others	14,899	-	-
Total	**42,017**	**362**	**310**

Table 3-3 Incidence of Five Leading Cancers in Women, 2006 (not including carcinoma in situ)

Site	No. of Cases	Crude Incidence (per 100,000)	Age-Standardized Incidence (per 100,000)
Female breast	6,895	61	50
Colon and rectum	4,455	40	32
Liver and intrahepatic bile ducts	2,925	26	22
Lung, bronchus and trachea	2,992	27	22
Cervix invasive cancer	1,828	16	13
Others	12,181	-	-
Total	**31,276**	**277**	**229**

cavity cancer. To control the hazards of betel-quid, the Department, in addition to educating the public on the hazards of betel-quid chewing through all kinds of media, efforts have also been made in all areas. Since 2008, in the health promoting school project, schools may decide, upon actual needs, to include in the teaching skills to refuse betel-quid chewing. The armies are made betel-quid free. In communities, in collaboration with private sector organizations, fight against betel-quid chewing is advocated. Through health bureaus and private sector organizations, 130 high betel-quid chewing workplaces have been assisted to build betel-quid free work environments. By years of hard work, in 2008, the betel-quid chewing rate in males 18 years and above had dropped to 15%.

2) HPV Vaccine

In 2006 and 2008, the Department approved the marketing of two types of HPV (human papilloma virus) vaccines. To make the public understand better HPV vaccine and the control of cervical cancer, educational materials for different age groups have been produced. To study policies regarding HPV vaccine, a telephone survey of parents agreeing daughters 9-15 years to accept cervical cancer vaccine, and a questionnaire survey of the knowledge and attitude of parents of junior high school daughters on cervical cancer vaccine have been conducted. A symposium was organized to discuss issues of whether public funds should be used to subsidize cervical cancer immunization to collect opinions of different groups on the issues of HPV. At the end of 2008, experts and scholars were called to compile an assessment report on the policies of HPV.

3. Early Detection of Cancer

1) Cervical cancer screening: Work began in July 1995 to provide women 30 years and above with one Pap-smear examination each year. Findings of a telephone survey in 2008 conducted by the Bureau of Health Promotion of the Department show that 70% of women 30-69 years had had one Pap-smear examination in the past three years. Database of the Pap-smear screening report shows that 56% of women have had Pap-smear screening in the past three years. Pap-smear screening has reduced the incidence and mortality of cervical cancer by almost 50%.

2) Female breast cancer screening: In the period between July 2002 and June 2004, a project to screen women 50-69 years for breast cancer in two stages was tried out. Beginning in July 2004, women 50-69 years are given mammography screening once every two years. In the past two years, 288,000 women have accepted the mammography screening, at a screening rate of 12%. About 50% of the breast cancer detected through mammography is either at the 0 or 1st stage, indicating that screening is useful in the early detection of breast cancer.

3) Colon and rectum cancer screening: Since 2004, people aged 50-69 years are encouraged to accept fecal occult blood test. In the last two years, some 480,000 persons have accepted the test, at a screening rate of

10%. About 40% of the colon-rectum cancer detected through the screening is either at the 0 or 1st stage, indicating that screening is useful in the early detection of colon-rectum cancer.

4) Oral cavity cancer screening: Since 1999, examination of oral cavity membrane is offered to the smoking or betel-quid chewing groups 18 years and above. In the last two years, 1.04 million people have accepted the examination, giving a screening rate of 25%. Of them, 632 persons are confirmed oral cavity cancer.

4. Upgrading the Quality of Cancer Diagnosis and Care

1) The Bureau of Health Promotion of the Department announced on October 4, 2007, the Standards of the Quality of Cancer Diagnosis and Treatment in 2008, and Operational Procedures for the Quality of Cancer Diagnosis and Treatment. Work began in 2008 to conduct accreditation of cancer diagnosis and treatment by the announced standards for hospitals with 500 and more new diagnosed cancer cases. In 2008, 22 hospitals had been successfully certified. Results of the accreditation are announced for the reference of the public in seeking medical care.

2) Hospice and palliative care has been promoted since 1995. By the end of 2008, there were 34, 59 and 65 hospitals providing hospice care, hospice home care, and hospice shared-care respectively. In 2008, the hospice shared-care had served 13,900 some cancer patients.

3) The use of hospice and palliative care (including hospice care, hospice home care and hospice shared-care) of cancer patients in the year prior to their death is analyzed by the death tolls and claims for the National Health Insurance. The use rate had sharply increased from 7.4% in 2000 to 31.8% in 2007.

Section 6 Tobacco Hazards Prevention

For the prevention of tobacco hazards, the Tobacco Hazards Prevention Act was implemented in 1997. A health and welfare surcharge was levied on tobacco products in 2002; the surcharge was adjusted to NT$ 10 per pack of cigarettes in 2006. Of the surcharges, 3% is used for tobacco hazards prevention. A telephone survey of the smoking behavior of adults in 2004 through 2008 shows that the smoking rates of adults 18 years and above are 42.9% for men and 4.6% for women in 2004; 40.0% and 4.8% in 2005; 39.6% and 4.1% in 2006; 39.0% and 5.1% in 2007; and 38.6% and 4.8% in 2008. Data of the past years show that the smoking rate of men shows a declining trend; whereas the smoking rate of women is under close observation.

1. Smoke-Free Environment

The main goals of the tobacco hazards prevention are to reduce the smoking rate and to minimize the exposure rate to second-hand smoking in public places. Smoke-free environment, is promoted in communities, restaurants, schools, workplaces and the armies. Major activities are:

1) promoting 30 smoke-free communities; 92 groups have joined the project; and

4,600 families are now smoke-free. 12,452 restaurants are made smoke-free.

2) In collaboration with the Ministry of Education, 3,868 senior high/vocational schools, junior high schools, primary schools and 48 universities and colleges took part in this project.

3) In 2008, 74 workplaces had been supervised on the spot to promote either smoke-free or smoke-restriction policies. The survey on tobacco hazards in workplaces commissioned out by the Department indicates that the smoking rate of employees is 20%; and the exposure rate to second-hand smoking indoors of workplaces is 26%.

4) In collaboration with the Ministry of Defense, tobacco hazards prevention policies in armies are formulated; smoking-cessation intervention services are offered; and research and monitoring on tobacco hazards prevention are also conducted.

5) The international smoking cessation campaign, "Quit and Win 2008" , has been launched since April in Taiwan. The event is open to adults over 18 years old who have smoked for more than a year, with each participant requiring one person to serve as a witness. There are 18,741 participants to this year's quit and win campaign who have promised trying not to smoke from May 2nd to 29th. "Throw Away Your Cigarettes Design" competition was held at the same time. Prize winners are promoted on commercials networks and movie theaters.

6) Through the use of diversified media channels, videos of 25 county/city mayors advocating smoke-free public places are made; contests of individualized no-smoking signs for public transportation means and restaurants are held. Through the use of public and private sector resources, efforts are made to advocate the new regulations of the Tobacco Hazards Prevention Act, the hazards of second-hand smoking, and other information relevant to tobacco hazards and smoking-cessation. A survey in December 2008 soon after the educational activities shows that 90% of the public know about the new regulations of no-smoking in public transportation means, indoors workplaces of three persons and more, and in public places.

7) Non-Smoking Express mobile exhibition delivers the messages of tobacco hazard prevention on campus. This exhibition is held alternately in 17 senior high and vocational schools during one and a half year. This exhibition shows the impacts of smoking to economy, appearance and relationships, and also the plots of tobacco companies in marketing of tobacco products. In a ten-minute break or after school study, the students can spend some time to attend this Non-Smoking Express at school.

2. Diversified Smoking-Cessation Services

Article 21 of the amended Tobacco Hazards Prevention Act and Article 14 of the WHO Framework Convention on Tobacco Control stipulate that to assist smokers quit smoking is a major task of countries in the control of tobacco hazards.

1) Out-patient smoking-cessation therapy: Currently there are 2,149 medical care institutions distributed over 357 townships and districts (97%). In the period 2002 through 2008, a total of 360,957 people have accepted the services; 42,857 people accepted the services in 2008 alone. The six-month cessation success rate was about 22%.

2) Smoking-cessation help-line: A project, smoking-cessation counseling line, began in 2003. Toll-free (0800-636363) counseling services are offered by specialists in psychological counseling. By the end of 2008, the service received 340,000 enquiries; In 2008, counseling services received 76,800 enquiries. For those who have accepted counseling for several times, the group's six-month cessation success rate was about 29%.

3. Amendment and Enforcement of the Tobacco Hazards Prevention Act

The Tobacco Hazards Prevention Act has been amended following the principles of the WHO FCTC (Framework Convention on Tobacco Control). The Amendment was passed by the Legislative Yuan in June 2007; promulgated by the President of the Republic on July 11 of the same year; and will come into effect officially on January 1, 2009. This is one step further in protecting the health of the people and in the prevention of tobacco hazards as well.

To enforce the Tobacco Hazards Prevention Act, several important activities have been carried out. They are: 696 temporary workers are employed to help counties and cities in inspection and site-visiting; in 2008, a total of 215,000 firms had been inspected to find 12,530 violations. Tickets had been issued to 8,275 violations, and a total of NT$ 2,256,000 in fines had been collected. In the management of public complaints and counseling, 463 complaints have been received, and 369 cases have been offered counseling. A survey on the achievements in the enforcement of the Act is held. The average pass rate is 91.4%. Professional skills of employees are strengthened through workshops, training courses and teaching manuals.

Section 7 National Nutrition

Chronic diseases such as cancer, stroke, heart diseases, diabetes and hypertension are highly associated with. Therefore, to build a healthy and balanced diet concept in the population, to promote a healthy diet life, and to reduce the occurrence of chronic diseases are current important tasks that are to be actively promoted.

1. National Nutrition and Health Surveys

To periodically monitor the nutrition status of the population, the third national survey on changes in health status and nutrition in 2004-2008 was conducted, focusing on infants and young children 6 years (inclusive) and less and adults 19 years (inclusive) and above. The survey includes a questionnaire interview on dietary consumption, KAP (knowledge, attitude and practice) of nutrition, and various nutrition-associated diseases, and health examination to understand the nutrition problems and nutrition-associated diseases in different age groups for reference in the establishment of nutrition

improvement action plans and nutrition policies. Household survey and health examination began in July 2005. In this survey, the computer assisted personal interview (CAPI) system was used the first time; and the dual energy X-ray absorptiometry (DEXA) mobile vans went around for bone density examination. In total, 6,189 persons had been questionnaire-interviewed and 3,670 persons had been given health examination.

2. Nutrition Labeling

In recent years, people have become more aware of nutrition and health, many developed countries have enforced the nutrition labeling on packaged food. To meet the demands of the public, to build in consumers correct knowledge of nutrition labeling, and to provide them with sufficient information when they are selecting and buying food, the nutrition labeling system for packaged food on market has been promoted.

The nutrition labeling system in Taiwan has been promoted step by step with the active involvement of the manufacturers. The labeling requirements are announced one by one by food items. In 1998, the principles of nutrition labeling that packaged food on market should comply with were announced. The principles regulate that packaged food showing nutrition claim should provide with nutrition labeling. Since January 1, 2008, all completely packaged food products on market are required of nutrition labeling.

In Taiwan, nutrients that are required of mandatory labeling include energy, protein, fat, saturated fat, trans-fat, carbohydrates, and sodium. Thus far, the daily value of nutrient intake for 15 nutrients, including energy, protein, carbohydrates, fat, sodium, calcium, iron, vitamins B1, B2 and E, dietary fibers, vitamins A and C, cholesterol, and saturated fat, have been established.

Section 8 Health Education

To establish in the population healthy lifestyles, the Department has promoted various health education activities by means of mass media such as TVs, radios, newspapers, magazines, public transportation means, and the Internet to systematically provide the public with correct health information to help them build healthy behavior, to self-manage their own health, and to lay a sound foundation on good health and happiness. Major achievements in 2008 are as follows.

1. Integration of Health Education Resources

1) Health education themes are set; tuberculosis control is integrated; resources of the National Health Insurance are valued; correct use of medical care resources is promoted; the core values of the National Health Insurance are supported; and a national hand-washing campaign is promoted.

2) Health education resources are integrated and health education channels are established. Through diversified resources, continuing promotion and integrated packing, the knowledge of the public on health issues has been improved. An identification system is used to link policy and image. Channels are also made available to respond immediately to

the issues of concern of the public to remove their doubts.

3) A Health 99 website is set up. Currently, there are 1,324 kinds of educational materials on the web for browsing, downloading or requesting.

4) For the easy reading of the public, the Newsletter, Health Education Weekly, and the e-Bulletin on Food of the Department, the e-bulletin of the Bureau of National Health Insurance, and the Food and Drug Safety Weekly are integrated into one "Health e-Bulletin". At present, there are about 60 thousand subscribers.

2. Improving Knowledge of Health Education Workers

A symposium on the exchange of innovative ideas is held. Outstanding units are asked to share their experiences in health education. Experts and scholars are also invited to lecture on new knowledge and innovations to improve the skills and knowledge of the health education workers in carrying out their duties.

A compilation of educational materials in 2008 is produced and distributed to 5,200 hospitals, schools and other organizations for the use of the front-line health education workers in their duties. 80% of the users are highly satisfied with the contents, the editing and design of the publication.

3. Establishing a Cross-Ministerial Cooperation Mechanism

The health promoting school project is implemented in collaboration with the Ministry of Education. School teachers and nurses are trained and media are well coordinated to build a resource platform for health promoting schools.

Hand-washing is promoted. Teachers and caregivers of primary schools and kindergartens are trained to be seed workers to promote correct hand-washing in students and parents and thus to practice healthy living.

4 Communicable Diseases Control

4 Communicable Diseases Control

In the control of communicable diseases, in addition to the continuing efforts in epidemic surveillance and investigation, preparedness for disease prevention, research and immunization, more should be done to expedite the amendment of laws and regulations to comply with the world trend, and to set up a disease control command system. It is hoped that through a comprehensive disease control system, epidemics can be early detected and prevented to protect the health of all the people.

Section 1 Laws and Frameworks of Communicable Disease Control

To arrest the occurrence, infection and spread of communicable diseases, the Communicable Disease Control Act and other relevant laws and regulations are specifically formulated to adequately regulate the obligations and rights of the people in communicable disease control, and also for workers concerned to act in accordance when executing their duties.

1. Laws and Regulations for Communicable Disease Control

The Communicable Disease Control Act and the HIV Infection Control and Patient Rights Protection Act are the two important laws in the prevention and control of communicable diseases. To effectively realize these two important laws, 20 some relevant laws, regulations and orders were amended or formulated in 2008, to bring in line with the international trend.

1) Communicable Disease Control Act

The most recent amendment of the Communicable Disease Control Act was made in July 2007. Some major points of the amendment are: (1) both the domestic and international epidemic situations may serve as the factors for the central competent authority to consider activating the epidemics command center to conform to the spirit of "disease control without borders" ; (2) quarantine framework is adjusted; passengers, vessels, aircraft and cargos are quarantined respectively; (3) to prepare for the influenza pandemics, avoid the occurrence and spread of zoonotic diseases, regulations governing the management of vector animals or animals known or suspected of transmitting communicable diseases are made more specific and comprehensive; regulations concerning compensation and punishment are also added; (4) the central competent authority shall directly designate responsible hospitals in the Communicable Disease Control Medical Network; they will be subsidized at discretion; and (5) legal basis for competent authorities to supervise medical care institutions in enforcing infection control is established.

2) HIV Infection Control and Patient Rights Protection Act

To strengthen the protection of the rights of the infected persons and to set up a coordination mechanism for protecting their rights, the Act was amended in July 2007; the original title of "the AIDS Prevention and Control Act" was also renamed to the "HIV Infection Control and Patient Rights Protection Act". Some major points of amendment are: (1) in terms of the personal and legal rights of the infected persons, it is clearly stipulated that their basic human rights such as nursing care and housing should be protected; (2) regulations are added that the central competent authority shall invite groups and private sectors to promote the campaigns stipulated in the HIV Infection Control and Patient Rights Protection Act; (3) medical institutions shall not refuse to provide medical care services to the infected; medical personnel shall, upon consent of the person concerned and through counseling process, perform HIV tests; (4) legal basis is added for the implementation of the harm-reduction program, education of the high-risk groups, and mandatory screening; it is clearly specified that persons participating in the harm-reduction program who were included in the Needle-Syringe Program and Drug Substitution Treatment shall be waived of criminal penalties; and (5) persons concerned, if unfortunately infected with HIV in their course of executing relevant duties, shall be reasonably compensated to protect their rights.

2. Frameworks of Communicable Disease Control

1) Frameworks of Communicable Disease Control

Communicable diseases are controlled at two levels, the central and the local. The Centers for Disease Control of the Department of Health (Taiwan CDC) is the highest disease control authority in Taiwan to be responsible for the formulation of communicable disease control strategies and plans, and also for the supervision, direction and evaluation of local government agencies. County/city health agencies formulate their own action plans in accordance with the strategies and plans of the central government, and execute various communicable diseases control programs accordingly.

2) Framework of Laboratory Testing

The Taiwan CDC is responsible for the laboratory testing and research of various communicable diseases in country. In 2008, the Regulations Governing Laboratory Testing for Communicable Diseases and Management of Laboratory Testing Institutions, and the Operational Guidelines on the Authorization of Laboratory Testing Institutions for Communicable Diseases by the Department of Health were announced to promote an authorization system of institutions in performing laboratory testing of notifiable diseases. To assure the overall competency and quality of laboratory testing, a quality monitoring of laboratory testing is conducted. To meet the demands for the laboratory testing of various communicable diseases, 13 virus laboratories and 9 tuberculosis bacilli laboratories have been contracted. A National Plan for the Quality Management of the Collection and Transportation of Specimens of Communicable Diseases is also formulated to assure the quality, timing and safety of specimens sent by local health agencies for laboratory testing.

3) Incident Command System

When the SARS epidemics devastated Taiwan

in 2003, for the lack of a disease-oriented disaster control center as a focal point for coordination and combat command between the central and the local governments, the overall risk management of the government in communicable disease control was jeopardized. For this, the National Health Command Center (NHCC) was established in 2005 to consolidate relevant information supplied by ministries and departments concerned, local governments and private sectors organizations, and to transfer it into real-time information needed for decision makers. Along with the implementation of the International Health Regulations 2005 (IHR 2005), a contact point for liaison with other countries has been set up to facilitate notification response of major epidemics and public health emergencies.

3. Communicable Disease Control Medical Network

To upgrade the response competency against emerging communicable diseases, the Infectious Disease Control Medical Network was set up in 2003. It was later renamed the Communicable Disease Control Medical Network.

In 2008, the Regulations Governing Operation of the Communicable Disease Control Medical Network was announced. The country is divided into six subnetworks; 141 isolation care and emergency responding hospitals are designated to accept and care for the infected. Supervision and assessment of the operation of the negative pressure isolation wards designated by 25 emergency responding hospitals are conducted periodically to maintain the efficiency of the negative pressure isolation wards. To assure that the emergency responding hospitals can mobilize their efforts to accept and care for patients during disease outbreaks, they are asked to formulate emergency responding plans of their own in accordance with the H5N1 influenza strategic and combat plan.

4. Disease Surveillance and Investigation Mechanism

The number of cases of notifiable diseases in the Taiwan Area in 2008 is shown in Table 4-1 and Table 4-2. The surveillance and investigation of epidemics situations are as follows.

1) Pluralistic Surveillance Systems for Communicable Diseases

Sentinel surveillance networks are set up to collect reports weekly and to evaluate the overall trend in Taiwan. The information is feedback to the sentinels.

(1) Sentinel surveillance system: By the end of 2008, 799 physicians had volunteered to become sentinels for the system which covers around 87% of cities and towns in Taiwan. Diseases monitored include influenza-like illness, enterovirus infection diarrhea etc.

(2) School-based surveillance system: By the end of 2008, 611 primary schools had taken part in this project, covering around 93% of all townships throughout the country. Diseases monitored include influenza-like illness, hand-foot-mouth diseases or herpangina, diarrhea and fever.

(3) Surveillance systems in densely populated institutions: By the end of 2008, 1,732 institutions had participated in this project. Diseases monitored include communicable diseases of respiratory t systems and gastrointestinal symptoms, and cluster infections.

Table 4-1 Cases of Acute Notifiable Diseases, 2008

Category	Disease	Total	Indigenous	Imported
I	Smallpox	0	0	0
	Plague	0	0	0
	SARS	0	0	0
	Rabies	0	0	0
	Anthrax	0	0	0
	H5N1 Influenza	0	0	0
II	Diphtheria	0	0	0
	Typhoid	33	13	20
	Dengue Fever	714	488	226
	Meningococcal Meningitis	19	19	0
	Paratyphoid Fever	11	3	8
	Poliomyelitis	0	0	0
	Acute Flaccid Paralysis	74	74	0
	Shigellosis	90	46	44
	Amoebiasis	227	144	83
	Malaria	18	0	18
	Measles	16	9	7
	Acute Viral Hepatitis type A	236	201	35
	Enterohemorrhagic E. coli Infection	0	0	0
	Hemorrhagic Fever with Renal Syndrome	1	1	0
	Hantavirus Pulmonary Syndrome	0	0	0
	Cholera	1	1	0
	Rubella	33	25	8
	Chikungunya	9	0	9
	West Nile Fever	0	0	0
	Epidemic Typhus Fever	0	0	0
III	Pertussis	41	40	1
	Tetanus	18	18	0
	Japanese Encephalitis	17	17	0
	Congenital Rubella Syndrome	1	0	1
	Acute Viral Hepatitis type B	231	216	15
	Acute Viral Hepatitis type C	124	122	2
	Acute Viral Hepatitis type D	4	4	0
	Acute Viral Hepatitis type E	14	10	4
	Acute Viral Hepatitis Unspecified	22	22	0
	Mumps	1,145	1,145	0
	Legionellosis	69	66	3
	Haemophilus Influenza type b Infection	12	12	0
	Neonatal Tetanus	0	0	0
	Enteroviruses Infection with Severe Complications	373	373	0

Table 4-1 Cases of Acute Notifiable Diseases, 2008

Category	Disease	Total	Indigenous	Imported
IV	Herpesvirus B Infection	0	0	0
	Leptospirosis	47	47	0
	Melioidosis	45	40	5
	Botulism	11	11	0
	Invasive Streptococcus Pneumoniae Infection	805	805	0
	Q Fever	91	90	1
	Endemic Typhus Fever	31	28	3
	Lyme Disease	2	0	2
	Tularremia	0	0	0
	Scrub Typhus	491	488	3
	Varicella	3	3	0
	Cat-Scratch Fever	28	28	0
	Toxoplasmosis	2	2	0
	Severe Complicated Influenza Case	22	22	0
V	Rift Valley Fever	0	0	0
	Ebola-Marburg Hemorrhagic Fever	0	0	0
	Yellow Fever	0	0	0
	Ebola Hemorrhagic Fever	0	0	0
	Lassa Fever	0	0	0

Notes:

1. Amended and announced by the Department of Health, the Executive Yuan, on October 24, 2008, under Shu-Shou-Chi No. 0970001187, and became effective on November 1, 2008.
2. Data were re-downloaded on May 1, 2009 and the coverage period was from January 1, 2008 to December 31, 2008.
3. Data were analyzed by the onset dates.

Table 4-2 Confirmed Cases of Chronic and Other Notifiable Diseases, 2008

Category	Diseases	No. of Confirmed Cases
II	MDR-TB	159
III	Smear- positive tuberculosis	5,559
	Other tuberculosis	8,706
	HIV infection	1,752
	Hansen's disease	8
	Syphilis	6,526
	Gonorrhea	1,621
IV	Creutzfeldt-Jakob disease	0

Notes:

1. Amended and announced by the Department of Health, the Executive Yuan, on October 24, 2008, under Shu-Shou-Chi No. 0970001187, and became effective on November 1, 2008.
2. Data were re-downloaded on May 1, 2009 and the coverage period was from January 1, 2008 to December 31, 2008.
3. Data were analyzed by the diagnosis dates.
4. Tuberculosis confirmed cases were included in the statistics based on the dates of reporting.

2) Integration of Epidemic Reporting Systems

(1) Work is continued to integrate various reporting systems and to enhance their functions to achieve the goal of making the entry of reporting into one, and thus to upgrade the efficiency of disease notification.

(2) An integrated national disease control information network was set up. The network combines databases of the notification of communicable diseases and the geographic information system (GIS), to collect communicable disease information through multiple channels to timely monitor and control epidemics.

(3) Investigation of Epidemics

The communicable disease epidemics investigation information system is constructed to assist in the epidemic investigation of notifiable diseases, and to produce a model questionnaire to help medical staff analyze of the epidemic situations or for the reference in preparing management measures.

The Field Epidemiology Training Program (FETP) is continued to prepare manpower in field epidemiology and to timely control outbreaks. The result of investigation is supplied to the administration for reference.

Section 2 Control of Major Communicable/ Emerging Communicable Diseases

Diseases such as plague, smallpox, rabies, malaria and poliomyelitis have been successfully eradicated in recent years. However, along with the increasingly frequent international interaction, the threats of emerging and re-emerging communicable diseases have increased day by day, and the control of communicable diseases has once again faced serious challenge.

1. Tuberculosis

The number of confirmed tuberculosis cases in Taiwan has declined year by year. In consideration of the current status of tuberculosis and assessment of the effectiveness of control efforts in the past as well as, and with reference to "The Global Plan to Stop TB (2006-2015)" of the WHO, the Department has formulated a Mobilization Plan for halving Tuberculosis incidence in Ten Years, with a view to reduce incidence of tuberculosis to 34 per 100,000 by the year 2015. International cooperation is actively promoted; academic research is developed; and private sectors as well as government sections are encouraged to join fighting against tuberculosis. Achievements in 2008 are as follows.

1) The Directly Observed Treatment Short-Course (DOTS) has been promoted. By the strategy of "delivering medicine to hand, supervising medication on the spot, and leaving after medicines are taken" , the failure rate of treatment and relapses are effectively reduced, and cases of multiple drug-resistant tuberculosis are prevented. Currently, about 90% of all sputum positive cases are included in the plan.

2) The Multiple Drug-Resistant (MDR) Tuberculosis Medical Care System began to operate on May 1, 2007. Through collective management and care and by the expanded

DOTS plan (DOTS-Plus), the success rate of treatment of MDR-TB cases has been improved.

3) A set of Exit Control of Tuberculosis Patients by Air Travel was announced on September 1, 2007 to interrupt the spread of tuberculosis and to improve the international image of the country.

4) Since April 1, 2008, a plan for the treatment of latent tuberculosis has been practiced. In coordination with the Direct Observation Preventive Treatment (DOPT) plan, the incidence of tuberculosis is expected to be reduced. In 2008, 1,490 cases took part in this project.

5) Case finding is actively promoted. Mobile X-ray vans go around the country for chest X-ray examination, for 176,247 person-times. Epidemics situations in 2008 had declined; and the number of confirmed cases dropped by 2% over 2007.

2. Communicable Diseases of the Enteric Tract

1) Enterovirus

The epidemic situations of enterovirus infection are closely monitored through the Notifiable Disease Surveillance system, the Sentinel Surveillance system, and the Laboratory Surveillance systems for virus infections. Preventive strategies in 2008 include, (1) county/city health bureaus are commissioned to implement the intensified control plan for enterovirus infections in communities; local seed workers are trained; community health education is strengthened; (2) training on the clinical treatment of serious complications of enterovirus infection is conducted; the timing for the referral of suspected serious cases and matters to be noticed at time of treatment are emphasized to upgrade the professional knowledge and skills of medical and nursing personnel; and (3) hospitals are designated to treat the serious cases of enterovirus with adequate medical care, and to reduce the fatality rate and the occurrence of sequelae.

2) Hepatitis A

The incidence of hepatitis A in mountain townships had dropped from 90.7 (183 confirmed cases) per 100,000 in 1985 to 0 in 2008. In 2008, The Taiwan CDC has implemented a pilot project called the “Hepatitis A prevention and immunization plan targeting night market food venders.” The plan screens vendors; those who haven't had immunity are given vaccination; and those who have immunity or have been immunized are issued certificates, for the reference of the public in choosing food stands for consumption.

3. Dengue Fever

Strategies of prevention and control in 2008 are: (1) a mobilization mechanism has been set up; coordination meetings of health and environmental protection authorities have been held; a joint inspection model is established; county/city governments are requested to set up dengue fever command centers at county/city and township/district levels; (2) health education of the public is intensified; work manuals for the prevention and control of dengue fever are amended; training of disease control workers and medical/nursing personnel is strengthened to include vector mosquito survey and emergency spraying; (3) surveillance mechanisms for breeding sources, larva and vector mosquitoes

have been established and strengthened; surveillance of virus mosquitoes and studies on the drug-resistance of vectors mosquitoes are conducted.

4. Blood and Body Fluid-Transmitted Communicable Diseases

1) AIDS

(1) By the end of 2008, there had been a cumulative total of 17,428 cases of HIV infection (including 680 foreigners). Of the indigenous cases, 5,183 had developed into full-blown AIDS; and among them, 2,199 had died. The number of new cases had dropped since 2005, and for the last three consecutive years.

(2) To face the increase of AIDS infection in drug addicts, the harm-reduction program of AIDS for drug addicts was launched in 2005. Major strategies include, (1) HIV screening for drug addicts is expanded to early detect cases for timely treatment; (2) a Needle-Syringe Program (NSP) is conducted to provide drug addicts with supervision and follow-up, and drug-cessation counseling, to prevent them from being infected with hepatitis B, hepatitis C and AIDS; (3) a substitution treatment is offered to IDUs with oral substitutes of lower hazards in place of intravenous injection of high danger; they are followed-up and supervised, given health education, and referred to drug-cessation; by the end of 2008, 87 medical institutions throughout the country were providing drug substitution treatment services, and 1,103 stations were offering counseling and health education on clean needles and syringes, 418 needle vending machines were offering clean needles and syringes free of charge; the recalling rate of used needles and syringes was 61%.

(3) The Five-Year Phase IV program of the AIDS is implemented. There are 36 hospitals designated for the care of AIDS throughout the country, and five hospitals are designated to provide free medical care to drug addicts infected with AIDS. Free anonymous HIV screening is conducted to enhance the screening of high-risk groups and specific groups. In 2008, a total of 11,194 persons had been screened, and the positive rate was 2.15%.

(4) To prevent the vertical transmission of HIV from mothers to children, all pregnant women are screened against HIV. By 2008, 72 pregnant women had been detected HIV positive (including 16 aliens).

2) Sexually Transmitted Diseases (STD)

Work is continued in the health education of the public on the control of sexually transmitted diseases, and in providing laboratory testing services of HIV for patients of sexually transmitted diseases. In collaboration with private institutions, sex disease-friendly clinics are set up. Supervision and treatment of contacts are strengthened for more effective prevention. The sentinel physician reporting and surveillance of sexually transmitted diseases was initiated in 1993. In 2008, there were 283 medical care institutions along with 684 n doctors joined this project. The notification of STD and transfer of HIV specimens are thus realized.

3) Hepatitis B and C

A pilot project, Enforce Hepatitis B and C Trial

Treatment Program, began in 2003, hoping to significantly reduce incidences of liver cirrhosis and liver cancer. Work is continued to conduct screening of pregnant women at prenatal care for hepatitis B, and immunization of the newborns against hepatitis B. The carrier rate of children at age six has declined from 10.5% in 1989 before the immunization program to only 0.8% in 2007. Make-up immunization against hepatitis B of pre-school age children and school children upon enrollment in school is also conducted.

5. Prevention and Control of Emerging Communicable Diseases

1) 2008 Symposium on Zoonotic Diseases and Training Activities

Issues of the Symposium include the zoonotic diseases newly added to the list of notifiable diseases as well as, and major outbreaks and special cases of these diseases either domestically or internationally, to intensify knowledge of zoonosis and their preventive measures. The Manual for Creutzfeldt-Jakob Disease and other Human Transmissible Spongiform Encephalophathies - Guideline on Patient Management and Infection Control is amended. Training programs on the reporting and infection control of Creutzfeldt-Jakob disease are organized for members of dental associations and long-term care institutions.

2) Surveillance Systems for Emerging and Re-emerging Communicable Diseases

Work is continued to build a national background database on the host animals of emerging communicable diseases common to men and animals. Academic institutions were commissioned to conduct surveys of the Norovirus on pig farms in 2008. The surveys indicated that the risk factors associated with the Norovirus on pig farms were, farms in the southern part of the Island, white-hair pigs, pigs for meat, and during autumn and winter seasons. All viruses are of the second genotype in two subtypes, including the fourth subtype, which is at present considered the subtype that is primarily responsible for the global prevalence of enterogastritis in winter. There is also the second subtype that is genetically similar to the Japanese virus strain.

6. Prevention and Control of Imported Communicable Diseases

1) Quarantine

Necessary quarantine measures are taken against vessels, aircraft, crew and passengers. To maintain the sanitation and security of ports of entry and exit, a sanitation of ports and security team is organized jointly by the Taiwan CDC and the concerned authorities to prevent the entry or export of communicable diseases. Cases without fear of public health hazards are allowed to proceed with their international journey. By regulations of the IHR (2005), they are reported to the competent authorities of the next port of entry.

2) Communicable Disease Control in Travel

To early detect and effectively control communicable diseases, infrared thermal apparatus are installed at international ports to scan the body temperature of inbound passengers. Inbound passengers suspected of communicable diseases are required to fill in the "Communicable Disease Control Survey Form" for assessment and follow-up management. Light-boxes, posters and bulletin boards are set up for public education; educational materials such as leaflets and videos are produced to improve the knowledge of the public on the prevention of communicable diseases

in traveling and to improve their self-management of health.

3) Health Management of Alien Laborers

(1) To prevent the import of communicable diseases, all legally imported alien laborers are required of health examinations for application of entry visas. They are, after entry into the country, further required to undergo health examination at designated hospitals 30 days before or after being employed for 6 months, 18 months and 30 months. Alien laborers failing in any one item of the examinations after entry, with the exceptions of intestinal parasites (except Entamoeba histolytica), that are given 45 days for treatment and re-examination; and and syphilis that is given 30 days to complete the treatment.

(2) In 2008, 373,105 person-times of alien laborers had gone through regular health examinations (not including the examination three days after entry), and the failure rate was 8.54%. The failure rate of intestinal parasites was the highest at 8.36%; that of pulmonary tuberculosis came next, at 0.16%. The HIV antibody positive rate was 0.01%.

Section 3 Disease Control Preparedness and Infection Control

Measures taken to upgrade the overall national capacity to face disease outbreaks and biological agents disasters are as follows.

1. Influenza Pandemics

To tackle with the influenza pandemics, the Department has formulated four strategies, Early Detection, Interruption of Transmission, Antiviral Medicines, and Influenza Vaccines, and five defense lines, containment abroad, border control, community epidemic control, normal function of medical system, and individual and family protection. Achievements in 2008 are as follows.

1) Strategies and combat plans are renewed. In coordination with the WHO and information around the world, the Influenza Pandemic Strategic Plan is renewed; and the action plans and the Strategy Plan for the Execution of Influenza Pandemic Response are amended.

2) Different antiviral drugs are stockpiled at the level of 10% of the population; and the priority list of drug use is established. Work plans for antiviral drugs against influenza are formulated to be part of the SOP for disease control. A process to activate the use of the raw materials of Tamiflu is completed. Drills without advance warning are held for drug dispensing firms.

3) Plan for the stockpile and the use of H5N1 vaccine is completed. H5N1 vaccines are stockpiled as short-term supplies for combat readiness. According to the priorities of immunization for high-risk groups of exposure to influenza, voluntary immunization of core risk-groups were completed in April, 2008.

4) Knowledge and skills of workers at various levels and the general public have been upgraded. Eight digital learning curricula on influenza pandemics have been organized; and focusing on different groups, 13 kinds of educational materials have been produced.

5) International cooperation is actively promoted. The Taiwan CDC participated in the APEC international visual conferences, and the

Cross-National Collaborative Study Plan on Influenza of the European Union. Delegation was sent to the 13th International Conference on Infectious Diseases (ICID) to share results of the preparedness of Taiwan against influenza pandemics.

2. Counter Bio-Terrorism

Work is continued to review the counter bio-terrorist attacks response mechanism, and to renew the organization of the bio-defense response teams. In addition, in 2008, stocks of medicines and defense facilities were reorganized. 15,000 doses of antibiotics against Anthrax are renewed; updated biological and chemical defense facilities, specimen collection devices and kits are purchased, to maintain the capacity in confronting bio-terrorist incidents.

3. Management of Disease Control Supplies

To meet the demands for epidemic control and possible biological agents disasters, personal protection equipment (PPE) is managed by integrating information concerning the supply end, the flow process as well as the demand end. Several contracts on supply are signed; and a mechanism for the dispatch of N95 surgical masks and protection clothing is set up. In the safety stocking and management, a management information system (MIS) for supplies has been established; and supplies are stocked in sufficient amount at three levels of the central government, local governments and hospitals in separate warehouses to share risks and shorten time required for delivering.

To assure the smooth operation of the emergency dispatching of supplies, drills on the delivery of supplies are held. A set of standard operational procedures on the flow of supplies and their management has been formulated. The Regulations Governing the Operation Procedures and Compensations for the Expropriation and Requistion of Property for the Control of Communicable Diseases, and another set of Regulations Governing Implementation of the MIS are amended to facilitate the management of disease control supplies.

4. Nosocomial Infection Control

To protect the safety of patients and to effectively realize nosocomial infection control, several policies have been formulated. In January 2008, a set of Regulations Governing Inspection of the Implementation of Infection Control Measures in Medical Care Insitutions was announced for implementation. Major achievements are as follows.

1) To upgrade the quality of inspection on infection control in hospitals, the Taiwan Joint Commission on Hospital Accreditation was commissioned to conduct on the spot inspection of infection control in 495 hospitals.
2) To effectively monitor nosocomial infection in hospitals, the Taiwan Nosocomial Infection Reporting System was used for the voluntary reporting by hospitals. Around 300 hospitals are in use of this system. In 2008, the Taiwan Joint Commission on Hospital Accreditation was commissioned to implement a plan for the consistent assessment of the promotion of the new definitions of nosocomial infection; relevant practical case-study workshops were organized.
3) Professor Didier Pittet, an international expert on nosocomial infection control and hand hygiene, was invited to lecture on the WHO

directions in hand hygiene and control of antibiotics.

5. Research and Laboratory Testing

1) Plans for the establishment of reference laboratories for six major pathogenic agents of communicable diseases, yellow virus, mycobacterium bacteria, fungi, virus and parasites, have been completed to greatly upgrade the skills and capacities of laboratory testing. The first domestically produced volume of the electro-microscopic atlas of clinical microbes is also completed. The Atlas illustrates the taxonomy morphological specifics, history, and the epidemic situations of the diseases in Taiwan for 13 viruses, 24 bacteria, and two strains of fungi.

2) A plan to develop a platform for the surveillance skills of unknown/emerging pathogenic agents is ongoing to strengthen the collection of specimens of unknown/emerging pathogenic agents. Multiple molecular testing methods have been actively brought in and developed to improve the laboratory diagnostics skills of emerging infectious diseases.

3) In 2006, a "PulseNet Taiwan" was set up to provide quick confirmation and matching for cluster food-borne communicable diseases to effectively control the spread of diseases. The PulseNet Taiwan also serves as a platform for exchanging information with international surveillance systems and academic institutions. The National Influenza Center (NIC) has been set up to integrate domestic and international surveillance, to track down and report trends of change of influenza viruses, and to serve as a platform for exchanges with other NICs across the world.

4) In collaboration with the National Institute of Infectious Diseases (NIID) of Japan, projects to construct a molecular epidemiology laboratory network for diseases prevalent in Asia such as dengue fever and other vector-borne diseases, and development of technology on multilocus variable number tandem repeat analysis (MLVA) of intestinal bacteria are under progress. A collaborative relationship has been built with the Aberdeen University of the UK and the Chiba University of Japan to exchange information on bacteria strains types. In collaboration with the National Institute of Public Health and Environmental Protection of the Netherlands, a global surveillance project on the Beijing strain of tuberculosis is undergoing. The Taiwan CDC also participated in the WHO and US CDC-sponsored global rotavirus vaccine plan, and is a member of the Asian Rotavirus Surveillance Network (ARSN).

5) Pathogenic gene database: Work is continued to integrate and renew the sequencing typing automation procedures and laboratory information management systems. The entire process of gene sequencing from collection, PCR, matching and result analysis is integrated in one, and the functions of the follow-up of specimens, data matching, and automatic delivery of mails, and renewal of the front-end gene databases have been improved.

6. Bio-Safety of Laboratories

Since 2006, a set of "Regulations Governing Management of Infectious Biological Materials and Collection of Specimens from Patients of Communicable Diseases" has been implemented to provide a legal basis for the management of infectious biological materials and laboratory bio-

safety. By the core principles of self-management, correct reporting, and key-point inspection, a legal basis for the management of infectious biological materials and bio-safety of laboratories is provided. By the end of 2008, 426 units had been authorized to set up bio-safety committees (or full-time responsible personnel) to complete the functions of the bio-safety organization, building a high-quality bio-safety environment which meet the international standard.

Section 4 Immunization

Development of vaccines and immunization can effectively prevent and control diseases that are vaccine-preventable.

1. Current Status of Immunization and Trend

The ten routine immunizations currently provided are BCG, hepatitis B, DPT (diphtheria, pertussis and tetanus combined), oral polio vaccine, chickenpox, MMR (measles, mumps and rubella combined), Japanese encephalitis, influenza, Td (tetanus and reduced diphtheria toxoid), and hepatitis A (in mountain townships and high-risk areas). An application and review system for the relief of victims of immunization was set up by the government to offer adequate relief.

To provide convenient immunization service and improve coverage rate, counties and cities have actively requested hospitals to assist in immunization; and more efforts are rendered in areas of lower coverage rates to encourage immunization and make-up immunization through follow-up. The immunization coverage rates of children in 2008 are shown in Figure 4-1.

On October 1, 2008, a project began to immunize the elderly 75 years and above against Streptococcus pneumoniae, in conjunction with immunization against influenza at the same time, to reduce the occurrence of severe complications and deaths, to lower medical costs as well as improve the health and welfare of the elderly.

2. Development and Manufacturing of Serum Vaccines

1) Production of Biological Products

(1) A total of 1,808,005 doses of vaccines, toxoid, antitoxin and antivenin serum have been supplied periodically. Three batches of test fluid, 4 batches of final products and 12 batches of raw serum materials of antivenin serum products have been produced. 12 batches of semi-products of BCG and 5 batches of BCG final products have been tested. One batch of diphtheria-tetanus products, 4 batches of tetanus toxoid products, 130 batches of pure water testing and 11 batches of raw materials have been tested.

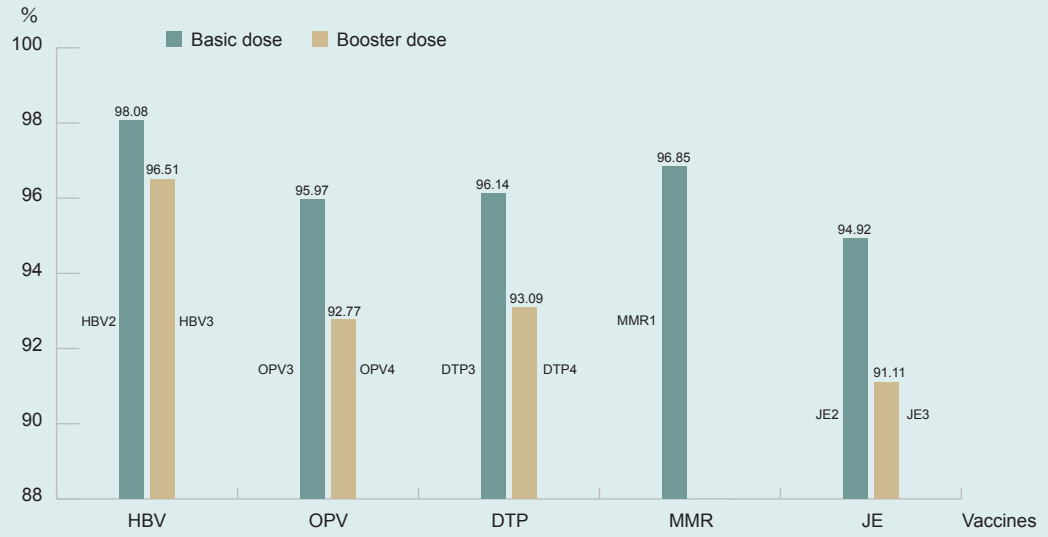
(2) Animals for experiment such as mice, guinea pigs, rabbits, poisonous snakes and ferrets are supplied and raised on contract. Antivenin serum is manufactured by using horse serum. A total of 293 liters of antivenin horse serum were produced in 2008.

2) Development of Bio-Products

(1) Influenza Research and development project on influenza

Achievements in 2008 are as follows. (1) Based on the HA gene sequences of H5N1 virus, DNA vaccines are designed; the manufacturing skills of the DNA vaccines for novel influenza are

Figure 4-1 Immunization Coverage Rates for Young Children, 2008



Note: HBV2, HBV3, OPV3 are for cohorts born between January 1 and December 31, 2007; DPT4, OPV4, MMR1, JE2 are for cohorts born between January 1 and December 31, 2006; and JE3 is for cohorts born between January 1 and December 31, 2005.

Source: National Immunization Information Management System (data downloaded in January 2009).

established; and sufficient DNA vaccines can be manufactured within six months to meet the demands of epidemic outbreaks. (2) Research teams for the clinical trials of influenza vaccine immunization were set up to analyze the protective titers of the indigenous virus strains and vaccine strains of those immunized against influenza. (3) The clinical testing laws and regulations for a consultation and assistance mechanism of the "Taiwanese Vaccine R&D (including Mass Production Technology) Project" were established, and the preclinical CMC review check list needed for early clinical testing was completed.

(2) Development of enterovirus type 71 particle vaccines

Achievements in 2008 are as follows. (1) The enzyme linked immune absorption experiment method has been successfully improved to detect the virus-like particle (VLP) protein. (2) The VLP manufacturing processes are established to purify high concentration (≒ 900 μg/ml) VLP samples in one liter of cell fluid. (3) Thus far, 15.3 mg of purified VLP (≒1.528 mg/ml, 10 ml) have been produced, and experiment on monkeys is ongoing.

3) Domestic Vaccines Research System

For effectively promoting the commercialization of the results of research and development, the Taiwan CDC has signed contracts with the National Health Research Institutes (NHRI) on two items of technical transfer. They are, the authorization of NHRI on the technical transfer of the manufacturing techniques of enterovirus type 71 by cell culturing method, and the technical transfer of the manufacturing techniques of Japanese encephalitis vaccine by cell culturing method.

5 Management of Food and Drugs

5 Management of Food and Drugs

Being a member of the WTO (World Trade Organization) and APEC (Asia Pacific Economic Cooperation), and along with the increasing volumes of international trade in food and drugs, to meet the impact of the opening of markets, issues such as the safety management of food and drugs, education of the public on safe use of drugs, control of drug abuse, establishment of international mutual recognition, and the upgrading of the quality of domestic products have become most important in Taiwan.

Section 1 Safety Management of Food and Drugs

The quality of food and drugs, the flow of products, and the services provided by professional workers are closely associated with the health of the people. Therefore, in addition to establishing a strict management mechanism for food and drugs, promoting good manufacturing practices, and establishing international mutual recognition, more is done to strengthen education of the public to transmit correct information, and thus to assure the health of the people.

1. Safety Management of Drugs

The following activities have been actively promoted to protect the health of the people.

1) A 2008 National Symposium on Pharmaceutical Affairs was held on September 10-12, 2008, focusing on "constructing an environment of safe drug use". Health bureaus shared their experience; and major issues in pharmaceutical affairs and important public policies were announced at the same time.

2) Safety Management of Chinese Medicines

(1) GMP is universally practiced by all Chinese pharmaceutical factories. By December 2008, 118 Chinese pharmaceutical factories were practicing GMP.

(2) To realize the labeling on the packing of Chinese medicine materials, on October 14, 2008, a set of principles on items to be labeled on the tag or packing of all imported and marketed Chinese medicine materials and decocting pieces was amended and announced. 143 more items of imported and marketed Chinese medicine materials and decocting pieces are required of labeling on the tag or packing, totaling 324 items.

(3) On February 5, 2008, the Standards for the Clinical Trial of New Chinese Medicines were announced.

(4) For the safe use of consumers, and to upgrade the quality of extract products, on September 12, 2008, Article 86 of the Principles Governing Registration and Market Approval of Pharmaceuticals was amended and announced. Regulations

governing the total amount of heavy metals in extracts of Chinese medicines, the total amount of heavy metals and arsenic in 10 preparations of extract Chinese medicines, and the total amount of microbes in 10 preparations of extract Chinese medicines were announced for the industries to comply with.

(5) On November 25, 2008, nine more Chinese medicinal materials were added under the items of "edible Chinese medicinal materials". By the end of 2008, 212 Chinese medicinal materials had been so announced.

3) Control of Illegal Drugs and Advertisements

(1) A special project, the 2008 joint inspection of illegal pharmaceuticals, cosmetics and food, was carried out, focusing inspection of markets, vending stands, night markets, Chinese boxing clinics, alternative therapy clinics, chiropractics, Chinese medicine hospitals and clinics, pharmacies, and Chinese medicine pharmacies, to inspect whether counterfeit and prohibited drugs were sold, whether the firms carried a practice license, the labeling of medicines, and the illegal practice of un-licensed personnel. In total, 222 sites had been inspected to find 69 violations.

(2) In 2008, 2,334 cases of illegal drugs had been seized, including 242 cases of counterfeit drugs, 13 cases of prohibited drugs, 26 cases of misbranded drugs, 141 pharmaceutical dealers in violation of regulations, 246 labeling and testing specifications not in line with regulations, 1,609 advertisements in violation of regulations, and 57 other cases.

(3) In 2008, a project, monitoring of illegal advertisements on newspapers and magazines, was carried out. The results are shown in Table 5-1. 3,134 cases were suspected of law-breaking. They were reviewed by the Department, and then, referred to local health bureaus for action. In total, 1,327 cases were confirmed of law-breaking, and the fines amounted to NT$ 271,850,000.

4) To provide the public with relief to drug hazards, in October 1998, a set of Guideline on Drug Hazards Relief was announced; effective January 1999. To make the relief system more comprehensive, in May 2000, the Drug Relief Act was promulgated. In 2006, the review criteria were relaxed and payments were raised. By the end of 2008, 994 applications had been received; of them, 415 cases were accepted and compensated, at a compensation rate of 46.68%. The total amount of relief was NT$ 155,250,000.

2. Good Manufacturing of Pharmaceuticals and International Mutual Recognition

To strengthen the drug review system, to upgrade the quality of domestic pharmaceutical products, to link them with the international community, and thus to improve their international competitiveness, action has been taken to actively promote good manufacturing practices (GMP) of pharmaceuticals and international mutual recognition.

1) Work is continued to promote the GMP of pharmaceuticals. By the end of 2008, 161 domestic pharmaceutical factories were practicing GMP, and 139 factories were practicing cGMP. At present, 771 drug

Table 5-1 Illegal Advertisements on Newspapers and Magazines, 2008

Nature	No.	Closed	not Closed	No. of Violations Confirmed	Amount of Fines (NT$)
	No. of Cases	No. of Cases	No. of Cases		
Chinese pharmacy	100	100	0	91	1,540,000
Western pharmacy	185	183	2	71	2,540,000
Chinese medicine	78	78	0	47	536,000
Western medicine	195	195	0	106	3,740,000
Foods	1,029	839	190	558	13,770,000
Cosmetics	1,324	1,275	49	654	8,704,000
Medical devices	68	51	17	21	1,890,000
Unknown	1	1	0	0	0
Beauty and weight-control	62	59	3	9	170,000
Others	92	67	25	24	1,010,000
Total	3,134	2,848	286	1,581	33,900,000

Note: "Violations confirmed" refers to cases that have actually been processed by the administration.

importing factories have applied for the third phase validation review; of them, 652 factories have passed the review. In addition, 123 drug importing factories have applied for on-spot inspection; of them, 102 have passed the review.

2) Accreditation of GMP for medical devices is continued. 460 factories of domestically manufactured medical devices have been registered for GMP; and 3,079 factories have been registered for QSD (Quality System Document) of imported medical devices.

3) By the exchange of letter on medical devices signed between Taiwan and the EU, technical collaboration plans have been signed with 12 EU medical device notified bodies. Thus far, a letter of exchange on technical collaboration in medical devices has been signed with the Swissmedic, the Swiss Agency for Therapeutic Products, to facilitate international harmonization and mutual recognition in the management of medical devices.

3. Safety Management of Food

To remove the fear of people from buying harmful food and to assure their health, regulations for imported food are strengthened; information of unqualified food items is announced; and a food consumption warning system, the Food Safety Signals, and a food traceability system are established.

1) Food safety related regulations are reviewed

and amended. To strengthen the current management of food sanitation, and following the international regulations, food industries are asked to practice more self-management and to place more responsibility on their products. In 2008, the Food Sanitation Act was partially amended, and the amendment was promulgated on June 11.

2) Management of imported food is strengthened. In accordance with the Regulations Governing Inspection of Imported Food, persons responsible for customs declaration, place or country of origin, if repeatedly importing products not meeting requirements, may ask the relevant dealers or government organizations of the exporting country to present plans for improvement. Live, fresh and frozen fishery products that are found not meeting regulations, their dealers are asked to immediately recall the products from shelves, and their inspection frequency is adjusted upward to 20%. In 2008, as a result of the melamine contamination of dairy products in mainland China, importation from China of all dairy products was temporarily suspended; and the China government was asked to come up with improvement plans. Melamine is now made a key item for the inspection of imported food.

3) Reporting system is strengthened, and information is released immediately. Under the principle of transparency, information is made public soon after reports of unqualified inspection of imported food come in. The information is posted on the "unqualified food information" of the food website of the Department. In 2008, 117 items of unqualified imported food were announced.

4) A food safety signal mechanism is set up. When food safety is in suspicion, professional scientific basis and risk assessment are used as a communication platform to decide the results in the form of red-yellow-green safety signal system (Table 5-2). Red light stands for hazardous; yellow light is for safety under suspicion; and green light indicates low hazards to human health. This mechanism also applies to international food safety. When major incidents of international food safety are reported, they are either placed on newspapers or are indicated by the food safety signal mechanism. In 2008, 10 international food safety incidents were indicated by this mechanism.

5) A risk management for food contaminants is established. Ministries and departments concerned meet periodically to integrate resources and process matters timely. Focusing on the management of environmental pollution and food safety at the sources of production, a set of Management Procedures for the Reporting and Response of Incidents of Environmental Protection and Food Safety has been formulated. A food inspector system has also been set up.

6) The management of harmful food is practiced. Classification and inspection are strengthened. A hotline is set up for consumers to report. A special project of cross-county/city inspection of food safety is promoted. Education of the public is intensified to help them identify safe food. The Food Sanitation Management Act is amended.

7) Promotion of HACCP (Hazard Analysis Critical Control Point)

   (1) In 2006, the HACCP system was universally practiced on all fishery products.

Table 5-2 Food Safety Lights

Light	Denotation
Red 	a. Hazardous to human health or not, should not be used for human consumption b. Immediate hazards to human c. Validity date exceeded d. Not safe and may be hazardous to human health e. In violation of the permissible amount standards for food safety and also hazardous to human health f. Food adulterated with drugs g. Assessment of health risks indicates high possibility of hazardous to human health
Yellow 	a. No immediate hazards to human health; hazards are suspected, and in-depth investigations or improvement are needed b. Food suspected of not safe c. In violation of the permissible amount standards for food safety, though not hazardous to human health, however the impact is large d. Assessment of health risk indicates suspicions of hazardous to human health
Green 	a. Incomplete labeling b. Though may be hazardous, risk factors have been controlled c. All rumors; products are safe d. Assessment of health risk indicates very low possibility of hazardous to human health

Databases on facts of fishery products found not meeting requirements and the current status of industries practicing HACCP have been established.

(2) On August 15, 2007, it was announced that meat processing industries shall comply with regulations of HACCP; and this practice would be implemented step by step a year after the announcement.

(3) On September 12, 2007, announcement was made that all boxed lunch factories shall comply with regulations of HACCP. The practice would be implemented step by step. Since September 15, 2008, all boxed lunch industries that supply more than 3,000 pieces of boxed lunch a day shall comply with regulations of HACCP.

8) In 2008, the food traceability framework was completed for fresh milk, flavored milk, yogurt, and non-alcoholic beverage (including bottled water, coffee and tea) industries. A processed food traceability network is completed for 15 items of fresh milk on market, one item of yogurt, 11 items of bottled water, and five items of coffee and tea.

9) To improve the professional knowledge of food-delivery industries, and to assure the safety and quality of food in the entire process from production, manufacturing, transportation, sales, and delivery to the hands of consumers, the Department has posted the background information of domestic food-delivery industries and those that have undergone training on the website of the Taiwan CAS Development Association for the inquiries of health agencies, dealers and consumers.

10) A management system for the voluntary and mandatory labeling of genetically modified ingredients in food is implemented. Thus far, 17 cases of genetically modified soybeans and corns and five cases of mixed genetically modified corns have been reviewed and approved.

11) A food poisoning surveillance mechanism is set up. In 2008, there were 269 incidents of food poisoning, affecting 2,961 persons, with 0 deaths. When compared with the 240 incidents and 3,223 victims of 2007, the number of incidents had increased by 29, and the number of victims had decreased by 302 persons. Of the food poisoning incidents in 2008, by place of food intake, more occurred at places where food was supplied (125 cases), schools (48 cases), home (37 cases), and offices (22 cases). They were similar to those of 2007.

12) The sanitary management of public eating places is strengthened. By the end of 2008, 27,637 cooks had been licensed, and the goal was attained by more than 100% (the goal was 25,000 cooks).

13) Management of special dietary food is promoted. Special dietary food refers to "infant formulas and supplementary food for older infants" , and for adult use that have been adjusted for their nutrient components, including adjusted protein, amino acid, fat or minerals-adjusted food and low-allergic, body-weight control food, and food for tube-feeding. Food that is within the scope of special dietary food should be sent to the Department for review and approval. Names of food items that are qualified can be found on the food information website.

4. Safety Surveillance Mechanism for Food and Drugs

To safeguard the safety of drug use and buying and consumption of food, the Department has made all efforts in the inspection and seizure of illegal food and drugs, set up mail-box and toll-free telephone lines for reporting to arrest the rampage and hazards of illegal food and drugs.

1) The safety surveillance system for drugs is continued. In September 2004, the Regulations Governing Management of Drug Safety Surveillance was announced, and drug safety surveillance period was adjusted from seven years to five years. Some designated medical devices were placed under surveillance for a period of three years. Currently, 1,105 items of drugs and 17 items of medical devices are placed under safety surveillance. They are posted on the website of the National Drug Adverse Reactions Reporting Center.

2) To timely detect adverse reactions of new drugs under clinical trial, the National Drug Adverse Reactions Reporting Center was set up. By the end of 2008, 31,708 cases of adverse reactions of drugs after marketing, and 38,412 cases of adverse reactions of drugs under clinical trial had been reported.

3) Registration and market approval of food is implemented to assure the safe use of food of the public.

   (1) By regulations of Article 14 of the Food Sanitation Management Act, food additive, food in tablet and capsule forms, shall not be manufactured, processed, prepared, repacked, imported or exported without being inspected, registered and permit

licenses issued.

(2) By regulations of the Health Food Management Act, health food shall not be manufactured, imported, labeled or advertised as health food, or emphasized as having health promotion effects, unless they are inspected, registered and approved. Since December 31, 2007, the registration and market approval of health food is done in two tracks.

Section 2 Management of Controlled Drugs

To prevent the legal controlled drugs from being used illegally, and to conduct prevention of substance abuse, the Bureau of Controlled Drugs of the Department had promoted the following activities in 2008.

1. Management System of Controlled Drugs

To control the flow of controlled drugs in country, a management system of controlled drugs is set up; a management by schedule of controlled drugs is established; and a license management and inspection is practiced.

1) Controlled drugs are managed at four schedules by their addiction, dependence, abuse, and social hazards.

2) A management system on the flow of controlled drugs is established; a licensing management system is practiced. Companies or institutions concerned must apply for registration licenses of controlled drugs before the drugs can be imported, exported, manufactured, sold and purchased. In 2008, 12,462 institutions concerned had been issued registration licenses for controlled drugs; and 39,503 physicians, dentists, veterinarians, and assistant veterinarians had been issued use licenses for controlled drugs.

3) Workshops for seed workers on laws and regulations concerning the management of controlled drugs have been organized to train the employees of local competent health authorities for their skills in the promotion of laws and regulations concerning the control of controlled drugs.. Online learning curricula on outlines of laws and regulations concerning controlled drugs are posted on the Taiwan e-learning website (http://elearning.taipei.gov.tw/) for the learning of professional medical personnel.

4) Auditing and inspection of controlled drugs

(1) Control of controlled drugs: For the manufacturing, import, export of controlled drugs, and their use in medical and pharmaceutical teaching, research and experiment, permit licenses, letters of agreement or approval should be applied for. In 2008, 1,953 such applications had been approved. The purpose is to control controlled drugs from the sources of origin to prevent them from being illegally used.

(2) Reporting and auditing of the flow of controlled drugs: A controlled drug management information system is set up; the practice of online reporting of the flow of controlled drugs is promoted to facilitate the establishment of databases on the flow of controlled drugs. In 2008, 98.81% of the dealers had used the online reporting; and the institutions using online reporting had increased from 71.48% in 2007 to 84.90% in 2008. The Controlled Drug Management Information System is

used for auditing and inspection of the flow of controlled drugs; and on-spot inspection is carried out for any unusual behavior. In 2008, on-spot inspection had been carried out 16,241 firm-times, to find 270 firms in violation of regulations, at a law-breaking rate of 1.66%. Firms in violation of regulations are processed in accordance with regulations of relevant laws to prevent the misuse, abuse or use for other purpose of controlled drugs.

2. Prevention and Control of Drug Abuse

Abuse of the emerging drugs has become a killer of the new generations. To protect the health of the people, the government has actively promoted various control measures against drug abuse; set up drug abuse reporting systems; and conducted diversified educational activities on the prevention and control of drug abuse.

1) A 2008 Symposium on the Prevention of the Abuse of Emerging Drugs was held. Experts from Japan, the Netherlands, and the US were invited for keynote speeches to facilitate international cooperation and exchange of information on drug abuse.
2) More educational materials, videos and teaching materials are produced focusing on different ethnic groups and age groups for distribution to governmental and private organizations in the prevention of drug abuse.
3) To establish a community-based publicity network for the prevention of drug abuse, a series of activities on the theme of "fight against drugs with love; healthy life" have been organized in communities in collaboration with local groups, primary schools, and health bureaus.
4) To improve the knowledge of the public on the hazards of drug abuse, education on drug abuse has been intensified in collaboration with 29 community and private organizations. Of the 7,096 copies of questionnaire returned, the knowledge of the public on drug abuse has improved by 10%.
5) An Internet Museum of Anti-Drug Resources is set up to provide the public with information on hazards of drug abuse. An online learning program is developed.
6) More medical institutions have been supervised to participate in the reporting of drug abuse. This practice is also made one of the items for the evaluation of local health organizations.
7) Statistical data on drugs seized and abuse of controlled drugs are compiled; trends of drug abuse and emerging drugs are monitored; data on cases of drug abuse and laboratory testing are compiled and published for the reference of organizations concerned.
8) In collaboration with the Ministry of Justice, local drug abuse prevention centers are supervised for case referral. A joint inspection program of local drug abuse prevention centers is carried out to inspect the county/city centers.

3. Laboratory Testing for Drug Abuse

Laboratory testing of abused drugs is one important link in the prevention of drug abuse. Major activities in 2008 are as follows.

1) Specimens of drug abuse referred by judicial, prosecution, police and health authorities are tested. In 2008, 1,250 non-urine specimens were tested, to find methamphetamines in most of them, Ketamine the next, and benzodiazepine the third. Distribution of the drugs detected in non-urine specimens is

shown in Figure 5-1.

2) Accreditation and management of urine-testing institutions: 13 institutions have been accredited. Items accredited include methamphetamines, amphetamines, morphine, codeine, MDMA, MDA, marijuana and Ketamine. These institutions have conducted urine testing for 187,295 cases, an increase of 11.6% over 2007. The testing coverage rate for urine specimens is as high as 99.9% (Figure 5-2).

3) To improve the credibility of testing and to enhance self-capacity, on June 21, 2008, the Bureau passed two accreditations, "testing of urine specimens" and "testing of controlled substances" , of the ASCLD/LAB. On June 26 of the same year, the Bureau also passed the accreditation of the TAF (Taiwan Accreditation Foundation) on "urine testing for controlled drugs and illegal drugs" and "testing of controlled drugs and illegal drugs" . The Bureau is the first laboratory in country that has won accreditation of ASCLD/LAB and TAF at the same time.

Section 3 Laboratory Testing for Food, Drugs and Cosmetics

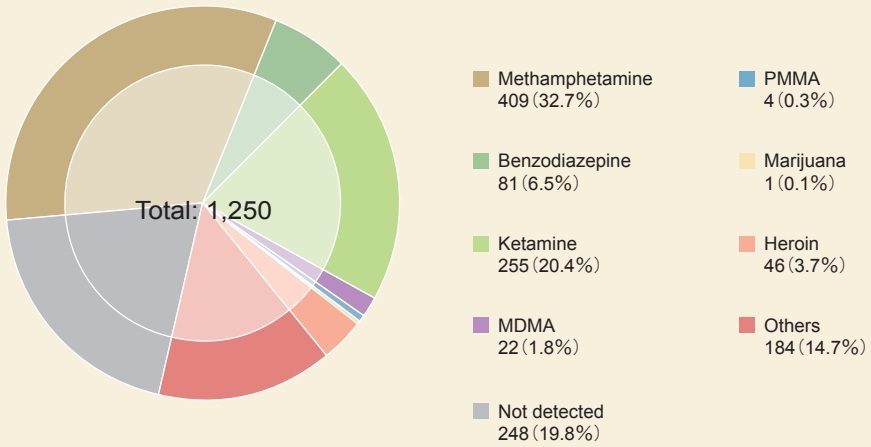
Drugs, medical devices, medicated cosmetics, food additives, health food, and genetically modified food must apply for registration and pre-market approval. They may be manufactured, imported or sold only after being issued permit licenses. Product testing should be conducted to assure quality and safety. Biological products such as vaccines and botulinal toxins, and blood products must be, in addition to the application for permit licenses, batch-tested for sealing before marketing. Upon sudden incidents of drugs, food and cosmetics, laboratory testing for confirmation is also required.

To effectively utilize private laboratory testing resources, accreditation of laboratories has been actively promoted with a view to supervise the operation of laboratories by international standards to assure the quality of testing.

1. Laboratory Testing

Laboratory testing of food and drugs is for

Figure 5-1 Distribution of the Drugs Detected in Non-Urine Specimens, 2008



policy implementation on one hand, is also to support the routine laboratory testing of local health bureaus and other testing organizations; and to conduct laboratory testing on the quality and safety of products on market.

1) Administrative testing: Testing is conducted for product registration, market approval and issuance of permit licenses; and batch-testing for sealing for vaccines, blood products, botulinal toxins; and testing of emergency incidents such as residues of Ractopamine in pork, and melamine-contamination of milk powder.

2) Support to county/city health bureaus: Sampling testing for inspection, consumer protection, and testing for food-borne outbreaks.

3) Supportive testing: Testing is conducted upon request of organizations such as the customs authorities to levy duty on imported goods, manufacturers for product certificates for export, assistance to judicial courts, prosecution, police and customs authorities for the testing of confiscated drugs or food.

4) In 2008, a total of 12,871 samples had been tested. Of them, 855 samples were for product registration and pre-market approval, 364 samples were for batch-sealing, 2,054 samples were for inspection, 2,675 samples were for consumer services, 985 samples were for food poisoning incidents, 1,093 samples were for assistance to other organizations, 151 samples were tested upon request of other organizations, and 4,694 products on market had been tested through surveys (Figure 5-3). Results of laboratory testing are posted on the Bureau of Food and Drug Analysis website and the Consumer Information Network of the Department for reference of consumers in

Figure 5-2 No. and Coverage of Urine Testing by Accredited Testing Institutions by Year

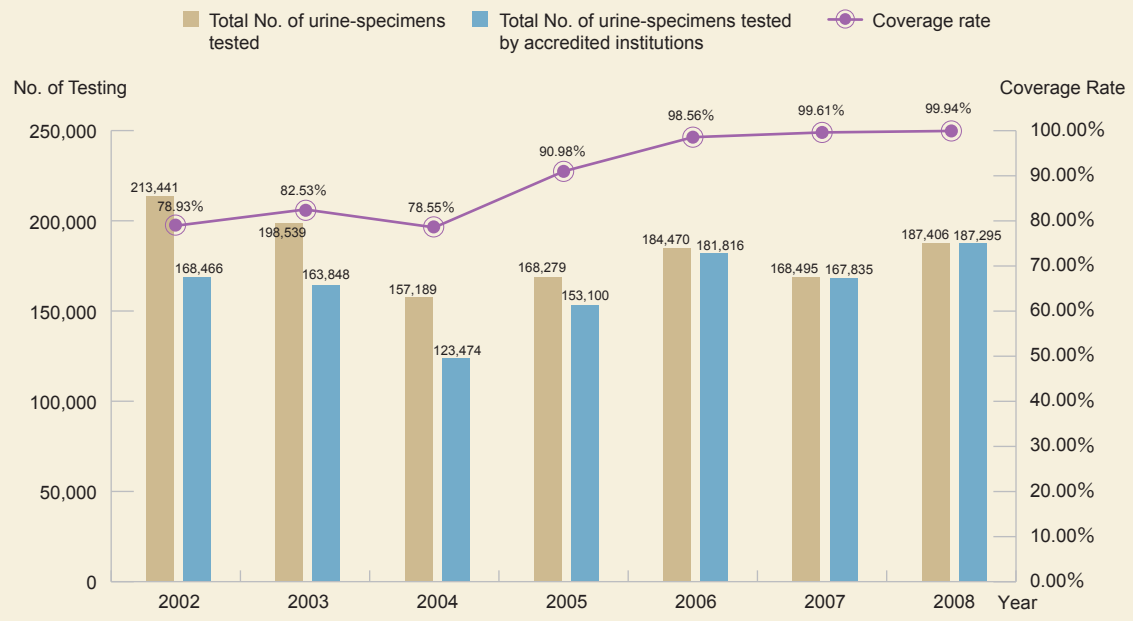
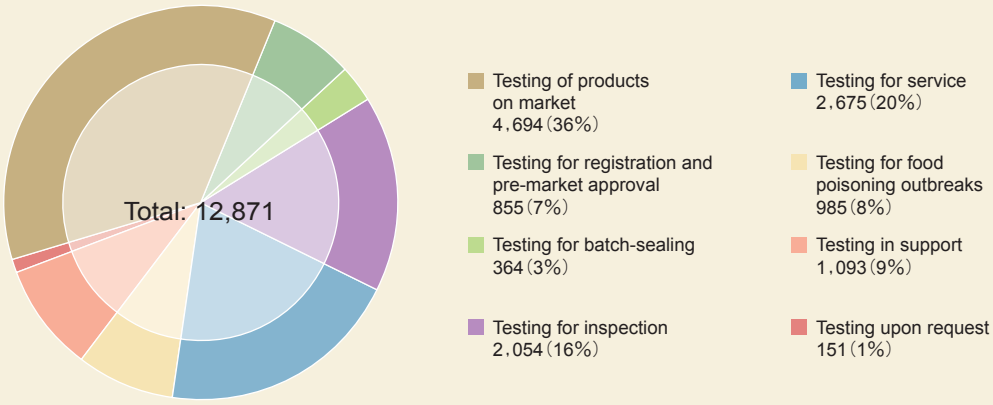


Figure 5-3 Types of Laboratory Testing for Drugs, Foods and Cosmetics, 2008



selecting products. Unqualified products are processed by local health bureaus to enhance the management and supervision of products before marketing.

2. Quality of Laboratory Testing

To establish a strict and efficient quality of laboratory testing, the Good Laboratory Practice (GLP) is actively practiced. The Bureau has passed the accreditation of the TAF. Testing capacities of county/city health bureaus have been upgraded.

1) GLP is actively promoted. In coordination with the government policy in joining the WTO, county/city health bureaus are supervised to set up the GLP systems. All 25 health bureaus have passed the accreditation of TAF.

2) A regional integrated laboratory testing system for local health bureaus is established. The Central, Southern, and Northern Region Integrated Systems are now in operation. Each system develops its own specialty testing items for mutual support. By sharing resources and expertise, testing efficiency is upgraded.

3) Accreditation of private sector laboratories is promoted. By international accreditation standards, the accuracy of testing results is assured, and the quality of testing is upgraded. By 2008, 18 laboratories had been accredited for the testing of food, and three laboratories had been accredited for the testing of drugs and cosmetics. Items accredited for the testing of food include residues of pesticides, veterinary drugs, heavy metals, food additives, food components, dioxin, and microbes. Items accredited for the testing of drugs and cosmetics include hydroquinone, salicylic acid, tranexamic acid, aerobic plate count, Staphylococcus aureus, Pseudomonas aeruginosa, and Escherichia coli.

4) To improve the skills of local laboratory testing and inspection personnel, training programs, workshops, online learning, and proficiency testing relevant to inspection and laboratory testing have been organized.

6 Health Care

6 Health Care

Along with the rapid changes in health and medical care, and social and economic environment, how the medical care systems and medical care teams can best assure the public of safe medical care has become a challenge of today. How to provide a holistic and adequate health care system to the people, how to realize community medical care and preventive health, and thus to improve the health of the people and their quality of life are some of the current key issues.

Section 1 Health Care Systems

In 1985, in coordination with the promulgation of the Medical Care Act, a medical care network plan was promoted. Taiwan was then divided into 17 medical care regions to plan for medical care manpower and facilities in each region. The primary goals of the plan are to balance the distribution of medical care resources, to shorten regional differences, to avoid repeated investment of medical care resources, and thus to elevate medical care standards by region.

The plan has been implemented in four phases. In the last 20 years, the number of hospital beds has gradually become sufficient; the quality of medical care has been upgraded. However, medical care resources in mountain areas and offshore islands require further strengthening; and the quality of primary care still has room for improvement. In coordination with the post-SARS reform of medical care systems, and to face the impact on Taiwan brought about by the aging of population and the emerging communicable diseases, and to promote holistic health care at the same time to assure the safety of patients, and to construct a patient-centered medical care environment, a holistic health care plan was implemented in 2005-2008. Key issues of the plan include the strengthening of regional medical care systems, upgrading of the service quality of primary care, planning of medical manpower and improvement of their professional quality, improving quality of medical care, strengthening of the external monitoring mechanism for medical care quality, and implementation of medical care programs for special groups. To continue the holistic health care plan, a health navigation plan for the new cohorts will be implemented in 2009.

1. Medical Care Resources

To promote the balanced development of medical care resources, by the Medical Care Act and the medical care network plan, a regional medical care system is established to promote regional medical care plans in accordance with the needs of the people. Achievements in 2008 are as follows.

1) Current status of medical institutions: In 2008, there were 515 hospitals, and 19,659 clinics (Figure 6-1). The number of hospitals is declining; whereas the number of clinics is increasing.

2) Current status of hospital beds: In 2008, there were 152,091 beds in medical care institutions (including general beds and special beds). Of them, general beds accounted for 64.41%. In all medical care institutions, there were 97,958 general beds (including 73,426 acute general beds, 3,928 chronic general beds, 6,595 acute psychiatric beds, 13,661 chronic psychiatric beds, 48 tuberculosis beds, and 300 beds for Hansen's disease). On average, there were 66.37 beds per 10,000 population; the goal of the medical care network plan has been achieved. Changes of the bed/10,000 ratio by year are shown in Figure 6-2.

Figure 6-1 No. of Hospitals and Clinics by Year

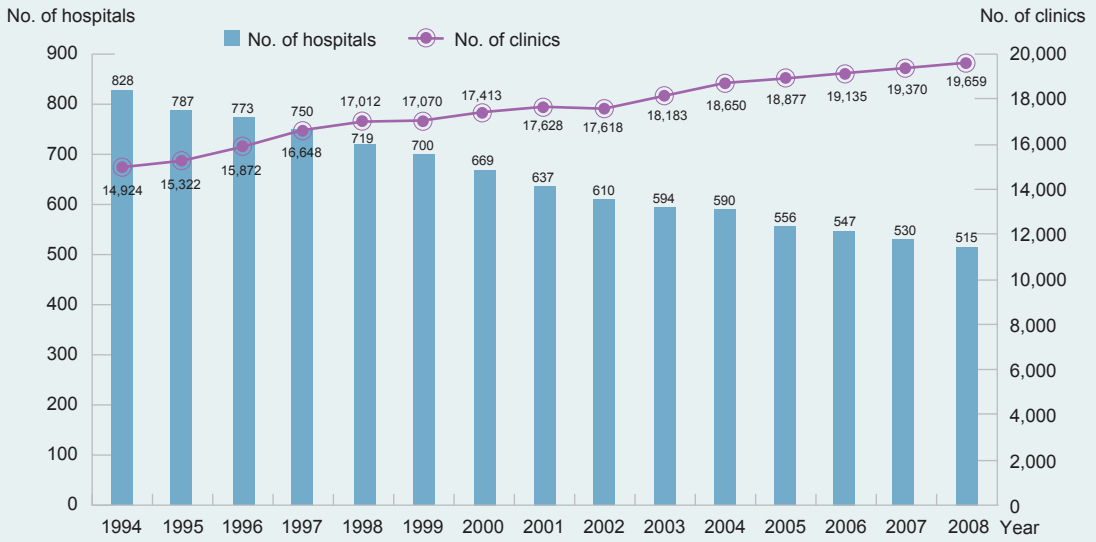
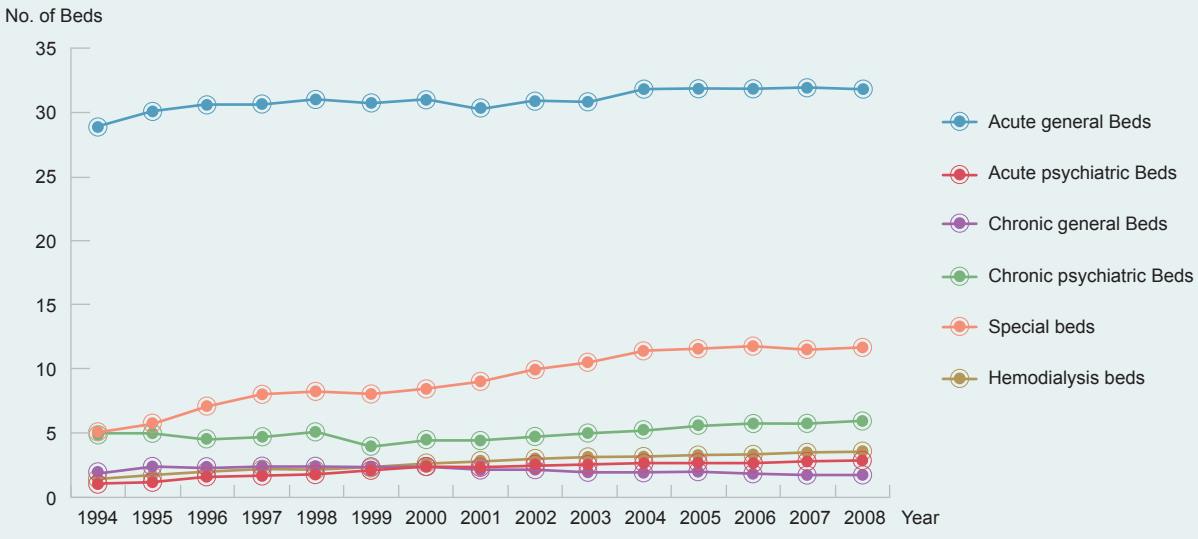


Figure 6-2 No. of Hospital Beds per 10,000 by Year



3) The Medical Care Development Fund: In the period 1992 till end of 2008, a total of 313 medical care institutions had been subsidized by the Fund. In addition, in 20 districts, to encourage medical personnel to practice in remote areas of relatively poor resources, subsidies had been made available to improve emergency care. To improve the quality of medical care services, six small-scale hospitals were subsidized to set up a joint practice model with clinics. 16 hospitals had been subsidized to improve their capacity and upgrade medical care quality to provide integrated medical care services to the elderly.

2. Community Medical Care System

Medical care systems have been reformed after the SARS outbreaks. Since 2004, community public health (disease control) groups have been established on trial basis to promote prevention and health promotion in community, to integrate resources of disease control and medical care and resources of private and public sectors. By the establishment and strengthening of community public health (disease control) groups, interaction between local health bureaus/health stations and community medical care groups (formed by clinics and their collaborative hospitals) is enhanced to jointly promote health, medical care and disease control, and to solve the health problems of the community. Since 2005, a pilot project, integrated services by the community public health (disease control) groups, has been tried out. In this project, community hospitals, clinics, and health stations join together in a community medical care network to provide comprehensive holistic medical care by establishing household files, reviewing medical care needs of the residents, and providing adequate referral services to fully practice the functions of family medicine systems. In 2008, 305 community medical care groups and 43 public health (disease control) groups had been established. A regional shared care network of "good physicians and good hospitals" in the neighborhood has thus been established.

3. Medical Care Services of DOH-Hospitals

1) The Great Warmth project is promoted. In 2008, a total of NT$ 4,243,866 were made available for subsidies to help the less-privileged families. A total of 1,094 cases had been referred for care.

2) Strengthening care of the elderly

(1) Nursing homes and centers for the care of dementia elderly have been set up. In total, 2,326 beds in nursing homes and 150 beds in the centers for dementia elderly have been made available.

(2) Service teams for hospice and palliative home care have been set up to provide holistic hospice and palliative home care to reach the goal of allowing the elderly suffering from cancer to age in their familiar neighborhood. Such services are now provided by six DOH-hospitals of Hsinchu, Taichung, Fengyuan, Nantou, Tainan and Penghu).

3) The first BOT hospital, the Shuanghe Hospital, started operation on July 1, 2008. The contract is till March 7, 2054.

Section 2 Quality of Medical Care

To protect the safety of patients, to upgrade the quality of medical personnel, to strengthen management of hospitals, to continue the external quality monitoring of hospitals, and to establish a national hemodialysis medical care resources and

control of blood quality system are some of the pressing matters of the moment.

1. Quality of Medical Care Services

The goals are to establish a patient safety-oriented medical care environment, to plan for a new hospital accreditation system, to develop safety surveillance of patients and a safety incidents reporting mechanism. Achievements are as follows.

1) Patient Safety and Quality of Medical Care

(1) Annual objectives for the promotion of patient safety and quality of medical care in hospitals for 2008-2009 have been formulated. Health bureaus are asked to supervise hospitals in their jurisdiction to include these objectives in their assessment.

(2) A Taiwan Patient Safety Reporting System (TPR) is set up to realize patient-centered medical care, and to establish a non-punitive learning environment to avoid the repeated occurrences of errors.

(3) A patient safety website is set up to provide patients with the latest information on safety and to serve as a platform for interaction.

2) The Hospital Accreditation System

Reform of the accreditation of hospitals and teaching hospitals is made on the direction of "patient-centered" and "priority on patient safety".

(1) The key points of the new accreditation system focus not much so on structural assessment but more on the assessment of process and performance to break the myth of "the larger hospital the better; the more departments the better". Hospitals are encouraged to develop different types of specialties focusing on the health needs of the community residents. Reform of the accreditation system for teaching hospitals focuses on the development of teaching plans as a principle to place more emphasis on process of teaching and training, and their outcomes, and thus to improve the manpower quality of physicians and medical personnel, and to improve the overall quality of medical care.

(2) A "scheduled but not on fixed time" plan for follow-up supervision and inspection is practiced. A "patient-centered" safe care environment is established to improve the quality of medical care. In 2008, 476 hospitals passed the accreditation, accounting for 93% of all hospitals. 22 hospitals had been followed-up for supervision and inspection.

(3) Accreditation of psychiatric hospitals and psychiatric rehabilitation institutions is conducted. 25 psychiatric hospitals and 82 psychiatric rehabilitation institutions have been accredited.

(4) Accreditation of Chinese medicine hospitals operated by responsible physicians with two and more years of medical training is conducted. On August 4, 2008, names of 12 qualified hospitals for training were announced.

3) To upgrade the quality of the pre-practice training of dentists, a plan on the training of dentists two years prior to independent practice was initiated in 2008. Training curricula, qualifications of teachers, and standards for the authorization of training institutions will be decided by the end of 2009.

2. Environmental Protection Measures in Hospitals

1) At present, there are six disposal and management institutions set up under the supervision of the Department for joint disposal of wastes. Two of them apply the sterilization method for disposal, and the rest have incinerators. In May 2005, a medical waste joint disposal institution was approved to recycle by electrolysis developing and fixing fluid produced by medical institutions to solve the problems of disposing these substances of hospitals.

2) To reduce wastes and recycle them for use, the Department has, since 2000, through a demonstration project on waste reduction and resource recycling, supervised medical institutions to take initiative in properly handling and managing their medical wastes. One company for the recycling of wastes is approved and issued license for operation to recycle medical wastes containing metals.

3. Improving the Quality of Blood Supply and Transfusion

In January 2006, the Blood Products Act and their implementation regulations were promulgated. With this, the national blood service is further strengthened; the quality of blood for medical use is upgraded; and the safety of blood transfusion is further guaranteed.

1) New sources of blood are developed actively; the first-time blood donation rate is improved. At present, there are more than six million blood donors, at a blood donation rate of 7.86%. In the last eight years, the average amount of blood donated each year is 2,267,739 bags.

2) Automation of laboratory testing for blood is strengthened to reduce the re-examination rate and to avoid the occurrence of reading errors, and thus to improve the quality of blood operation and protect the safety of blood recipients.

3) About 0.73% of the population in Taiwan carries variety amounts of antibodies in red blood cells. Hemolysis often occurs after blood transfusion. For this reason, screening of blood donors for antigens in red blood cells is conducted to effectively improve the chances of patients of rare blood types to receive adequate blood for transfusion, and thus to improve the safety of blood transfusion.

Section 3 Psychiatric Care and Mental Health

As a result of social transformation, human relationship has become more distant; and social and mental problems have increased day by day. Prevention of psychiatric disorders and enhancement of mental health have thus become important issues of concern. For this, the Department has spared no efforts in promoting medical care for psychiatric patients, in planning for mental health services, in providing the public with counseling on mental health, and thus to prevent the occurrence of post-trauma stress syndromes and other psychiatric disorders.

1. Psychiatric Care Services

To strengthen the care network and to help psychiatric patients return to the community, community rehabilitation services have been actively promoted. Major activities in 2008 are as follows.

1) Governments at various levels and private sector organizations are subsidized year

by year to strengthen their equipment and facilities for psychiatric care, rehabilitation, and psychiatric nursing care, and thus to make psychiatric care more accessible to patients. Thus far, 5 psychiatric rehabilitation institutions, and 4 psychiatric nursing homes have been subsidized.

2) To encourage psychiatric patients of stable conditions, patients with partial functional loss, and patients of good rehabilitation potential to return to the community, rehabilitation facilities have been substantiated to strengthen community rehabilitation services. By the end of 2008, the community rehabilitation centers had served 3,151 patients; and the half-way houses had 3,728 beds.

3) To understand the care of patients in community, registration of the community follow-up care systems for psychiatric patients in 25 counties and cities have been made. Currently, 98,665 cases are placed under management, follow-up and home-visit.

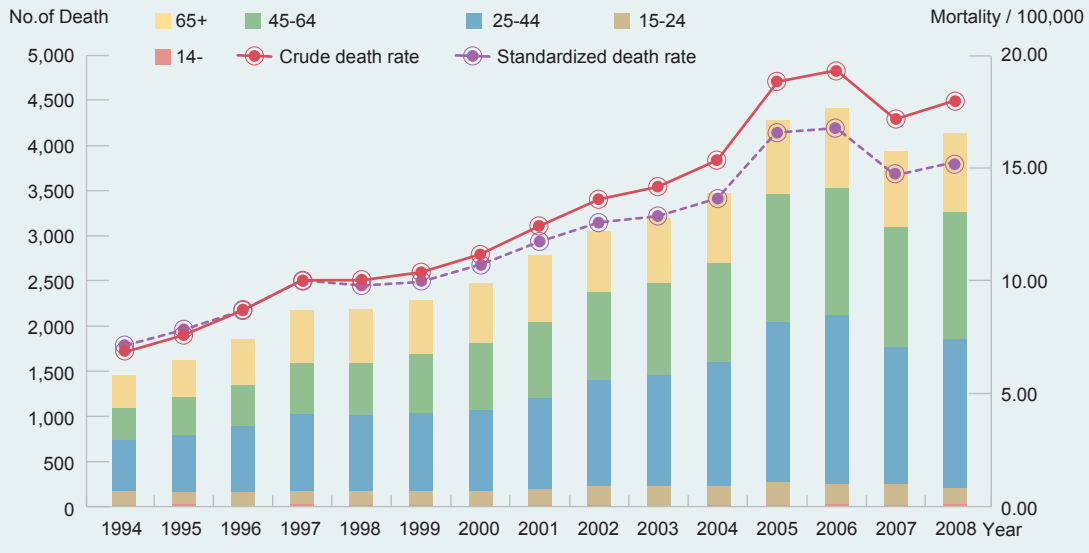
4) 25 counties and cities have been subsidized to set up community mental health centers to provide the community residents with mental health care, counseling and education.

5) 111 institutions have been designated by the Department for drug addiction treatment. Of them, 6 are core hospitals, 98 are drug-cessation hospitals and 7 are drug-cessation clinics.

2. Prevention of Suicide

The suicide death rate of Taiwan had increased from 6.2 per 100,000 in 1994 to 17.9 in 2008 (see Figure 6-3 for the number of suicide and death rate by year). For 12 consecutive years, suicide has been on the list of the ten leading causes of death. With the September 21 earthquake, the SARS outbreaks, and the global economic recession, people are facing more health, social and economic impact, and the entire environment has become less favorable to the prevention of suicide. For this, the Department has made

Figure 6-3 No. of Suicide cases and Mortality Rate by Year



Note: Dotted line stands for the standardized mortality rate adjusted by the age-structure of the 2000 world standard population.

suicide prevention a priority task.

1) In 2005, a national action plan on strategies for the prevention of suicide was approved by the Executive Yuan. The plan is formulated on the concept of prevention in three stages and by five levels. Short, mid and long-term goals of suicide prevention are drafted from three dimensions of comprehensive, selective and indicative.

2) A suicide prevention reporting and concern system is set up to report home visiting and referral of suicide cases to health bureaus and the Department. In 2008, 24,180 cases had been reported.

3) In December 2005, a suicide prevention center and a 24-hour hotline, 0800-788995, were set up to provide the public with professional counseling services. In 2008, 48,127 calls had been received.

4) In collaboration with the community mental health centers, the community support network has been activated; the shared care network for depression has been expanded; and training and certification of professional personnel have been intensified. Meetings have been held to improve the reporting for suicide prevention and their follow-up visits.

Section 4 Long-Term Care Service Systems

Community long-term care systems have been developed to allow functionally disabled individuals in community to maintain independent, autonomous, safe and dignified life capacity. Special care models have also been developed to provide the mentally and physically impaired with comprehensive care services. Details of the services will be illustrated in Chapter 7.

1. Strengthening Community-Based Long-Term Care

Along with the aging of population, prolongation of life expectancy, changes in disease patterns, and the sharp increase in the number of disabled persons, demands for long-term care have increased drastically. To meet these demands, the Department has actively promoted the long-term care services systems to provide the public with integrated, accessible and continuous care services.

1) A diversified long-term care service network is developed to strengthen care resources in community. Focusing on community care and supported by institutional care, hospitals and nursing homes are supervised actively

to provide home care services. At present, there are 347 nursing homes, 484 home care institutions, and 17 day care centers.

2) A care management system is set up. 25 counties and cities are supervised to set up long-term care management centers to integrate social and health resources for long-term care. These centers serve as a single window for linking and delivering long-term care services. In these centers, 21 stations are set up and staffed with 302 professional workers. Workshops have been organized to upgrade the professional skills of workers.

2. Services for the Mentally and Physically Impaired

1) A pilot project on tele-care, including community-based care, home care and institution care, has been tried out since 2007. People under different service models can thus avail themselves to continuing care services.

2) 21 district and above teaching hospitals have been subsidized to set up auxiliary aid centers to provide services in the professional assessment of auxiliary aid, counseling, and individualized designing. Patients are also given training and education.

3) 25 hospitals are commissioned to implement a joint child development assessment center plan to develop an accessible service network for the assessment of the development of children.

Section 5 Quality of Nursing Care

1. The total nursing care system is promoted. Through supervision, hospitals are asked to practice total nursing care, and to establish a collaborative model between nurses and nursing assistants to reduce the workload of nurses, to improve quality of nursing care, to minimize chances of friends and relatives keeping company of patients, and thus to reduce the burden of families on the care of patients.
2. Action has been taken to improve the work environment of nursing personnel and encourage them to stay on job. In 2008, 12 medical care institutions, nursing and midwifery institutions, organizations concerned, and colleges and universities took part in the development of indigenous strategic models to help hospitals encourage nursing personnel to stay on job.
3. Continuing education for nurses is promoted. In 2008, seven nursing professional groups had been subsidized to develop continuing education curricula for various specialties. In coordination with the promulgation on June 20, 2008, of the Regulations Governing Practice Registration and Continuing Education of Nursing Personnel, four professional nursing associations were designated by the Department on October 31 as authorized executing units of continuing education. Specifications on the review of curricula and credits for the continuing education of nursing personnel have been formulated.
4. A specialty professional registered nurse system is promoted, and review of specialty nurses is conducted. 68 hospitals have been approved for the training of nursing personnel in internal medicine and surgery. Continuing education for specialty professional registered nurses is also organized.
5. A project to supervise post-partum nursing homes is commissioned out. 69 such homes

have been supervised for reference in the accreditation, management and policy-making on post-partum nursing homes.

6. A continuing education system for midwifery personnel is promoted. In coordination with the Regulations Governing Practice Registration and Continuing Education for Midwifery Personnel, practicing midwives are required to renew their licenses on April 15, 2011.
7. Training is offered to nursing leaders from 14 countries. Taiwan's quality experience in nursing care is shared, and at the same time, Taiwan's international visibility in health matters is enhanced.

Section 6 Emergency Medical Care

In order to ensure the sound development of emergency medical services system, improve the qualities of emergency medical services, and secure life and health of the injured and ill patients in emergency, the Emergency Medical Service Act was amended and promulgated on July 11, 2007.

1. To immediately monitor and access the regional catastrophes and emergency medical disasters, 6 Regional Emergency Operation Center (REOCs) around Taiwan（Taipei, Taoyuan, Taichung, Tainan, Kaohsiung, and Hualien）have been constructed to timely integrate and allocate the resources in case of difficult times.
2. An “intensive care bed reporting system” has been established to provide an invigorate emergency care system and a fluent patient flow.
3. A “poisonous, chemical and nucleic hazard system” was also built to enhance the response capabilities and to fortify the professional personnel, protective equipment and facilities as well as the disasters.
4. 2,767 people were educated ever since 2008 via the 62 CPR & AED (Cardiopulmonary resuscitation and automated external defibrillator) emergency education classes promoted by the Department, especially in the hustle and bustle public places and scenic spots.
5. To improve the quality of ambulances services and to assure that disaster response measures are properly practiced by local health bureaus, the management of ambulances and the drills on the rescue of mass casualties are included in the evaluation items for local health bureaus.

Section 7 Health Information

Following the National Health Informatics Project (NHIP, 2008 to 2011) that was approved by the Executive Yuan in August 2007. This work is continued to develop major health information infrastructures, to improve medical care quality and patient safety, and to enhance use efficiency of medical care resources.

1. The National Health Informatics Project (NHIP)

1) Promotion of Electronic Medical Records (EMR)

To enhance the willingness of medical care institutions in promoting electronic medical records, the Department has formulated promotional strategies in four dimensions of the legal, standards, security and promotion. On December 25, 2008, the set of Regulations of EMR Production and Management by Medical Institutions was amended and announced. The

Regulations specify that the date and scope of EMR implementation should be clearly announced and posted by medical institutions. In addition, the forms and standards for 30 electronic medical records and templates for inter-hospital EMR exchange were revised, and 20 hospitals were advised and subsidized to pass the certification of the ISO 27001:2005 information security management system.

2) Healthcare Certification Authority

The Healthcare Certification Authority (HCA) was inaugurated on June 13, 2003, to provide certification services in electronic medical documents. By the end of 2008, a cumulative total of 167,939 electronic certificate IC cards had been issued. The card is used for the promotion of electronic medical records, to serve as a portal for the health information herald system, to serve as the regional healthcare information platform, for use in multi-credential online the National Health Insurance enrollment and withdrawal registration system, online childbirth reporting system, exchange of electronic official document exchange system of medical care institutions, and reading of information on the medical columns of the National Health Insurance card.

3) Public Health Information Service Platform

A service-oriented Public Health Information platform and its portals have been set up to integrate and connect all Public Health Information systems between the Department and its affiliated institutions, to promote the health information exchange or data sharing, and to reduce repeated data input of information. In 2008, inventories of the Public Health Information systems of health institutions were taken; and the information integrated application service architecture was planned.

4) Value-Added Use of Health Information

In 2008, a program to establish a collaborative center for the value-added use of health information was implemented to consolidate individual information into collective information for practical utilization, and thus to promote the quality of policy-making in public health, and also for reference of academic research and innovation.

2. Health Information Services

1) Health Information Services

Various systems for service, application and management of health information are planned; cross-organizational flow of information is strengthened; and efficiency of healthcare services is enhanced. Achievements in 2008 are as follows.

(1) On December 1, 2008, the medical affairs management system was renewed and put online. The system is to provide the Department and the health bureaus with information for the management of medical affairs, pharmaceutical affairs, management of nursing/midwifery and psychiatric rehabilitation institutions, and management of medical personnel and their administrative disciplinary measures. The system is connected to other relevant systems for information exchange and sharing.

(2) Functions of the online application systems of medical personnel reporting for supporting services are maintained. In the year, 2,027 hospitals have taken part in the operation to process 118,564 cases.

(3) The operation of the reporting platform of ICU empty beds and deaths is maintained.

In 2008, 203 first-aid responsibility hospitals and 191 hospitals reporting the number of empty beds in ICUs and deaths in hospitals, respectively, to this platform.

(4) Functions of the reporting systems of psychiatric care, suicide prevention and assessment of mental and physical impairment are revised and maintained to improve follow-ups of cases. In 2008, 1,935 cases for psychiatric care, 24,760 cases for suicide prevention, and 66,734 cases for assessment of mentally and physically impairment had been reported.

(5) Functions of the websites of the 355 health stations are maintained for the public to search online for relevant information on healthcare. A cumulative total of 32,587,907 person-times have visited these websites.

(6) The public online service systems continue to provide application forms on medical affairs, pharmaceutical affairs and food sanitation for downloading, to inquiring about the progress of processing, and notifying applicant to collect the certificate back. The systems are connected to the shared electronic payment platform of the Research, Evaluation and Development Commission of the Executive Yuan, and the fee-payment systems of banks and convenience stores.

(7) On March 18, 2008, the the automatic comparison function of the certification management system was officially placed online. By the end of 2008, 54,816 documents and 499,938 pieces of goods had been processed.

(8) The Food Safety Management Information System is continued to be amended and maintained for strengthening the control of food safety and the reporting of inspection cases. By the end of 2008, 275,241 inspections had been processed.

(9) By the end of 2008, the drug interaction system had been visited by, 123,028 person-times of medical personnel from 3,076 medical institutions.

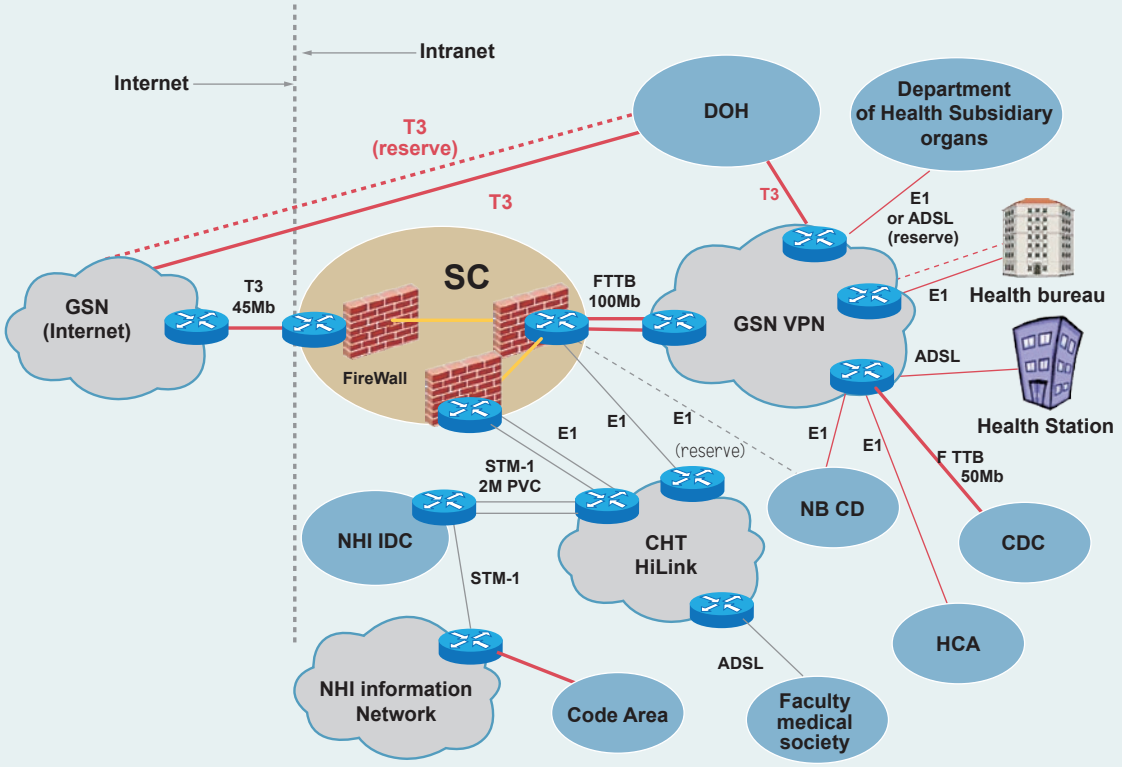
2) Health Information Network

The Health Information Network (HIN) is the national hub for the exchange of health information (Figure 6-4), to provide functions in the exchange and sharing of health information. The Service Center (SC) is responsible for the operation and management of various public information systems, and also for providing counseling services to the linking institutions. The SC is also responsible for the management of the network and information security; and at the same time, conduct visits and supervision on the information environment of health bureaus and health stations, and assist in upgrading the efficiency and quality of information management of these primary healthcare units, and reduce digital divide between the urban units and the rural units s.

Section 8 Medical Manpower

The size and quality of medical manpower have impact on the quality of medical care services and the accessibility to medical care resources. For this, the Department has continued to conduct projects related to the distribution of medical manpower and their training to realize the sound operation of the medical care system.

Figure 6-4 Framework of HIN Network



1. Current Status of Medical Manpower

By the licensing systems of professional personnel, there are 14 laws and regulations governing the management of medical personnel. They are the Physician's Act, Pharmacist's Act, Midwifery Personnel Act, Dietitian's Act, Nursing Personnel Act, Physical Therapist Act, Occupational Therapist Act, Medical Technologist Act, Medical Radiology Technologist Act, Psychology Counseling Personnel Act, Respiratory Therapist Act, Audiologist Act, Dental Technician Act, and Language Therapist Act. The Optometrist Act will soon be drafted.

By the end of 2008, there were 16.03 western medicine physicians, 2.25 Chinese medicine doctors, 4.85 dentists, 12.91 pharmaceutical personnel, and 54.97 nursing personnel, all per 10.000 population. By the holistic healthcare plan, the goal of 15.7 western medicine physicians per 10,000 has been achieved; and the estimated needed numbers of Chinese medicine doctors, dentists, medical technologists, medical radiology technologists, physical therapists, occupational therapists, pharmaceutical personnel, nursing personnel, and dietitians have also been met. The number of psychology counseling personnel, however, is not yet sufficient.

2. Development of Medical Manpower

To improve the quality of medical personnel, on-job training and plans for the development and cultivation of various kinds of medical manpower

are conducted each year. Major achievements are as follows.

1) In principle, the number of western medicine students to be enrolled each year is limited to 1,300. The development of other categories of medical personnel is done on control basis. Applications should be made prior to the establishment of schools; and the applications are reviewed by the Ministry of Education for control purpose. Planning for physician manpower in the future will be based on the goal of balanced distribution of resources; and a periodic assessment mechanism will also be set up. The number of medical personnel licensed and in practice is shown in Table 6-1.

2) Plan for the development of local medical and nursing personnel has been implemented. Indigenous peoples and residents on offshore islands are trained as medical personnel on government scholarship; they are sent back to their home towns for service upon completion of training. In the past years, 256 government scholarship-sponsored physicians have been trained.

3) Training of physicians on government scholarship is implemented. They are

Table 6-1 Medical Manpower, 2008

Category	No. Licensed	No. Practicing	No. Practicing per 10,000
Physicians	51,647	36,960	16.0
Dentists	14,281	11,187	4.9
Chinese medicine doctors	10,377	5,184	2.3
Medical technologists (technicians)	18,380	8,384	3.6
Medical radiology technologists (technicians)	6,593	4,674	2.1
Pharmacists (assistant pharmacists)	47,009	28,772	12.9
Nursing personnel	344,955	126,792	55.0
Midwives	53,578	274	0.1
Occupational therapists (technicians)	3,246	2,025	0.9
Physical therapists (technicians)	9,169	4,716	1.3
Counseling psychologists	1,174	821	0.4
Clinical psychologists	807	674	0.3
Dietitians	5,556	2,259	1.0
Respiratory therapists	1,658	1,379	0.6
Dental mold technicians	2,617	1,101	0.5
Dental assistants	269	43	0.0
Bone setters	4,011	949	0.4

Notes: Licensed No. excluding the dead practicioners.

assigned, upon graduation, to either work in primary care units or to specialize in less popular medical specialties. Thus far, 5,868 physicians have been trained on government scholarship. 3,267 of them have been assigned to work in the DOH systems. Since 2005, graduates on government scholarship are assigned to work in the DOH-hospitals for six years. They are routinely assigned to work in remote areas.

4) Professional medical societies are commissioned to conduct screening and review of specialty physicians to upgrade the quality of their professional training. Hospitals for the training of specialty physicians are accredited and certified every three years. At present, 26 specialties have been announced; of them, three are sub-specialties of dentistry. By the end of 2008, 39,036 person-times of physicians had been qualified and issued certificates.

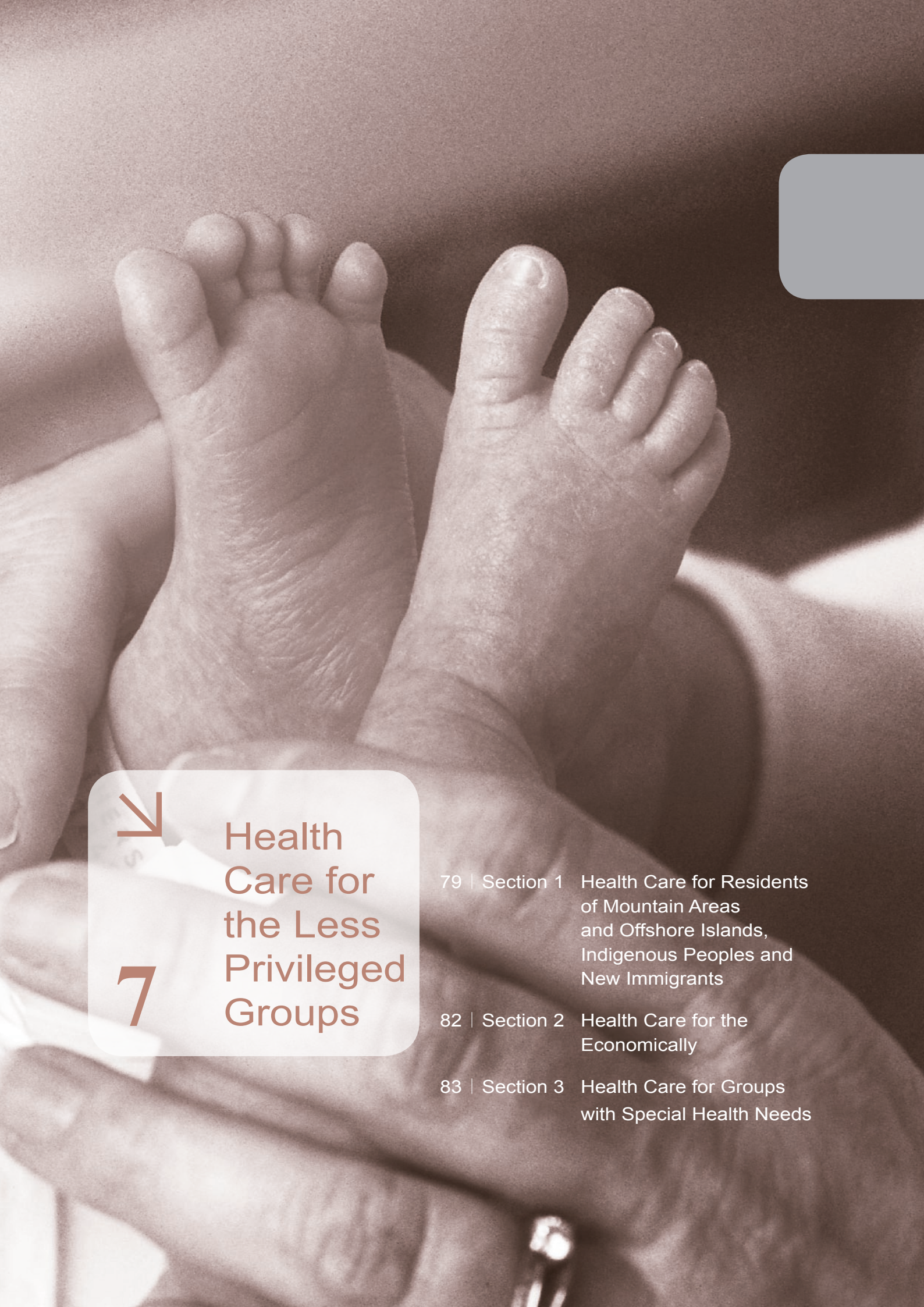
5) To strengthen in physicians the concept and capacity of holistic care, to improve the quality of training of resident physicians, and to realize the ideal of "patient-centered" holistic care, a plan for the training of physicians in general medicine after graduation has been promoted to offer to patients more comprehensive medical care services. In 2008, 102 training hospitals were in this plan.

6) Training of Chinese medicine doctors in Taiwan comes in a 7-year and 8-year undergraduate training and a 5-year post-baccalaureate program. The elementary examination for Chinese medicine doctors was terminated in 2008; and the special examination will be terminated in 2011.

7) Plans have been promoted to improve the clinical training of Chinese medicine doctors to enhance the teaching, research, training and practice environments of Chinese medicine.

   (1) To realize the clinical training of Chinese medicine doctors, 24 hospitals have been subsidized to conduct 35 projects on the improvement of the clinical teaching and training in Chinese medicine.

   (2) To strengthen the supervisory functions of the responsible physicians of Chinese medicine hospitals, to develop Chinese medicine doctors of holistic care capacity, and to promote the sound development of Chinese medicine hospitals, a training program for responsible physicians of Chinese medicine hospitals will be implemented in 2009.



7 Health Care for the Less Privileged Groups

7 Health Care for the Less Privileged Groups

Health care services provided to the groups less privileged in health on the principle of equality in health focus on the low-income families, young children, the elderly 65 years and above, residents of remote areas or the indigenous peoples, and people requiring special care (the disabled, chronic patients, patients under hospice and palliative care).

The National Health Insurance implemented in March 1995 aims at minimizing the economic barriers of the public to medical care, and improving accessibility to medical care. By 2008, the coverage rate had reached more than 99%, and a large part of the health needs of the people have been thus met. This Chapter illustrates by section health care services for residents of mountain areas and offshore islands, the indigenous peoples, the new immigrants, the economically-deprived groups, and groups with special health needs.

Section 1 Health Care for Residents of Mountain Areas and Offshore Islands, Indigenous Peoples and New Immigrants

For their special geographic environment, living conditions in mountain areas and offshore islands are, generally speaking, poorer; and supply of medical manpower is insufficient. They are a relatively less-privileged group in terms of medical care resources and health care. The new immigrants, for language barrier and cultural differences, are also the less privileged groups in health.

1. Health Care for Residents of Mountain Areas and Offshore Islands, and the Indigenous Peoples

To improve the accessibility, comprehensiveness and continuity of health care for residents of mountain areas and offshore islands and the indigenous peoples, the Department has taken action with priority to integrate medical care resources in offshore islands, upgrade quality of medical care in mountain areas and offshore islands, strengthen functions of health stations, and actively promote the quality of medical manpower and enhance the emphasis on prevention and control of major diseases.

1) Improvement of Hardware Facilities in Mountain Areas, Offshore Islands and Remote Areas

In 2008, reconstruction, renovation and repair of 11 health stations (rooms) in mountain areas and offshore islands had been subsidized to renovate buildings and prolong their use. Subsidies had also been made to the repair

of two helicopter parking lots in mountain townships. Health stations (rooms) in mountain areas and offshore islands, and health stations in plane areas of indigenous peoples had also been subsidized for the procurement of medical equipment, information facilities and mobile vans and motorcycles to improve the quality of medical care and information facilities of remote tribes and to shorten differences between the urban and the rural areas.

2) Continuous Development of Local Medical Manpower

(1) The plan for the development of medical manpower in indigenous areas and offshore islands is continued. Thus far, 686 medical personnel have been trained.

(2) Graduates on government scholarship are sent back to work in their own townships. To encourage them to stay on job, in coordination with the Integrated Delivery System (IDS) of the National Health Insurance, medical personnel are subsidized to stay on after completion of their duties. At present, 70.78% of these medical personnel stay on.

(3) Continuing education for physicians in health stations of mountain areas is promoted. Training curricula include care of acute and critically ill patients, alcohol-cessation, physical therapy, occupational therapy, and rehabilitation for victims of family violence and sexual assaults.

3) Promotion of Community Health Building

(1) Community health building is promoted upon the principles of "indigenous", "health issues-oriented", and "setting up mechanisms". In 2008, in collaboration with organizations concerned in tribes of indigenous peoples and on offshore islands to promote community health building; two supervisory centers and 77 community health building centers had been established.

(2) In 2008, through public solicitation, 46 teams of college and university students for the promotion of community health building in mountain areas and offshore islands during summer vacation had been subsidized 12,250 person-times.

4) Promotion of Health Information

(1) 143 mobile stations in 17 townships of indigenous peoples in five counties have set up the health information systems (HIS) to improve further the quality of medical care in remote tribes. Of all program activities, the "mobile clinics" to deliver medical care to the tribes and the more humane registration system in mother language are two remarkable achievements to provide more convenient medical care services to the residents, and to shorten differences in medical resources between the urban and the rural areas.

(2) The picture archiving and communication system (PACS) is set up; and health information systems are integrated. In 2008, six health stations in Taichung, Hsinchu, Nantou and Pingtung were connected to the DOH-Taoyuan Hospital to

improve the medical care quality in remote tribes.

5) **Protecting Health and the Rights to Medical Care for the residents of mountain areas and offshore islands**

(1) To improve the accessibility to medical care, in coordination with the Integrated Delivery System of the National Health Insurance, the rights of the residents on offshore islands to medical care are protected through support of specialists, fixed-point clinics on holidays, mobile clinics, and commissioned-out medical care.

(2) Four health bureaus in Penghu, Kinmen, Lienchiang and Taitung are subsidized to conduct tele-medical care continuously.

6) **Emergency Delivery of Patients in mountain areas and offshore islands**

(1) A 24-hour DOH Air Referral Review Center is set up. In 2008, 318 applications had been received, and 282 were approved, at a rate of 88%; and 36 air delivery trips had been saved. 11 air referral visual information systems in mountain areas are newly established to improve the care of acute and critically ill patients.

(2) A set of Guidelines Governing Subsidies to Transportation Costs for Delivery of Critically Ill or Emergency Patients in Mountain Areas and Offshore Islands for Medical Care is formulated to subsidize costs for transporting patients to Taiwan for medical care. In 2008, 309 emergency patients had been transported; and 21,974 critically ill patients had been subsidized for medical care in Taiwan.

2. Health Care for the New Immigrants

1) To protect the reproductive health of alien spouses, health cards for management are

established for alien spouses and education on reproductive health is given. In 2008, cards for 95% of all alien spouses had been established. Costs of prenatal care for alien spouses who have not yet established household registration are subsidized. In total, subsidies have been made for 9,861 person-times. A plan to provide translation service on reproductive health for alien spouses is promoted. 190 health stations in 19 counties and cities are taking part in this plan.

2) Alien laborers are required to take health examinations at designated hospitals prior to entry into the country, within three days after entry, and 30 days before and after employment for six months, 18 months and 30 months. In 2008, 373,105 person-times of alien laborers had taken the regular health examinations (excluding the one three days after entry). The failure rate was 8.54%.

3) Persons holding certifying documents of permanent residency in Taiwan such as residency permit for aliens, may subscribe to the National Health Insurance in accordance with regulations of the National Health Insurance Act, and pay insurance premiums and be issued Insurance IC cards. With the card, they are then entitled to necessary and comprehensive medical care services at contracted medical institutions at time of illnesses, injuries, child delivery, and accidents.

4) To promote the health of the new immigrants, the Department has produced educational materials in different languages on communicable disease control, management of chronic diseases, and the National Health Insurance.

Section 2 Health Care for the Economically

To ensure access to medical care of those who are unable to pay for the insurance premiums, and to reduce their burdens, the Department and the Bureau of National Health Insurance, have taken measures to assist them since 2008.

1. Subsidies on Insurance Premiums

Governments at various levels subsidize people of specific less-privileged groups on insurance premiums. They include the low-income families, jobless retired servicemen, unemployed laborers and their dependents, the handicapped persons, the elderly above 70 years and children under 3 years of the near-poor households, and unemployed indigenous peoples under 20 years and over 55 years. In 2008, some 2.04 million people had been subsidized at a total of NT$ 15.3 billions.

2. Assistance on Insurance Premiums

1) The Relief Fund: Individuals, who are qualified by the Regulations Governing Recognition of Individuals in Financial Difficulty or in Special Financial Difficulty under the National Health Insurance, may apply for interest-free loans to the Relief Fund to pay for overdue insurance premiums and the self-payment medical costs due to the insured institutions. The loan will be paid back a year after. In 2008, 8,708 loans had been approved, at about NT$ 500 millions.

2) Referral to charity groups: Individuals who are unable to pay for insurance premiums are referred, with the assistance of the Department and the Bureau of National Health Insurance, to public interests groups or individuals for support. In 2008, 2,672 cases had been successfully referred.

3) Installment payment: Individuals who cannot afford to pay insurance premiums in full at one time may apply for installment payment. In 2008, 248,000 people had taken advantage of this system.

4) Assistance Plan to the economically-disadvantaged: A plan to assist the economically-disadvantaged was implemented in early 2008 by the Executive Yuan to assist the low-income families and marginal low-income families to pay for their overdue insurance premiums and unpaid loans of the Relief Fund, at a total of NT$ 800 millions for 33,402 persons. They include 32,420 persons of low-income families and 982 persons of the marginal low-income families.

3. Medical Rights of Those Unable to Pay Insurance Premiums

Individuals not subscribing to the National Health Insurance or their insurance premiums are overdue, at time of critical illnesses, with the certificate of poverty issued by village/neighborhood chiefs or hospitals, may avail themselves initially to medical care as the insured. After treatment, they will then be, upon individual conditions, assisted to subscribe to the Insurance, apply to the Relief Fund, or for referral or installment payment.

Section 3 Health Care for Groups with Special Health Needs

1. Human Rights Protection and Care of Hansen's Disease Patients

1) On July 18, 2008, the Hansen's Disease Patient Human Rights Protection and Compensation Act was passed by the Legislative Yuan and promulgated by the President of the Republic on August 13 of the same year. The Act specifies the correct name of the disease to resume reputation, their compensation, medical care and nursing care, planning for a Hansen's disease medical care park, and the establishment of a committee for the protection of the human rights of Hansen's disease patients.

2) Compensation funds of NT$ 492,629,994 have been paid to 272 inmates of the Losheng Sanatorium.

3) For life care, each patient is given NT$ 18,000 per month; of them, NT$ 7,750 per month is for incidental expenses.

2. Prevention and Control of Rare Diseases

The Rare Disease Control and Orphan Drug Act was implemented in August 2000. Taiwan is the fifth country in the world after the US, Japan, Australia and the EU to enact laws and regulations for the prevention and control of rare diseases. The Act is primarily to prevent the occurrence

of rare diseases, to provide early diagnosis and care of patients of rare diseases, to help patients access to adequate drugs and special nutrient food for rare diseases, and to encourage and ensure the supplies, manufacturing, research and development of these drugs and nutrient food.

To provide patients of rare diseases with comprehensive care, rare diseases are included for payment in the National Health Insurance under the category of critical illnesses and injuries and metal and physical impairment. A set of Regulations Governing Subsidies to the Medical Care of Rare Diseases is formulated to subsidize the medical costs of diagnosis, treatment, drugs and special nutrient food not covered by the National Health Insurance. A supply center for drugs and special nutrient food for patients of rare diseases has also been set up. By the end of 2008, 167 rare diseases in 153 categories had been announced; 40 items of special nutrient food and 81 drugs for rare diseases had also been announced.

3. Health Care for the Mentally and Physically Impaired

1) Building a Comprehensive Care Model

To provide the mentally and physically impaired with comprehensive care, a special care model has been developed under the long-term care systems.

(1) 25 counties and cities have been subsidized to provide home nursing care to allow the functionally disabled elderly to be cared in an environment familiar to them. For those disabled elderly with rehabilitation needs and yet are unable to be transported to medical care institutions for rehabilitation, they are provided with home or community rehabilitation services to help maintain and improve their mental and physical functions. To strengthen the supporting systems for the caregivers, to allow families in the long-term care of cases a brief break, a respite care service is offered to the home-care givers.

(2) To improve care of the dementia elderly, the Department has, since 2005, subsidized 18 nursing homes to set up 356 beds for the care of the dementia elderly, and to improve quality of services and facilities, and thus to upgrade the care capacity of these nursing homes for the care of the dementia elderly, and to reduce, at the same time, troubles encountered in the care of patients, and to improve their quality of life.

(3) Local competent health authorities have designated 240 medical institutions to conduct assessment of mental and physical impairment. The Mentally and Physically Impaired Persons Rights Protection Act was promulgated on July 11, 2007. Assessment standards will be formulated in accordance with the ICF system of the World Health Organization in eight categories of mental and physical impairment. On May 28, 2008, the Department commissioned out this task to the Corporate De-Zhe Medical Research Foundation.

2) Oral Health

The common problems of oral health of the mentally and physically impaired are lack of medical care restoration, poor oral hygiene, inadequate tooth-cleansing, and lack of preventive health intervention. For this, various activities have been promoted for the preventive care of oral health of the mentally and physically impaired.

(1) The five-year plan for the oral health of the mentally and physically impaired was approved by the Executive Yuan on May 26, 2008.

(2) A project, oral preventive health care service for the mentally and physically impaired in 2008, was conducted to train dentists and oral health workers, and to provide oral preventive health care services in 28 institutions for the mentally and physically impaired. A project of fluoride application on teeth for the prevention of dental caries for children is also conducted to reduce their dental caries rate.

4. Human Rights Protection and Care of the HIV-Infected

The Department has spared no efforts in the human rights protection and health care of AIDS patients. Taiwan is one of the few countries that provide the HIV-infected with free medical care. When HAART was first developed in 1997, it was immediately brought in to provide the infected with free cocktail therapy.

1) In the Protection of Human Rights

(1) On December 17, 1990, the "AIDS Prevention and Control Act" was promulgated to effectively regulate the control of HIV infection and to protect the rights of the infected. To meet the needs of the changes in diseases epidemics, and also in accordance with the more active actions in the protection of human rights around the world, the Act was amended and renamed the "HIV Infection Control and Patient Rights Protection Act" , to respond to the spirit of human rights and to meet the demands of AIDS control.

(2) The public understanding of AIDS is significantly insufficient; many of them hold discrimination and misunderstanding against the infected. The infected often face many unfair treatments in employment, schooling, medical care, nursing care and placement. For this, based on the HIV Infection Control and Patient Rights Protection Act, two sets of regulations, Regulations Governing Protection of the Rights of the HIV-Patients, and Operational Directions for Reviewing of of Applications for Stay or Residence for HIV-Infected Individuals, have been formulated to maintain the dignity and rights of the infected.

2) Health Care

(1) Since the amendment of the AIDS Prevention and Control Act (now the HIV Infection Control and Patient Rights Protection Act) on February 5, 2005, free anti-HIV medications have been provided, and payment under the National Health

Insurance has been extended to the non-insured HIV-infected to improve the coverage of medical care and accessibility to medical care. In 2008, 12,061 patients had been treated, at a rate of 83%.

(2) To improve the effects of medical care for the HIV-infected, to encourage the HIV-infected in the self-management of health, a case-manager project for HIV infection has been implemented since 2007. In 2008, 21 designated medical institutions for HIV control were in this project to provide cases with education and counseling.

(3) Through the follow-up management of county/city health bureaus and case-managers, patients are supervised to visit regularly the designated hospitals for treatment. They also care about the cases, their conditions, and thus to improve their willingness to medical care. Promotional campaigns are conducted on the advantages of regular medical care to prolong their chances of survival, reduce opportunistic infections, and thus to improve their quality of life. Counseling, testing and follow-up of contacts are enhanced.

(4) Private sector organizations such as the Harmony Home Association, Taiwan, and charity groups such as the Taiwan Roots Association have been subsidized to assist in the care of cases, making arrangement for their medical care, and emergency placement.

(5) To enhance the counseling for the HIV-infected and health education of the correction institutions , as well as to improve the knowledge of the inmates about HIV infection, three private sector organizations were commissioned to provide counseling and health education in correction institutions in 2008, to improve the knowledge of the inmates on HIV infection. Through counseling, cases were encouraged to accept medical care, and thus to protect themselves others, and to further reduce the HIV infection.

8 National Health Insurance

8 National Health Insurance

Since its inception in March 1995, the National Health Insurance (NHI) has greatly reduced the financial barriers of the public to medical care. The satisfaction rating of the public has always stayed high at around 70-80%. Many countries have praised this system. In the year 2008 alone, 409 persons from 36 countries made study visits. This Chapter focuses on the current status of the National Health Insurance and its reform.

Section 1 Current Status of the National Health Insurance

The National Health Insurance is one of the most important social constructions of Taiwan. The current status of the NHI is summarized as follows.

1. Current Status of Insurance Enrollment

The National Health Insurance is a mandatory social insurance. All individuals holding the Republic of China nationality and have registered their household in the Taiwan Area for more than four months shall, by law, join the NHI. Aliens holding certifying documents for residency and have resided in Taiwan for more than four months shall also, by law, join the NHI. However, persons employed are not restricted by the preceding four-month regulations. By the end of 2008, the total enrollment (not including the armies) was 22,918,144 persons, and the enrollment rate was more than 99% of the population.

In 2008,, the various assistance measures were continued to protect the rights to medical care of the disadvantaged minorities and to their burdens on insurance premiums. In addition to those mentioned in Chapter 7, the following assistance measures have also been actively promoted.

1) Easing the Financial Burden of Those with Catastrophic Illnesses

Patients suffering from cancer, chronic psychiatric diseases, in hemodialysis, congenital disorders and rare diseases are waived of their partial payment of the medical costs. By the end of 2008, around 790,000 patients carried valid catastrophic illness certificates.

1) Assuring the Medical Rights and Drug Use of Patients of Rare Diseases and Hemophilia

The NHI Medical Expenditure Negotiation Committee has, since 2005, budgeted in the global budget for hospitals special funds for the medical costs of patients of rare diseases, hemophilia and AIDS to protect their rights to medical care and drug use.

2. Insurance Financing

When the NHI was initiated, the insurance premium rate was set at 4.25%. Through all efforts of the Bureau of National Health Insurance

in promoting various measures to broaden sources of income and reduce expenditures, and by implementing strict financial monitoring, the premium rate that was originally planned to maintain the financial stability for five years had been continued without adjustment until September 2002 when a slight adjustment was made to 4.55%.

In 2008, the insurance revenue was NT$ 402.001 billions, whereas the insurance costs were NT$ 416.425 billions, giving a deficit of NT$ 14.424 billions by accrual basis. In the period between March 1995 and end of 2008, the total insurance revenue was NT$ 4,304.626, whereas the insurance costs were NT$ 4,331.621 billions, and the total deficits for these years had been NT$ 26.995 billions. The annual cumulative balance of the safety reserve is lower than the one month total of the insurance payments.

Along with the aging of population and increase in the medical expenditures for high-technology medical care, medical expenditures of the NHI have increased year by year. For economic reasons, the insurance premium rate has not been adequately adjusted for many years. The Department and the Bureau of National Health Insurance have continued to actively promote some reform plans, formulated several administrative measures, and promoted various measures to increase sources of income and reduce expenditures and prevent waste in the use of medical resources, and thus to alleviate the financial difficulties of the NHI. These measures are as follows.

1) Promoting the "Income-Increment and Expenditure-Reduction Measures" to maintain financial stability including:

   (1) Containment of Medical Expenditures

   i) Drug price surveys and the 6th drug price adjustment have been conducted; inspections of medical care institutions in violation of regulations and review and reduction of medical costs have been made to contain unnecessary expenditures.

   ii) Higher co-payment is collected to reduce abuse, and to monitor financial expenditures for items of medical care such as out-patient services, drugs and rehabilitation of higher utilization.

   iii) On December 31, 2008, the Department called a national meeting on drug policies of medical and pharmaceutical groups, experts and scholars, and representatives of consumers, to discuss measures to reduce drug price differences. The two resolutions of the meeting are, (1) a mechanism will be adopted to timely adjust and reflect market prices of drugs whose patent rights are overdue; and (2) drug price surveys and adjustment will focus on the short and medium periods after the patent rights are overdue.

   (2) Income Increment

   Issuance of bills to the interrupted insured is expedited; their insurance categories and amount of payment are checked. Each year, NT$ 1 billion from the balance of the public-interests lottery and NT$ 18 billions from the health and welfare tax levied on tobacco products are collected. Multiple programs of micro-adjustment are implemented.

2) To realize equity in the sharing of insurance premiums and to adjust premiums in coordination with increase in basic wages, the Bureau of National Health Insurance

announced on July 27, 2007, in accordance with the amended "categories of the insurance underwriting wages", a set of notes on the provisions of Article 70-1 of the Regulations Governing the Implementation of the National Health Insurance Act. The preceding notes were implemented on August 1, and the minimum amount of insurance underwriting for the insured under Group I of Category II was made to be claimed by the 6th grade of the classification of the new insurance underwriting amount (NT$ 21,000). An additional income of NT$ 5.5 billions per year in insurance premiums was made.

3) The preceding measures though may have helped the insurance financing, they are not enough to make up the deficits. In the long run, the insurance premium rate should be reviewed. Review of premium rate will be made through legal procedures at an appropriate time following the progress of law amendment and financial needs.

3. Insurance Benefits and Systems

1) Payment schedules for medical fees in the National Health Insurance are reviewed and amended to upgrade the quality of medical care and to assure reasonable payments. Work done in 2008 include:

(1) For Western Medicine

i) "The plan for the implementation of reserved funds to assure the total quality of western medicine primary care", "the health care quality indicators", "the pay-for-performance system", "the family docters integrate care plan", "the plan to improve areas of less medical care resources", and "the plan for the treatment of chronic hepatitis B and C" are amended; a new plan for the care of metabolic syndrome is added.

ii) Increase in the payments for organ transplantations to reflect the relative resource input of surgical transplantation and to encourage organ transplantation.

iii) To improve care quality, a new practice to adjust upward by 20% of the out-patient diagnostic fee of outpatient services for children under two years of age (inclusive) is implemented.

iv) The high payment for hemodialysis is discontinued. Payments are made in accordance with the classification of diseases by severity; payments for the automatic peritodialysis are added.

v) In coordination with the balances after the adjustment of drug prices, service fees for the outpatient services of hospitals, diagnosis and treatment fees for hospital care, pharmaceutical service fees, general fees for hospital care and bed costs of economic hospital beds and nursing care fees, hospital care fees for chronic psychiatric patients and day hospital care, and drug costs of primary care institutions have been adjusted.

vi) The plan to improve medical payment for tuberculosis of the National Health Insurance is included in the payment schedules to extend the scope of care.

(2) For Chinese Medicine

i) "The health care quality indicators",

the "pilot project of Chinese medicine aiding in the care of cerebrovascular disease patients with bedsore under hospital care of western medicine" , the "pilot project on the out-patient clinic care by Chinese medicine of children with cerebral paralysis" , the "pilot project on the care of child asthma at respite period by Chinese medicine out-patient care" , and "the plan to improve areas of less medical care resources" are amended.

ii) New items for the treatment of complex trauma by Chinese are added to upgrade the quality of care.

iii) Fees for prescribing oral medicine after treatment by Chinese medicine, trauma and dislocation replacement are adjusted upward.

(3) For Dentistry

i) The plan for the implementation of reserved funds to assure the total quality of dental out-patient care, the index items of medical care quality and their monitoring values, the pilot project on care service of total special service items at dental out-patient clinics, and the plan to improve areas of less medical care resources are amended.

ii) Endodontics of permanent teeth, specific local treatment, oral and maxillofacial and neck malignant tumor post-operation treatment, biopsy of soft tissue during pre-cancer sections, and biopsy of hard tissue during pre-cancer sections.

2) To reasonably contain medical costs, the budgeting mechanism has been practiced universally since July 2002. Action has also been taken to reform the payment schedules and the review systems to move from case review to the establishment of a document analysis-oriented review of the overall medical care patterns.

3) After the Executive Yuan has approved the range of growth of the NHI global budget, the matter is handed over to the NHI Medical Expenditure Negotiation Committee to coordinate the insurance payers and the service providers to negotiate the global budget and allocation of certain service items.

4) To improve the accessibility of the insured to medical care, medical institutions in contract with the Bureau of National Health Insurance are all around the country. By the end of 2008, there were 23,874 such institutions.

5) Regulations governing payment of pharmaceuticals are adjusted one by one to improve the quality of drugs used by the public and to give them more choices of drugs, and also to reduce their financial burdens.

4. Review of Medical Care and Disclosure of Medical Care Quality Information

1) Review of Medical Care Services

(1) Procedure review and professional review: Procedure review is to review the accuracy of the information on the claims submitted by medical institutions, and to make sure that the claims meet the various requirements of the fee schedule. A computerized automatic review system is set up to improve efficiency. In the process of professional review, claims are either randomly or purposely sampled through computers; they are then reviewed

professionally by the invited expert medical personnel.

(2) In coordination with the fee schedules, regulations governing payments for pharmaceuticals, or consensus on professional review of the branch bureaus of the Bureau of National Health Insurance, notes on the review of various disciplines are studied and revised for reference of physicians in the treatment of patients.

(3) Medical experts are invited to use the data of claims for medical fees to develop indexes of non-payment for drugs, examinations, operations or medical treatment. Abnormal cases are reviewed by procedure review for deduction in payment to correct abnormal medical behavior. By the end of 2008, 44 non-payment indexes had been announced.

(4) The review and administrative relief of medical fees of the National Health Insurance come in initial review, reply, re-deliberation, dispute mediation, appeal and administrative litigation. If the medical care providers are in disagreement with the results of the review on medical fees, they may apply for re-deliberation, and eventually dispute mediation if they are not convinced of the results of re-deliberation. Dispute mediation is handled by the NHI Dispute Mediation Committee.

2) Disclosing Information on Quality of Medical Care

Through disclosure of the quality indicators of the professional medical care services provided by medical care institutions, people will have direct access to the results of quality monitoring of various medical care institutions. They can then substantially supervise the quality of medical care.

Quality information by hospitals and departments is published on the Internet for public inquiries. By the end of 2008, 63 indicators had been announced for inquires by 2,098,222 person-times.

5. NHI IC Card

To reform the NHI certification, the NHI IC card has been universally used since January 2004 to provide the public with a simple, more convenient and safe service. The name-card size NHI IC card contains four information storing sectors for personal information, health insurance data, special zone for medical care, and health administration special zone. The IC card can also provide timely information on medical care; it also contributes to disease control. Achievements in 2008 are as follows.

(1) 99.9% of all NHI contracted medical care institutions have been verified for linking to provide a platform for communication between institutions.

(2) A special project to supervise the insured of abnormal utilization of medical care in clinics under the National Health Insurance is conducted. In 2008, a total of 15,128 patients had visited clinics for more than 20 times each month. After supervision, the number of visits had declined by 40-60%.

(3) “Organ donation” is noted on the NHI IC Card. Thus far, 67,801 persons have registered. This would allow medical personnel to know at the first moment about the individual's willingness of organ donation. In addition, 20,342 persons have registered for “hospice and palliative care”. Hospice and palliative care will be

provided to terminal patients in respecting their wishes to die with dignity and in peace.

(4) Since July 2005, immunization is registered on the IC card. During the period from 2006 to 2008, 7,146,651 pieces of information had been registered. By the uploading of the IC card information, medical care records of persons traveling from Southeast Asia countries is made available to facilitate the necessary management of dengue fever control.

Section 2 Reform of the National Health Insurance System

After several years of planning, the NHI Second-Generation Planning Task Force of the Executive Yuan has submitted a final report. The amendment of laws for the second-generation NHI is actively planned.

1. Goals of reform: to assure the reliability of medical care.
2. The core values: quality, equity, efficiency.
3. Key issues of law amendment:

1) Organizational structure and social participation: The NHI Supervisory Committee and the NHI Medical Expenditure Negotiation Committee will be merged into the NHI Supervisory Council to unify responsibilities of insurance revenue and expenditures, to strengthen the linking mechanism of the NHI financial revenue and expenditures, and to conduct relevant social participation of the citizens before major matters of the insurance are decided.

2) New premium system: Funds needed for the insurance will be shared by the government, the employers and the insured. Shares of the government will be calculated by certain formula of growth rate; shares of the employers will be calculated by certain formula and linked to the contributions of the insured; and shares of the insured will be calculated on household incomes.

3) Medical care quality and information disclosure: It is clearly stipulated that information on medical care quality relevant to the National Health Insurance be publicized periodically; and the pay for performance system be strengthened. Ways and procedures to formulate items of payments and payment schedules for medical care services and pharmaceuticals will be established.

4) Others: To prevent those who have stayed abroad for some long time from taking advantage of the insurance for medical care, regulations governing the immediate insurance underwriting of those who have record of insurance underwriting in past are deleted. A difference sharing system is set up. The insured may decide to use expensive medicines, the cost of which exceeds the upper limit of payment, and pay the differences.

4. Progress in Law Amendment

The draft amendment of the National Health Insurance Act was once again submitted to the Executive Yuan for review on January 25, 2008; and to the Legislative Yuan for review on February 15, 2008. The first reading of the Legislative Yuan was completed on February 29, 2008. The draft is currently under the review of the Health, Environment and Labor Committee.

9 International Cooperation in Health

9 International Cooperation in Health

The promotion of international health affairs is not only a matter of world trend, it is also essential in developing an international stage for healthcare management. Therefore, in addition to international cooperation and exchange, planning, promotion and coordination of policies concerning international aid, the collection of information, participation in international organizations, enhancement of international image, recruitment of specialists, and manpower development for international health should be in line with global trends - to develop diversity in the international health cooperation models in order to attain the ultimate goal of feeding back and contributing to world health. In May 2009, after years of efforts, Taiwan, at the invitation of the Secretary General of the World Health Organization, attended the World Health Assembly in the capacity of an observer.

Section 1 Joining the World Health Organization

Efforts to join the World Health Organization began in 1997. Throughout the years, Taiwan has upheld the principle of “diseases see no boundary” , through professional appeals, and also for the health rights of the 23 million people on Taiwan, in the efforts to join the WHO. For years, by the support of allied countries and international friends, the international community has gradually come to realize the necessity of Taiwan in joining the WHO; many countries and major international health organizations have openly supported Taiwan's appeal of joining the WHO.

1. In the last 12 years, Taiwan has strived to join the WHO. During this period, Taiwan experienced the outbreak of SARS and enterovirus, which made the international community to realize once again the importance of cross-border cooperation in disease control and health care; and at the same time, the importance of Taiwan becoming a member of the WHO. Taiwan will continue to actively participate in various international health-related meetings and activities to fulfill the responsibility as being a member of the global village, and thus to gain the support and recognition of other countries.
2. In 2008, Taiwan continued to take part in various WHO-associated conferences and activities, activities of major international health organizations, and cooperation in international health affairs. Major achievements are as follows.
    1) Former US Secretary of Health and Human Resources, Mr Tommy Thompson, visited Taiwan in April 2008. On many occasions,

Mr Thompson has openly expressed his support to Taiwan's appeal for joining the WHO.

2) Former Minister of Health, Dr. Hou Sheng-mou, sent a letter to the Secretary General of the WHO, to each health minister of the 193 member states of the WHO, and presidents of four major NGOs, to solicit their support to Taiwan's appeal.

3) A bilateral meeting with Mr Michael Leavitt, US Secretary of Health and Human Resources was held. Mr Leavitt also wrote a letter on behalf of Taiwan to the WHO Secretary General for support to Taiwan's appeal.

4) Exchanges were made on health issues with 17 allied countries of Taiwan. In these exchanges, Dr. Hou, former Minister of Health, on behalf of the 23 million people on Taiwan, expressed the gratitude to them for their support to Taiwan joining the WHO.

5) In December 2008, Professor Kang Chao-chou, professor of toxicology of the National Taiwan University, at the invitation of the Department, participated in the WHO-sponsored conference of experts on toxicology of melamine held in Canada. At the conference, Dr. Kang presented Taiwan's findings on the melamine testing for discussion.

In the early stage of promotion, the WHO was non-responsive to Taiwan's request; major countries such as the US, Japan and the EU were not so enthusiastic t as well. However, in recent years, the US and Japan have publicly supported Taiwan to become an observer of the WHA; and the European countries have also supported Taiwan's participation. Many other countries have also turned from their previous indifference to willing to support Taiwan's participation in the WHO. Especially in 2008, several allied countries spoke strongly at the WHA to support Taiwan's appeal and won approval from many countries present. This kind of development is favorable to Taiwan's appeal, and should lay the foundation for Taiwan's eventual membership.

Section 2 International Exchange and Cooperation in Health

International organizations such as APEC (in Asia), PAHO (Pan American Health Organization in the Americas), WAHO (Western Africa Health Organization in Africa), and EHFG (European Health Forum Gastein) and OECD (in Europe) are fully utilized to appeal to the international media Taiwan's humanitarian medical aid programs and substantial exchanges in medical care with other countries, and thus to improve Taiwan's international visibility. Activities of international exchange and cooperation in 2008 are as follows.

1. Participation in and Holding of International Conferences and Symposiums

1) International Conferences

(1) In April 2008, a delegation was sent to participate in the Dubai International Humanitarian Aid and Reconstruction

Conference and Exhibit. In the exhibit, Taiwan's contributions in humanitarian aid were displayed.

(2) In October, the Department collaborated with the International Forum Gastein, to organize the 11th European Health Forum Gastein in Austria. A parallel forum was hosted by Taiwan on the issue of "Health Ethics" to share Taiwan's health experience with European countries and improve our international exposure.

(3) In October, the Workshop on Public Health: International Trade and Domestic Legal Issues, was held to discuss the issues, such as "WTO and the development of public health", "drug use in developing countries", "food safety", and "tobacco control and trade disputes".

(4) In October, a delegation took part in the APHA (American Public Health Association" annual meeting. Dr. Yeh Chin-chuan, former Minister of Health, was invited to give an opening speech and present the achievements of the National Health Insurance in Taiwan. His speech and presentation received standing ovations. At the same time, two parallel forums on Taiwan's achievements in public health were also held, and ten papers were presented at these forums to share Taiwan's experience with others.

(5) In November, the 2008 Global Forum for Health Leaders was held. The theme of the Forum was "Health and Globalization: Challenges and Opportunities" to focus on issues such as "Evidence-Based Health Policy", "Global Trend of Healthcare Policy", and "Capacity-Building for Disease Control". Some 260 participants from 32 countries took part in this Forum.

(6) In November, the 40th Asia-Pacific Academic Consortium of Public Health

(APACPH) was held in Kuala Lumpur, Malaysia. Dr. Chiu Wen-ta, President of the Consortium, was honored to give the opening speech, which demonstrates. importance of Taiwan in the promotion of public health in the Asia-Pacific countries.

2) Symposiums

(1) In March, the TaiwanIHA held an exhibit of its two-year achievements in medical aid and a symposium on "sustained development of humanitarian aid from the global viewpoint".

(2) In September, there was an outbreak of melamine contamination in food from China. To synchronize the management of food safety in Taiwan with the international community, an International Experts Meeting on the Control of Melamine-Contaminated Food was held. Experts from the US, Japan, Australia, New Zealand and the EU were invited to discuss strategies to face these problems.

(3) To promote international exchange on Chinese medicine and pharmacy, the following symposiums have been held: "23rd Symposium on Natural Products", "2008 Perspective Biomed-Technology Development and 7th Cross-Strait Medicine and Biology Conference", "The 7th Consortium for Globalization of Chinese Medicine", "2008 International Symposium on Chinese Medicine", "2008 Cross-Strait Symposium on Chinese Medicine and Pharmacy", and "2008 CAM/TM professional training program".

3) Consultation Meeting: On October 21, 2008, Taiwan participated in the 20th Taiwan-EU Consultation Meeting held in Brussels. At the meeting, Taiwan presented several health issues such as the establishment of a collaborative mechanism for the quick reporting of unqualified food between Taiwan and the EU, and the control of counterfeit drugs. Discussion was also held with officials of the EU.

2. Exchange and Cooperation

1) In the APEC Health Task Group, the feasibility of combining the APEC electronic medical record and the APEC tourism card was proposed. The importance of the international transmission of communicable diseases and their collaborative control was also stressed. The APEC Health Task Group website is maintained to provide each economic entity with information on health, safety and activities to strengthen Taiwan's participation in APEC.

2) The DOH-Taoyuan Hospital was commissioned to conduct the 2008 health cooperation plan with the Belize sister hospitals and the Central and South Americas, to continue to promote bilateral and multilateral cooperation and exchange with the Central and South American health organizations. The DOH-Taichung Hospital was commissioned to conduct the 2008 health cooperation plan in the West African region, to help medical personnel of Gambia and Ghana for training in Taiwan and also promote matters on cooperation and exchange in health affairs.

3) The Italy-Taiwan Association was subsidized to conduct a series of activities in memory of the fifth anniversary of the death of Dr. Obani.

4) A memorandum of understanding on cooperation was signed with the Marshall Islands. The Taiwan Health Center was set up in the Majuro Hospital of the Marshall Islands. Cooperation in health affairs with the Marshall Islands is promoted.

5) Five projects under the Taiwan-Japan Technical Exchange Program and two projects under the Taiwan-Japan Technical Cooperation Program have been conducted.

6) The National Cheng-kung University was commissioned to conduct the 2008 Kenya Medical Cooperation Program to collaborate with the Great Lake University Kisumu to hold training on disaster prevention and response to help participants develop their capacity in responding to disasters.

7) In April, a Taiwan-France symposium on Chinese herbal medicines was held. At the meeting, Taiwan's experience in including Chinese herbal medicine in the payment of the National Health Insurance and its current development were explained. This paved way for future cooperation between the two sides.

8) In December, visits were made to the health-related organizations of the OECD to understand their operational mechanisms on health matters.

3. Education and Training

1) The Central American Medical Personnel Training Center of Panama invited Taiwan's experts in influenza control for lectures. The lectures were well received and highly acknowledged by all.

2) A project of "Legal advice on trade and public health, and manpower training on dealing with international affair" was organized to promote the capabilities of the staff of the Department

in the undestanding of international trade laws and public health counseling on relevant legal issues was also offered.

3) The Taiwan Health Center in Marshall Islands conducted training programs such as CPR and disaster rescue, health education on oral health for school children, screening of diabetes for prevention and health promotion, cooking classes and preventive screening, training of nursing personnel from the Asia-Pacific region, and training of medical personnel from neighboring countries.

4) At the Taiwan Health Center in the Solomon Islands, training on the control of tuberculosis was held. Students were given health education in the promotion of oral health. Health examinations were offered to local residents.

5) The DOH-Taipei Hospital was commissioned to set up the Taiwan International Medical Training Center for health and medical personnel. In accordance with the medical diplomacy policy of the government, the Center is to promote Taiwan's international health. The Center has thus far trained medical personnel from Mongolia, Russia, Indonesia and Burkina Faso, and established a collaborative mechanism for Taiwan in international exchange and cooperation in health affairs.

Section 3 International Medical Aid

Facing the new challenges of globalization and where diseases see no borders, Taiwan has spared no efforts in promoting international cooperation in health and medical aid to knock at the doors of the international community, and to promote deeper understanding of Taiwan and its people, hoping to gradually promote Taiwan's health diplomacy. Major achievements in 2008 are as follows.

1. Medical Aid

1) In March when Ecuador was heavily flooded, the TaiwanIHA immediately dispatched a medical team to provide medical care services. Sets of disaster rescue devices were procured to help in the rescue and relief of the disaster.

2) In May when Myanmar was hit by a tropical storm, the TaiwanIHA, the Lin-Jiou Mountain Buddhist Foundation and the ROC Rescue Association joined together to dispatch medical teams with medicines and supplies for emergency rescue and to provide medical care services.

2. Medical Assistance

1) The National Taiwan University Hospital was commissioned to conduct a Global Medical Instrument Support and Service Program. A total of 37 medical care institutions and medical device dealers have donated 165 pieces of medical devices for the benefit of eight countries.

2) In collaboration with the Ministry of Foreign Affairs, infrared-ray body temperature screeners were donated to the airport of El Salvador. A signing ceremony was held at the ROC Embassy in Salvador.

10 Science and Technology Research

10 Science and Technology Research

The Department focuses on “science, technology and welfare” as its goal of science and technology development and formulates relevant policies by evidence-based research to promote national health and medical care.

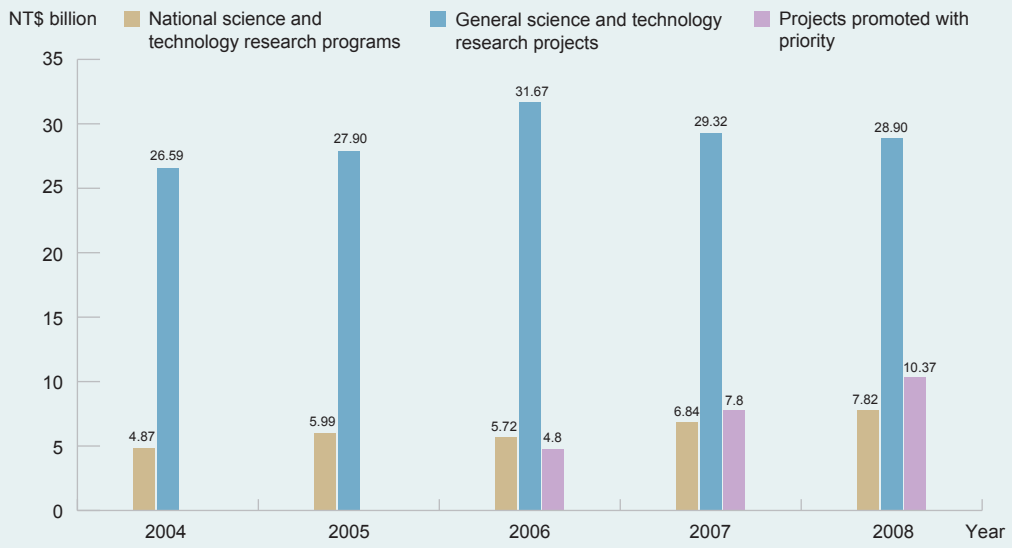
In 2008, the total amount of budget in science and technology research was NT$ 4.709 billions, an increase of 7% over 2007 (Figure 10-1). The type of research programs include “projects promoted with priority” , “general science and technology research projects” , and “national science and technology research programs” .

Section 1 Projects Promoted with Priority

1. The BioMedTech Island Program – Establishment of an Excellent Clinical Trial and Research System

1) A national excellent clinical trial and research center is set up in the National Taiwan University Hospital. The Chengkung University Hospital, National Defense Medical Center and the Wanfang Hospital have set up local/ regional specific excellent clinical trial and

Figure 10-1 Allocation of Funds for Science and Technology Research



research centers of tumor, cancer, stroke and trauma to improve care of patients.

2) In 2008, physicians, pharmacists, nursing personnel and clinical trial statisticians participated in clinical trial research to improve the quality of the clinical research-related professionals .

2. The BioMedTech Island Program – Preparatory Phase of the Taiwan Bio-Bank Project

Public hearing on the draft of Taiwan BioBank Management Act was held on August 15, 2008. The draft was submitted to the Executive Yuan for review on November 28 for further review.

3. Development (including mass production techniques) of Vaccines for Human Use

Four vaccines, H5N1 influenza, enterovirus 71, cellular Japanese encephalitis and Group B meningococcal, have been developed. In 2008, the potency testing and the pre-clinical toxicology testing of rodents and non-rodents of influenza vaccine cell-bank and virus-bank had been completed.

4. Pilot Project on the Use of RFID in Health and Medical Care

For patient identification, care procedures, drug safety and management of expensive medical instruments, the DOH-Taichung Hospital has used the Radio Frequency Identification (RFID) system for management and auditing. The patient identification rate has reached 100%. An automatic recording of drug use and functions to detect errors in patient identification have also been set up to serve as indicators of reporting in patient wards.

5. Tuberculosis Control Integrated Project

A diagnosis chip for the rapid testing of tuberculosis bacilli directly from sputum specimens has been developed for more sensitive and specific testing of active tuberculosis bacilli. The technique is used as a screening tool to help physicians in clinical diagnosis.

6. Chronic Kidney Disease Control

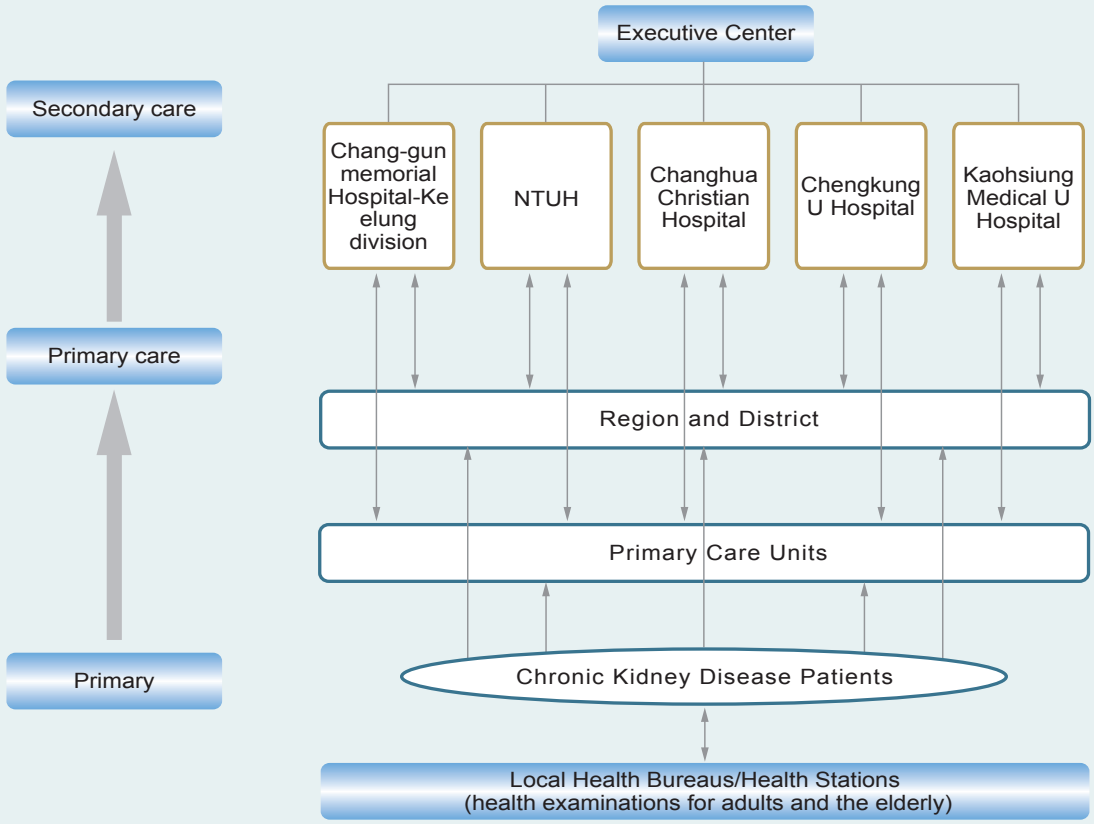
A chronic kidney disease shared care network website has been established to help medical care institutions establish case information and regularly remind caregivers to follow-up and manage patients. By the end of 2008, 146 medical care institutions used this system to manage information for 36,399 patients. A system was preliminarily established to promote the integrated care of patients of chronic kidney diseases in both primary care units and specialty hospitals. The follow-up management and monitoring network is shown in Figure 10-2. This is to improve the integrity of health management of the high-risk chronic kidney disease patients, and thus to effectively reduce the incidence of terminal kidney diseases.

Section 2 General Science and Technology Research Projects

1. Science and Technology Development and Management Projects

To enhance administrative efficiency, the DOH Information System for Solicitation, Review

Figure 10-2 National Chronic Kidney Disease Control and Care Model



and Management of Science and Technology Research Projects was set up and inaugurated in July 2008.

2. Projects on Science and Technology Research Policies in Health

1) Domestic and international public information on medical care quality is collected and analyzed. Surveys of the needs of the public are completed. 50 sets of medical care information are planned with priority. Web systems and databases are developed and set up. A mechanism and model for the publication and transparency of information on medical care quality is established.

2) The effects of mild and moderate dementia patients and their families under home care in community who are willing to accept assistance are explored. It developed two different intervention models, the “home-care training” and the “family support groups” . The result shows that the two intervention models can equally reduce the workload of families in the care of patients. Information on their general health conditions and knowledge and attitudes about diseases is also collected

for reference in the planning of long-term care policies.

3) In 2007-2008, visits and supervision of human trial committees were made. 27 human trial committees had passed the inspection and 26 committees had been supervised. Workshops have also been held to upgrade the quality of clinical trials.

3. Projects on the Science and Technology Research Policies in Pharmaceuticals

1) The drug interaction database is updated constantly to provide 24,300 medical care institutions and pharmacies throughout the country with relevant information to improve drug safety.

2) In 2008, three national patent rights for techniques in the research of Chinese medicine and pharmacy, "method for removing organic contaminants from Chinese herbal medicines", "a bio-medical system with the wireless transmission and the pulse diagnosis by the optical moire measurement", and "tongue diagnosis systems and methods", had been issued.

3) To understand the effects of Chinese medicine and pharmacy on gene expression, a project, "The Genomic and Proteomics Related Research on Traditional Chinese Medicine", is conducted. A compound herbal prescription "ZC008" for treatment of liver fibrosis has obtained US patent rights. In addition, the result of the project, "evaluation of anti-leukemia activities of Chinese herbs by beta-catenin reporter gene", has filed for the ROC patent.

4. Projects on the Science and Technology Research Policies in Food Safety and Laboratory Testing

1) The study to analyze the levels of trans fatty acids in fat, baking products, eggs and milk products in EU and USA was performed. The data will be available to the public and the manufacturers.

2) Studies on methods to assess the health promotion functions for eight health food items such as, improvement of menstrual pain, protection of kidney functions, reducing occurrence of diabetes-induced cardiovascular disorders, anti metabolic syndromes, alleviating the formation of fatty liver, have been completed for reference in the formulation of items and methods for the assessment of the safety of health food.

3) Surveys of the food intakes and nutrition statuses of pregnant women in Taiwan were conducted in 2008. Studies show that women in the early stage of pregnancy are generally short of folic acid; they are deficient in iron, calcium and multi-vitamins during pregnancy. Their chances of exposing to second-hand smoking are relatively high, which may lead to direct and long-term negative impact on the health of the pregnant women and fetuses. Study results will be used for reference in the formulation of nutrition promotion plans and regulatory guidelines.

5. Project for the Establishment of a Traceability System for Processed Food

Traceability networks for fresh milk on market, packaged drinking water, flavored milk, yogurt,

and non-alcoholic beverage (coffee and tea) have been established. The public can access to all the information about production and sales from the DOH food traceability website (http://tfts.firdi.org.tw). Industries of dairy products, beverage and packaged drinking water have been surveyed and assessed, and assessed the requirement to practice HACCP (Hazard Analysis and Critical Control Points) and relevant activities.

6. Establishing A Health Technology Assessment System

Four standard operational procedures for the health technology assessment system have been completed. Six research reports on the assessment of reimbursement for drugs including anti-lipid and osteoporosis have been completed. The executing body, the Center for Drug Evaluation, has become the first in Asia a member of the International Network of Agencies for Health Technology Assessment (INAHTA).

Section 3 National Science and Technology Research Programs

1. National Research Program for Genomic Medicine

1) Using the epidermal growth factor receptor as a target, the high-speed method for screening lung cancer drugs has been developed and filed for the provisional patent of the US in 2008.

2) Two research teams, "on the study of anti-liver cancer Chinese herbal medicine", and "on the genomic study of Chinese medical syndrome and sepsis", have been integrated.

2. National Science and Technology Programs for Agricultural Biotechnology –Project for the Establishment of an Environment for the Safety Assessment of the Genetically Modified Food

The standard of procedures on the safety assessment of genetically-modified food was set up in 2008. Toxicological evaluation of viral genes of PRSV and PLDMV in genetically-modified papaya has been completed. Safety assessment of the edible genetically-modified papaya has also been performed and will serve as an important reference for pre-marketing approval.

3. National Science and Technology Programs for Biotechnology and Pharmaceuticals-Promotion of Clinical Trial and Translation Medicine

1) In 2008, 11 clinical trial projects had been funded. Through monitoring and auditing, clinical physicians and researchers enhance their ability of GCP, and problems can be identified earlier to strengthen the quality of clinical trials.

2) In 2008, three patent rights had been obtained for the studies of "cancer screening method" (ROC patent rights), and "measuring gastronintestinal parameters " (Canada and Singapore patent rights).

Section 4 Research Projects of the National Health Research Institutes

In coordination with the Department of Health

(DOH), NHRI conducts research on health care systems, biomedical technology, pharmaceuticals, biologics, and medical engineering. NHRI also offers resources and services on biomedical research, promotes research communication and cooperation, and provides policy recommendations. Major achievements of 2008 are as follows.

1. Cancer Research

1) Study on the mechanism of the modulation of DNA repair enzyme O6-methylguanine DNA methyltransferase in human cancer cells: The results were published in Molecular Pharmacology in 2008. The findings not only provide a rationale for clinical trials with CPT and BCNU combination treatment in human cancers, but also suggest a new indication for treating patients who are receiving refractory CPT derivatives with BCNU.

2) Mobilization of bone marrow stem cells and cancer cells by granulocyte colony-stimulating factor in cancer therapy: The research revealed that administration of G-CSF during radiation neither promotes local tumor growth nor aggravates distant metastasis.

3) Molecular dissection of ENO1-induced immunosuppression in cancer patients: Findings were that (1) knockdown of the expressions of α-enolase (ENO1) tumor-associated antigen and urokinase-type plasminogen activator (uPA) genes could result in loss of the cell invasion and tissue metastatic capabilities of those cells and that (2) administration of ENO1 antigen alone into animals is sufficient to modulate the anti-cancer immunity of the animals.

4) The Taiwan Cooperative Oncology Group (TCOG): The group (1) held the Asia-Pacific Congress on Oral Cavity Cancer in conjunction with the 12th TCOG Annual Meeting, December 6–7, 2008; (2) organized six clinical research training courses for physicians, nurses, and statisticians in 2008; and (3) initiated and conducted the annual cancer program accreditation for hospitals in 2008 with

the Bureau of Health Promotion, the results will be included as one of the task indicators in the annual performance evaluation.

2. New Drug Development

1) Anti-cancer drug development: Recent progress on two anti-cancer drug candidates, DBPR104 and DBPR204, includes (1) accomplishment of preclinical studies with potentiality in treatment of various malignancies; (2) grant of U.S. patents; and (3) licensing out to SynCore Biotechnology Co. for further preclinical and clinical development.

2) Anti-virus drug development: A recent study focused on anti-HCV drug discovery and development, and identified a potent oral lead compound. This led to the signing of a trilateral collaborative research agreement with Genelabs Technologies Inc. and Genovate Biotechnbology Co. in July 2008 to jointly conduct further research to discover and develop novel drug candidates targeting the hepatitis C virus.

3) Anti-metabolic disease development: Recent research has focused mainly on DBPR108, a selected anti-diabetes drug candidate. Notable achievements in this area include that (1) DBPR108 was found to cause fewer side effects than present drugs and to show good in vivo efficacy in pharmacokinetic studies as well as in reduction of blood glucose; (2) a collaborative partnership for further development began in 2008; (3) preclinical studies have been launched; and (4) for rational drug design of anti-obesity agents targeting CB1 receptor, a series of compounds have found to exhibit significant weight-loss efficacy; relevant patents have been filed.

3. Molecular and Genomic Medicine Research

1) The regulatory role of atypical dual-specificity phosphatase (DUSP) in epidermal growth factor receptor (EGFR) signaling: The results indicate that an atypical DUSP VHR (VH1-related) is involved in the regulation of EGFR and focal adhesion kinase (FAK) signaling; VHR's expression affects the growth and migration ability of lung cancer cells.

2) Development of comparative analysis techniques for microbial pathogens: The team has established standard protocols for Illumina Genometyping, Roshe454 resequencing, and NimbleGen comparative genomic hybridization (CGH) platforms; the team also accomplished complete genomic sequencing of three clinically important pathogens: Klebsiella pneumoniae, Acinetobacter baumannii, and Mycobacterium tuberculosis.

4. Research on Infectious Diseases

1) Signal Transduction Pathways of Drug Resistance and Pathogenesis in Candida albicans: Overexpression of CDR1, an efflux pump, was previously found to be a major mechanism contributing to the drug resistance of Candida albicans, the most common human fungal pathogen; the team recently discovered that the expression of CDR1 is activated by a transcription factor, CaNdt80p, and repressed by serum; the team found that the cph1/cph1 efg1/efg1 mutant partially protects mice from systemic infections by the lethal wild-type C. albicans cells; the results demonstrate a new approach for vaccine development.

2) Investigation of the mechanisms of innate immune function defects in diabetes mellitus patients: DMTB patients had more severe infections, a higher mycobacterial load, a higher treatment-failure rate, and more delayed clearance of mycobacteria than TB patients; these unfavorable characteristics have led to a higher MDR-TB incidence in DMTB patients who have undergone regular anti-TB treatment; the team further found that diabetes (both type I and type II) seemed to decrease the phagocyte-derived cytokines, while type II diabetes more severely affected NK/T cells produced cytokines; these novel findings suggest that hyperglycemia and insulin resistance may affect immune reaction through distinct and hence additive mechanisms.

3) The role of HBV pre-S mutants in pathogenesis of HBV-related hepatocellular carcinoma: The team recently used HBV pre-S1 and pre-S2 mutants transgenic mice model in an in vitro trial; the results demonstrated that the potential chemopreventive agents containing PPARs agonists and anti-oxidants (resveratrol) can cause apoptosis of pre-S mutant heptocarcinoma cell lines; this could possibly be developed into a chemical prevention treatment for patients of hepatocarcinogenesis and chronic hepatitis B.

5. Bioinformatic and Genetics Research

Progression evaluation and cardiovascular outcomes of hypertensive families — a follow-up genetic study of the Taiwan SAPPHIRe cohort: The team conducted variance component linkage scans of 1365 non-diabetic Chinese subjects from the Stanford Asia-Pacific Program of Hypertension and Insulin Resistance (SAPPHIRe) study to search for QTLs responsible for obesity-related traits; several QTLs with strong linkage evidence were identified after incorporating genotype by sex (GxS) interactions into the linkage mapping, including two QTLs for BMI on chromosome 12q with MLS 3.37 (empirical p = 0.0043) and one QTL for hip circumference (MLS = 4.22, empirical p = 0.000033); sex-specific analyses demonstrated that these linkage signals all resulted from females rather than males; all of the regions with linkage signals were observed in one gender, but not in the whole sample, suggesting the genetic architecture of obesity-related traits does differ by gender; the team also discovered a family-based association of genetic variants in the IGF1 gene in relation to anthropometric variables, glucose levels, and insulin levels, based on a large sibship data set collected from the SAPPHIRe cohort.

6. Environmental Pollution and Occupational Medicine Research

1) Study on the biologically effective dose of biomarkers induced by toxins of second-hand cigarette smoking and occupational exposure: The team developed a liquid chromatography/ tandem mass spectrometry (LC/MS/MS) method for quantifying urinary cotinine as an exposure biomarker for second-hand cigarette smoking; the team also developed methods for analyzing DNA adducts such as 8-OHdG, 7-MG, 7-EG, and 7-HEG, which are the foremost methods internationally.

2) Study on the mechanisms of synergism in lung cancer between arsenic exposure and cigarette smoking: The team found that arsenic would act specifically on p53-compromised cells

(p53 dysfunction or inhibition) and increase carcinogenic risk due to the inhibition of Gadd45a protein, which induces centrosomal abnormality and colony formation; the team also found that NNK could provide a p53-compromised status, triggering synergism of arsenic and NNK; the results imply a carcinogenic risk from second-hand smoking and even from low dose arsenic exposure via food or drinking water.

3) The contribution of air pollution to cardiovascular diseases in Taiwan: The results suggest that deaths from lung cancer and cardiopulmonary diseases could be reduced over a 10-year span, given the following limits on atmospheric PM2.5: if the limit is set at 20 μg/m3, 9,807 deaths from lung cancer and 38,967 deaths from cardiopulmonary disease could be avoided; if it is set at 15 μg/m3, 12,817 deaths from lung cancer and 51,549 deaths from cardiopulmonary diseases could be avoided; and if it is set at 12 μg/m3, 14,464 deaths from lung cancer and 58,640 deaths from cardiopulmonary diseases could be avoided.

7. Medical Engineering

1) Investigation of the feasibility of "cell enhancement" by cultured human & rabbit corneal endothelial cells on a biodegradable membrane to improve the quality of cornea donors: the study demonstrated a novel technique to transplant cultivated HCECs as a cell sheet directly onto rabbit corneas and a promising recovery of corneal clarification; the team also developed a novel strategy for corneal endothelial reconstruction with a bioengineered cell sheet that cultivated human CE cells by temperature-modulated detachment and the results confirmed the availability of fabricating the bioengineered human corneal endothelium in vitro under conditioned thermoresponsive supports.

2) Fluorescence resonance energy transfer (FRET)-based dynamic analysis on pro-inflammatory cytokines in situ following spinal cord injury: The team has developed a quantitative FRET-based methodology for dynamic monitoring of inflammatory cytokines in situ, such as TNF-α, following spinal cord injury; this implementation will dramatically advance the development of effective therapeutics for neuron functional regeneration following spinal cord injury.

3) Interventional MRI (iMRI) research program: iMRI applications integrate various interventional, surgical, and therapeutic devices and equipment with a diagnostic MR imaging system so as to increase the accuracy of various procedures under real-time MR imaging guidance. In the first stage, the team focused on MRI-guided thermal ablation and interventional biopsy procedures, successfully integrating an animal research platform for MR guided HIFU (High Intensity Focused Ultrasound) ablation that is compatible with 3T MRI system. The team filed 5 patent disclosures and developed a prototype for the treatment of uterine fibroids including a set of MR-compatible HIFU probes. The accomplishments have established a successful model for the development of medical devices in Taiwan.

8. Gerontology Research

1) Immunopathogenesis of osteoarthritis — the mechanisms and the therapeutic approaches: The team found that retinoic acid (t-RA) can suppress IL-1-induced iNOS, COX-2, and chemokines production, which indicates that retinoic acid might be able to protect joints from inflammation induced cartilage damage; the team also found that Ginkgo biloba extracts (EGb) preserve immunomodulatory effects in human chondrocytes, mediated through suppression of activator protein 1 (AP-1) signal pathway; these potential immunomodulatory drugs might be useful for clinical treatment of osteoarthritis patients.

2) Skeletal progenitor cell defects and tissue repair in aging: The team's previous study showed that local infusion of IGF-I in old rats can strengthen bone formation; combining IGFBP-3 or IGFBP-5 with IGF-1 can further enhance the effect; the team further explored the effect of IGFBP on old osteoprogenitor cells, and found that PPAR-γ elevation in aging bones might be responsible for the preference of adipogenesis at the expense of osteogenesis, but Wnt10b can repress the expression of PPAR-γ and reverse this phenomenon; Wnt10b can also elevate the expression of Runx2, Dlx5, Osterix factors, and it is considered to be a viable agent for reversing age-related decline in bone-formation capacity.

9. Mental Health Research

1) Epidemiologic study of psychotropic drugs: The study indicates that individual, service provider-, and pharmacological characteristics all play a significant role on the occurrence of long-term use of Benzodiazepines (BZDs). Males, elderly, and those with physical or mental disorders were more likely to become long-term users of BZDs. Having received BZD prescriptions in multiple pharmacological agents, short-acting or mixed-type agents, and hypnotic indication were associated with a roughly 2- to 5- fold increased risk of BZD long-term use (LTU) soon after prescription initiation. With respect to discontinuation, the effects of pharmacological characteristics seem more salient as compared to those of individual and service-provider factors. Future strategies targeting individual factors and modifying service-provider prescription behaviors may be considered to reduce possible negative consequences of BZD LTU.

2) Psychogenomic study on the interaction between antipsychotics and smoking abstinence medication: The results suggest the response to a nicotine skin patch may be associated with one's polymorphism of genotypes CYP2C9, CYP2C19, and CYP2D6.

3) Therapeutic drug monitoring and pharmacogenomics in psychiatry: In an anti-depressant study, the preliminary results suggest that the ABCB1 gene relating to escitalopram drug distribution is associated with the severity of depression; a single nucleotide polymorphism within the gene showed high plasma escitalopram drug concentrations with less remitter than the non-remitter; this indicates that the plasma drug concentration alone may not be a sufficient indicator to predict the treatment outcome; the genetic variations need to be considered for

the individual treatment response.

10. Stem Cell Research

1) A novel FGF1-containing biomaterial nerve conduit — fabrication and in vivo evaluation: FGF1 can be grafted on the polylactide nerve conduit with the assistance of plasma treatment; the technique prolonged the release of growth factor from the conduit; the novel conduit containing FGF1 promotes nerve regeneration and can be used to treat peripheral nerve injury and other neural diseases.

2) PDMCs further immune profiling and chondrogenic differentiation in animal arthritis models: The team isolated human term placenta-derived multipotent cells (PDMCs), which later were differentiated into cells from all 3 germ-layers under the proper conditions; PDMCs were also found harboring significant immune suppressive effects, which may prevent transplantation rejection; the isolation method developed was granted a patent in 2008 and is currently under technology transfer; animal studies on immune reaction and chondrogenesis are ongoing; the PDMCs cells are expected to have the potential to be a source of progenitor/stem cells for therapeutic use.

3) Immuno-modulatory activities of human umbilical cord blood-derived mesenchymal stem cells are mediated by transforming growth factor beta-1 (TGF-β1): The study found that the addition of TGF-b1 into T cell cultures exerted the same responses in the absence of uMSCs; neutralizing antibody against TGF-β1 ameliorated the inhibitory effects of uMSCs; taken together, uMSCs induce CD4+CD25+ regulatory T cells and modulate the immune system by secreting TFF-b1 and activating the downstream signaling pathways.

11. Vaccine Development

1) Mucosal recombinant vaccines against respiratory infectious diseases: The team has successfully developed several viral vectors, including adenovirus, measles virus, and rubella virus for developing mucosal vaccines against respiratory syncytial virus (RSV); the adenovirus-based mucosal RSV vaccine can

effectively induce protective immune responses and prevent RSV infection in mouse model; two patent applications from this project have been filed.

2) Development of dengue vaccines: The team has developed several dengue vaccine candidates based on domain III of dengue E protein; these vaccine candidates can induce neutralizing antibodies against 4 dengue serotypes and have the potential for a tetravalent dengue vaccine development.

12. Nanomedicine Research

1) The team has synthesized nano-sized silica particles with ordered porous structure, which were designed as a new formulation for oral drug delivery vehicle; due to the high surface areas of mesoporous silica nanoparticles (MSN), large amounts of drug molecules can be loaded into the nanochannels; a targeting molecule can be conjugated onto the outside surface of MSN for selective recognition on specific target cells or organs.

2) The team has designed a series of mesoporous silica nanoparticles (MSN) with a controllable drug release function in GI tract; from the variation of pH values in different sections of gastrointestinal tract, the drug molecules can be well protected in the nanochannels under acidic pH of stomach fluid, and then the neutral pH of colon can cause the sustained release of drug molecules; patents for the technology have been filed in the United States and Taiwan; the team has progressively developed intelligent drug delivery system for in vivo tracking, and high efficiency of photodynamic therapy.

13. Immunology Research

1) The team applied molecular methods to assess the expression profiles of Dusp and MAP4k in various immune cells such as Th17 and dendritic cells, followed by correlating the observed dynamic gene expression to related in vitro functions of these cells; the quantitative expression profiling analyses were completed; the team is conducting functional studies of these immune cells in an attempt to establish the possible correlation.

2) The team used genetic approaches to generate conventional or conditional targeted mutations of Dusp and MAP4K knockout mice to search for potential alterations in immune cell development or immune response initiation in these mice, and then study the mechanistic links between gene ablation and phenotype expression.

3) The team established flow cytometry platforms to study surface antigen expressions in in vitro and in vivo differentiated CD4 T cells to search for novel CD4 T cell subsets and to enhance our understanding for CD4 T cell-mediated immune regulation; the flow cytometry platforms have been validated empirically and are already being used to analyze wild type and various knockout mice.

14. Cardiovascular Medicine Research

1) Protective mechanism for cell survival by prostacyclin: The team discovered that activation of PPARδ upregulated 14-3-3ε expression to maintain endothelial cell survival; the protective effect is mediated by Bad sequestration with 14-3-3ε and inhibits Bad

translocation to mitochondria; the protective pathway provides a potential therapeutic application for cardiovascular-, stroke-, and cancer-related diseases.

2) Cysteine-rich protein 2 (CRP2) in vascular smooth muscle cells (VSMCs): Following arterial injury, an absence of CRP2 enhances VSMC migration and increases neointima formation. Thus, upregulating CRP2 expression in the context of vascular injury might serve as a protective mechanism against intimal thickening. The study identified that transforming growth factor β (TGFβ), a factor present in the injured vessel wall, significantly induces CRP2 protein and mRNA expression in VSMCs and that the CRP2 upregulation by TGFβ is controlled at the transcriptional level via a CRE promoter element. Understanding the transcriptional activation of CRP2 may help to elucidate the molecular mechanisms that control VSMC gene expression in vascular diseases.

3) Study of immune system activated by TLR ligands: The results suggest that the Hsp90β// IRF3 dependent pathway plays a central role in CpG ODN-mediated IFN-α/β production; the knowledge obtained from this study is crucial for the development of new preventives and therapeutics.

15. Health Policy Research

1) Pharmacoeconomic and pharmacoepidemiologic research on new medical technology/ new drugs: The study has shown that (1) patients who took Thiazolidinediones, the new drug for DM, may have the risk of higher inpatient rate due to cardiovascular diseases; (2) Clopidogrel, the new drug used for anti-thrombus, is more expensive than the treatment using aspirin and PPI but doesn't result in less-adverse gastrointestinal events; (3) the stool color card screening policy started from 2002 has effectively reduced the medical cost of biliary atresia cases; and (4) the hospitalization rate of the recurrent peptic ulcer patients who received triple therapy was lower than those who did not, and the interval between 2 inpatient incidents was longer.

2) Healthy People 2020: The "Healthy People 2020 White Paper," the "Healthy People 2020 Executive Report," and the "Healthy People 2020 Technical Reports" were published in 2008, with the latter receiving a Best Publication Award from the Department of Health.

3) A study on prevalence, risk factors, medical utilization and health behavior of chronic kidney disease in Taiwan: The major findings include that (1) the prevalence of diabetic nephropathy for type 2 male diabetic cohort is 30.9%; regardless of the duration of DM, smokers have higher risk of developing diabetic nephropathy than non-smokers (OR = 2.28–8.14); (2) the incidence of chronic kidney disease for the participants in the Cardiovascular Disease Risk Factor Two-Township Study is 11.0%; the result of a 6-year follow-up study indicated that the risk factors contributing to chronic kidney diseases including old age, high triglyceride, and high uric acid; and (3) the adiponectin genotype of the CKD high risk group has shown differences among various ethnicities.

Appendixes

Health and Vital Statistics

Table1 Population Statistics

Year	Population	Population Composition			Dependency Ratio	Sex Ratio (per 100 women)	CBR	CDR	NIR	Life Expectancy			Population Density (Persons/ km^2)
		Under 15	15-64	Above 65						Total	Male	Female	
	(1,000)	%	%	%	%		‰	‰	‰	Year	Year	Year	
1995	21,357	23.77	68.60	7.64	45.78	106	15.50	5.60	9.90	74.53	71.85	77.74	590
1996	21,525	23.15	68.99	7.86	44.94	106	15.18	5.71	9.47	74.95	72.38	78.05	595
1997	21,743	22.60	69.34	8.06	44.22	106	15.07	5.59	9.48	75.54	72.97	78.61	601
1998	21,929	21.96	69.79	8.26	43.30	105	12.43	5.64	6.79	75.76	73.12	78.93	606
1999	22,092	21.43	70.13	8.44	42.60	105	12.89	5.73	7.16	75.90	73.33	78.98	610
2000	22,277	21.11	70.26	8.62	42.32	105	13.76	5.68	8.08	76.46	73.83	79.56	616
2001	22,406	20.81	70.39	8.81	42.07	104	11.65	5.71	5.94	76.75	74.06	79.92	619
2002	22,521	20.42	70.56	9.02	41.72	104	11.02	5.73	5.29	77.19	74.59	80.24	622
2003	22,605	19.83	70.94	9.24	40.97	104	10.06	5.80	4.27	77.35	74.77	80.33	625
2004	22,689	19.34	71.19	9.48	40.48	104	9.56	5.97	3.59	77.48	74.68	80.75	627
2005	22,770	18.70	71.56	9.74	39.74	103	9.06	6.13	2.92	77.42	74.50	80.80	629
2006	22,877	18.12	71.88	10.00	39.12	103	8.96	5.95	3.01	77.90	74.86	81.41	632
2007	22,958	17.56	72.24	10.21	38.43	102	8.92	6.16	2.76	78.38	75.46	81.72	634
2008	23,073	16.95	72.62	10.43	37.70	102	8.64	6.25	2.40	(f) 78.5	(f) 75.49	(f) 82.01	637

Notes：1.Economic growth rate is calculated by actual GDP. 2.(f) is Estimates.
Source：Department of Statistics, Ministry of the Interior.

Table 2 Health and Medical Expenditures

Year	Annual Economic Growth Rate	Per Capita GDP	Final Expenditure of Health Care for Private Sector			Net Expenditures of All Government Fiscal Year	Health and Medical Expenditures	Expenditure of DOH and Affiliated Organizations as % of Total Central Government Expenditures	Medical Expenditures as % of GDP	Consumer Price Index	Medical Expenditure Index
				% of GDP	% of Private Consumption						
	%	US $	NT $ million	%	%	NT $ million	%	%	%	2006=100	
1995	6.5	12,906	313,349	4.32	7.43	1,910,066	1.53	0.85	5.32	89.58	76.32
1996	6.3	13,527	355,249	4.47	7.64	1,843,786	1.57	0.78	5.39	92.33	77.60
1997	6.6	13,904	393,237	4.57	7.79	1,878,764	1.51	0.79	5.40	93.17	79.44
1998	4.6	12,679	431,469	4.67	7.94	1,992,593	1.37	0.66	5.48	94.73	80.18
1999	5.8	13,609	469,765	4.87	8.16	2,050,004	1.31	1.15	5.67	94.90	82.96
2000	5.8	14,519	493,863	4.92	8.11	3,140,936	1.28	0.85	5.67	96.09	86.08
2001	-2.2	13,093	516,748	5.24	8.43	2,271,755	1.17	1.07	5.97	96.08	87.23
2002	4.6	13,291	541,498	5.26	8.62	2,144,994	1.29	1.10	5.95	95.89	88.36
2003	3.5	13,587	561,720	5.34	8.84	2,206,223	1.53	1.14	6.09	95.62	91.29
2004	6.2	14,663	586,389	5.30	8.73	2,238,904	1.46	1.15	6.04	97.17	93.09
2005	4.2	15,714	615,803	5.38	8.77	2,278,439	1.20	1.11	6.01	99.41	96.80
2006	4.8	16,111	640,471	5.37	8.92	2,232,586	1.39	1.44	6.14	100.00	100.00
2007	5.7	16,855	672,408	5.32	9.03	2,296,077	1.45	1.61	6.13	101.80	103.91

Source：Annual Financial Report, Ministry of Finance.

Table 3 Medical Facilities

Year	Medical Care Institutions											
		Hospitals							Clinics			
			Western Medicine			Chinese Medicine						
				Public	Private		Public	Private		Western Medicine	Chinese Medicine	Dentistry
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1995	16,109	787	688	94	594	99	1	98	15,322	8,683	1,933	4,706
1996	16,645	773	684	94	590	89	1	88	15,872	9,009	1,987	4,876
1997	17,398	750	667	95	572	83	2	81	16,648	9,347	2,165	5,136
1998	17,731	719	647	95	552	72	2	70	17,012	9,473	2,259	5,280
1999	17,770	700	634	96	538	66	2	64	17,070	9,378	2,317	5,375
2000	18,082	669	617	94	523	52	2	50	17,413	9,402	2,461	5,550
2001	18,265	637	593	92	501	44	2	42	17,628	9,425	2,544	5,659
2002	18,228	610	574	91	483	36	2	34	17,618	9,287	2,601	5,730
2003	18,777	594	558	91	467	36	2	34	18,183	9,565	2,729	5,889
2004	19,240	590	556	88	468	34	2	32	18,650	9,819	2,852	5,979
2005	19,433	556	531	79	452	25	1	24	18,877	9,948	2,900	6,029
2006	19,682	547	523	79	444	24	1	23	19,135	10,066	3,006	6,065
2007	19,900	530	507	79	428	23	1	22	19,370	10,197	3,069	6,104
2008	20,174	515	493	79	414	22	1	21	19,659	10,326	3,160	6,173

Source：Office of Statistics, Department of Health

Table 3 Medical Facilities (Continued)

Year	Hospitals by Accreditation																	
	Medical Centers		Regional Hospitals		District Hospitals		District Teaching Hospitals		New Hospital Accreditation -Excellent		New Hospital Accreditation-Qualified		Psychiatric Hospitals		New Hospital Accreditation of Psychiatry-Excellent		New Hospital Accreditation of Psychiatry-Qualified	
	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
1995	14	19,375	44	22,342	505	44,750	63	15,860	…	…	…	…	30	8,368	…	…	…	…
1996	14	19,919	45	24,099	479	44,369	68	18,463	…	…	…	…	28	8,126	…	…	…	…
1997	16	22,151	51	28,282	468	42,834	69	17,514	…	…	…	…	26	8,348	…	…	…	…
1998	17	23,405	51	28,974	469	44,621	67	18,143	…	…	…	…	27	8,395	…	…	…	…
1999	18	24,555	51	27,883	426	42,327	66	18,446	…	…	…	…	32	8,709	…	…	…	…
2000	23	27,473	63	33,820	387	36,080	49	13,277	…	…	…	…	32	9,399	…	…	…	…
2001	24	28,389	66	35,381	401	36,104	47	13,168	…	…	…	…	35	9,703	…	…	…	…
2002	23	29,398	71	40,761	385	35,860	41	11,468	…	…	…	…	36	9,450	…	…	…	…
2003	23	30,301	72	42,158	372	34,922	42	11,765	…	…	…	…	37	10,493	…	…	…	…
2004	24	31,195	72	43,628	359	35,952	42	12,594	…	…	…	…	37	10,879	…	…	…	…
2005	22	30,552	64	39,536	352	38,584	41	13,453	…	…	…	…	38	11,153	…	…	…	…
2006	24	31,786	55	37,616	344	37,602	37	11,961	-	-	15	7,198	37	11,176	-	-	-	-
2007	23	32,439	20	14,970	306	28,254	23	7,714	24	15,979	59	24,683	29	7,239	7	3,537	4	1,092
2008	17	22,565	-	-	208	16,129	8	2,189	51	35,435	146	33,610	3	1,006	7	3,537	30	7,473

Notes：New Hospital Accreditation System was implemented in 2006.

Source：Office of Statistics, Department of Health.

Table 3 Medical Facilities (Continued)

Year	Health Stations					No. of Beds					Per 10,000 population								
							No. of Beds in Hospitals			No. of Observation Beds in Clinics		Hospital Beds							Clinics
		Taiwan Province	Taipei City	Kao-hsiung City	Kinmen Matsu			Public	Private			Acute general beds	Acute psychiatric beds	Chronic general beds	Chronic psychiatric beds	Special beds	Hemodialysis beds	
	No.	No.	No.	No.	No.	Beds	Beds	Beds	Beds	Beds	Beds	Beds	Beds	Beds	Beds	Beds	Beds	Beds
1995	369	338	12	11	8	112,379	101,430	39,922	61,508	10,949	52.78	30.12	1.22	2.38	5.01	7.16	1.76	5.13
1996	369	338	12	11	8	114,923	104,111	40,125	63,986	10,812	53.39	30.61	1.59	2.18	4.49	7.60	1.90	5.02
1997	369	338	12	11	8	121,483	108,536	41,421	67,115	12,947	55.87	30.46	1.73	2.38	4.71	8.58	2.06	5.95
1998	369	338	12	11	8	124,564	111,941	42,838	69,103	12,623	56.80	30.98	1.80	2.29	5.11	8.76	2.10	5.76
1999	369	338	12	11	8	122,937	110,660	39,440	71,220	12,277	55.65	30.84	2.10	2.28	3.93	8.63	2.32	5.56
2000	369	338	12	11	8	126,476	114,179	40,129	74,050	12,297	56.77	31.03	2.25	2.40	4.38	8.61	2.59	5.52
2001	363	332	12	11	8	127,676	114,640	39,670	74,970	13,036	56.99	30.27	2.27	2.17	4.44	9.24	2.77	5.82
2002	363	332	12	11	8	133,398	119,847	41,904	77,943	13,551	59.24	30.89	2.37	2.19	4.70	10.13	2.93	6.02
2003	372	340	12	12	8	136,331	121,698	42,777	78,921	14,633	60.31	30.77	2.46	1.91	4.89	10.74	3.08	6.47
2004	372	339	12	12	9	143,343	127,667	43,865	83,802	15,676	63.18	31.87	2.59	1.95	5.13	11.55	3.19	6.91
2005	372	339	12	12	9	146,382	129,548	44,273	85,275	16,834	64.29	31.80	2.64	1.94	5.51	11.75	3.26	7.39
2006	372	339	12	12	9	148,962	131,152	44,076	87,076	17,810	65.12	31.88	2.65	1.83	5.71	11.87	3.39	7.79
2007	372	339	12	12	9	150,628	131,776	44,873	86,903	18,852	65.61	31.94	2.77	1.75	5.78	11.52	3.48	8.21
2008	372	339	12	12	9	152,901	133,020	45,450	87,570	19,881	66.37	31.87	2.86	1.71	5.93	11.69	3.53	8.63

Source：Office of Statistics, Department of Health.

Table 4 No. of Medical Personnel in Practice

Year	No. of Medical Care Personnel												
		Physicians	Chinese Medicine Doctors	Population Served per Physician (including Chinese Medicine Doctors)	Dentists	Population Served per Dentist	Pharmaceutical Personnel	Population Served per Pharmaceutical Personnel	Nursing Personnel	Population Served per Nursing Personnel	Medical Technologists (Including Assistants)	Medical Radiological Technologists (including Technicians)	Dietitians
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
1995	118,242	24,465	3,030	777	7,026	3,040	19,224	1,111	57,585	371	4,722	1,793	298
1996	123,829	24,790	2,992	775	7,254	2,967	19,667	1,094	62,268	346	5,034	1,453	293
1997	137,829	25,730	3,299	749	7,573	2,871	21,246	1,023	70,447	309	5,389	2,266	515
1998	144,070	27,168	3,461	716	7,900	2,776	22,761	963	71,919	305	5,583	2,485	575
1999	152,385	28,216	3,546	696	8,240	2,681	23,937	923	76,252	290	6,015	2,500	656
2000	159,212	29,585	3,733	669	8,597	2,591	24,404	913	79,734	279	6,230	2,761	743
2001	165,855	30,562	3,979	649	8,944	2,505	24,891	900	83,281	269	6,542	3,152	778
2002	175,444	31,532	4,101	632	9,206	2,446	25,355	888	90,058	250	6,725	3,410	845
2003	183,103	32,390	4,266	617	9,551	2,367	25,033	903	95,747	236	7,055	3,557	895
2004	192,611	33,360	4,588	598	9,868	2,299	26,079	870	101,924	223	7,122	3,704	978
2005	199,734	34,093	4,610	588	10,141	2,245	26,750	850	105,183	216	7,323	3,880	1,056
2006	206,959	34,899	4,743	577	10,412	2,197	27,412	835	109,521	209	7,457	4,052	1,137
2007	214,748	35,849	4,862	567	10,740	2,138	28,040	819	114,179	201	7,642	4,211	1,239
2008	223,623	37,142	5,112	545	11,093	2,077	28,741	802	119,093	193	7,896	4,443	1,379

Source：Office of Statistics, Department of Health.

Table 5 Pharmaceutical Affairs

Year	No.of Pharmaceutical Firms									
		Pharmacies			Medicine Dealers			Pharmaceutical Manufactures		
			Owned and Operated by Pharmacists	Owned and Operated by Assistant Pharmacists	Western Medicines	Chinese Medicines	Medicial Devices	Western Medicines	Chinese Medicines	Medicial Devices
	Store	Store	Store	Store	Store	Store	Store	Store	Store	Store
1995	34,846	4,862	2,386	2,476	9,074	9,631	10,609	253	249	168
1996	37,176	6,438	3,243	3,195	7,563	9,585	12,948	242	238	162
1997	38,583	6,707	3,443	3,264	7,020	9,123	15,098	243	218	174
1998	39,027	6,434	3,436	2,998	6,466	9,217	16,262	243	217	188
1999	40,322	6,349	3,422	2,927	6,457	9,229	17,627	244	208	208
2000	43,641	6,397	3,491	2,906	6,359	11,161	19,016	243	207	258
2001	47,130	6,440	3,600	2,840	6,524	12,864	20,560	257	202	283
2002	49,752	6,990	3,983	3,007	6,526	13,202	22,268	244	200	322
2003	51,447	7,155	4,193	2,962	6,751	12,799	23,950	243	171	378
2004	52,685	7,435	4,465	2,970	6,759	12,712	24,924	244	171	440
2005	55,802	7,673	4,691	2,982	6,875	12,682	27,641	241	150	540
2006	57,976	7,397	4,598	2,799	6,941	12,577	30,062	238	129	632
2007	59,061	7,381	4,663	2,718	6,848	12,505	31,280	244	121	682
2008	58,834	7,251	4,628	2,587	6,630	12,234	31,650	245	111	749

Notes：No. of pharmacies in 2008 includes 2,411 part-time Chinese medicine dealers.

Source：Office of Statistics, Department of Health.

Table 6 Food Sanitation

Year	Laboratory Testing for Food Sanitation		Inspections for Food Sanitation Establishments							Incidents of Food Poisoning		
		Disqualified		Disqualified							No.of Cases	No.of Deaths
				To be Improved		Fined		Suspended				
	Piece	%	Store	Store	%	Store	%	Store	%	Piece	Person	Person
1995	40,410	10.51	237,189	20,390	8.60	1,316	0.55	6	0.00	123	4,950	-
1996	38,475	10.11	210,942	22,229	10.54	2,903	1.38	95	0.05	178	4,043	-
1997	38,606	10.49	197,042	16,582	8.42	1,051	0.53	29	0.15	234	7,235	1
1998	38,141	8.72	179,485	16,821	9.37	1,035	0.58	34	0.02	180	3,951	-
1999	37,773	8.09	181,818	19,020	10.46	37	0.02	10	0.01	150	3,112	1
2000	67,020	4.42	181,865	20,363	11.20	152	0.08	8	0.00	208	3,759	3
2001	34,907	8.56	166,195	20,069	12.08	104	0.06	59	0.04	178	2,955	2
2002	33,971	8.57	158,583	15,978	10.08	69	0.04	9	0.01	262	5,566	1
2003	36,220	10.06	177,102	15,525	8.77	104	0.05	8	0.00	251	5,283	-
2004	37,158	6.89	150,698	13,426	8.91	118	0.07	10	0.00	274	3,992	2
2005	39,395	6.36	182,575	15,218	8.34	51	0.03	5	0.00	247	3,530	1
2006	39,539	…	165,208	24,376	14.75	108	0.07	19	0.01	265	4,401	-
2007	38,729	…	156,794	27,769	17.71	94	0.06	11	0.01	240	3,223	-
2008	43,545	6.04	143,779	34,177	23.77	65	0.05	81	0.06	269	2,921	-

Source：Office of Statistics, Department of Health.

Table 7 Health and Social Insurance

Year	No.of Persons Under Social Insurance		No. of Outpatient Visits per 100 Insured Persons	No. of Inpatients per 100 Insured persons	Average Costs Per Outpatient Visit	Average Costs Per Inpatient Care	Average Days of Hospital Stay
		As % of Total Population	National Health Insurance	National Health Insurance	National Health Insurance	National Health Insurance	National Health Insurance
	1000 Persons	%	No.	No.	No.	No.	No.
1995＊	19,123	89.54	1,055.81	10.14	530	29,418	9.41
1996	20,041	93.11	1,360.89	11.72	549	31,935	9.03
1997	20,492	94.25	1,431.49	11.61	557	32,760	8.75
1998	20,757	94.66	1,499.66	11.83	588	34,851	8.78
1999	21,090	95.46	1,527.86	12.28	614	36,098	8.68
2000	21,401	96.07	1,472.20	12.57	631	36,478	8.73
2001	21,654	96.64	1,449.86	13.00	659	37,169	8.83
2002	21,869	97.11	1,451.80	13.47	707	39,160	9.05
2003	21,984	97.26	1,432.15	12.44	746	43,343	9.64
2004	22,134	97.55	1,549.52	13.60	776	46,914	9.70
2005	22,315	98.00	1,546.96	13.35	792	49,212	9.86
2006	22,484	98.29	1,467.87	12.95	840	50,216	9.92
2007	22,803	99.32	1,480.50	13.02	857	50,809	10.02
2008	22,918	99.48	1,488.08	13.30	899	51,475	10.24

Notes： ＊Date is for March to December only for the year 1995.
Source：Bureau of National Health Insurance.

Table 8 Causes of Death

Year	All Causes		Malignant Neoplasms			Hart Diseases			Cerebrovascular Diseases			Pneumonia			Diabetes Mellitus		
	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000
1995	117,954	554.6	1	25,841	121.5	4	11,256	52.9	2	14,132	66.5	8	3,070	14.4	5	7,225	34.0
1996	120,605	562.5	1	27,961	130.4	4	11,273	52.6	2	13,944	65.0	8	3,200	14.9	5	7,525	35.1
1997	119,385	551.8	1	29,011	134.1	4	10,754	49.7	2	12,885	59.6	7	3,619	16.7	5	7,500	34.7
1998	121,946	558.5	1	29,260	134.0	3	11,030	50.5	2	12,705	58.2	7	4,447	20.4	5	7,532	34.5
1999	124,991	567.9	1	29,784	135.3	4	11,299	51.3	3	12,631	57.4	7	4,006	18.2	5	9,023	41.0
2000	124,481	561.1	1	31,554	142.2	3	10,552	47.6	2	13,332	60.1	8	3,302	14.9	5	9,450	42.6
2001	126,667	567.0	1	32,993	147.7	3	11,003	49.3	2	13,141	58.8	8	3,746	16.8	5	9,113	40.8
2002	126,936	565.1	1	34,342	152.9	3	11,441	50.9	2	12,009	53.5	7	4,530	20.2	4	8,818	39.3
2003	129,878	575.6	1	35,201	156.0	3	11,785	52.2	2	12,404	55.0	7	5,099	22.6	4	10,013	44.4
2004	133,679	590.3	1	36,357	160.5	2	12,861	56.8	3	12,339	54.5	6	5,536	24.4	4	9,191	40.6
2005	138,957	611.3	1	37,222	163.8	3	12,970	57.1	2	13,139	57.8	6	5,687	25.0	4	10,501	46.2
2006	135,071	591.8	1	37,998	166.5	3	12,283	53.8	2	12,596	55.2	6	5,396	23.6	4	9,690	42.5
2007	139,376	608.2	1	40,306	175.9	2	13,003	56.7	3	12,875	56.2	6	5,895	25.7	4	10,231	44.6
2008	142,283	618.7	1	38,913	169.2	2	15,726	68.4	3	10,663	46.4	4	8,661	37.7	5	8,036	34.9

Notes：Data organized by ICD-10 since 2008
Source：Office of Statistics, Department of Health .

Table 8 Causes of Death (Continued)

Year	Accidents and adverse effects			Chronic diseases of lower respiratory tract			Chronic liver diseases and cirrhosis			Suicide and Self Inflicted Injury			Nephritis, nephrotic syndrome and nephrosis		
	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000	Order	No.of Deaths	Mortality per 100,000
1995	3	12,983	61.1	…	4,017	18.9	6	4,456	21.0	11	1,618	7.6	7	3,519	16.6
1996	3	12,422	57.9	…	4,310	20.1	6	4,610	21.5	11	1,847	8.6	7	3,547	16.5
1997	3	11,297	52.2	…	4,457	20.6	6	4,767	22.0	10	2,172	10.0	8	3,504	16.2
1998	4	10,973	50.3	…	4,961	22.7	6	4,940	22.6	10	2,177	10.0	8	3,435	15.7
1999	2	12,960	58.9	…	5,046	22.9	6	5,180	23.5	9	2,281	10.4	8	3,474	15.8
2000	4	10,515	47.4	…	4,717	21.3	6	5,174	23.3	9	2,471	11.1	7	3,872	17.5
2001	4	9,513	42.6	…	5,159	23.1	6	5,239	23.5	9	2,781	12.5	7	4,056	18.2
2002	5	8,489	37.8	…	5,226	23.3	6	4,795	21.4	9	3,053	13.6	8	4,168	18.6
2003	5	8,191	36.3	…	5,192	23.0	6	5,185	23.0	9	3,195	14.2	8	4,306	19.1
2004	5	8,453	37.3	…	5,292	23.4	7	5,351	23.6	9	3,468	15.3	8	4,680	20.7
2005	5	8,364	36.8	…	5,484	24.1	7	5,621	24.7	9	4,282	18.8	8	4,822	21.2
2006	5	8,011	35.1	…	4,969	21.8	7	5,049	22.1	9	4,406	19.3	8	4,712	20.7
2007	5	7,130	31.1	…	4,914	21.4	7	5,160	22.5	9	3,933	17.2	8	5,099	22.3
2008	6	7,077	30.8	7	5,374	23.4	8	4,917	21.4	9	4,128	17.9	10	4,012	17.5

Source：Office of Statistics, Department of Health .

Table 9 International Comparison

Year	Life Expectancy												Crude Birth Rate					
	Taiwan		Japan		USA		Germany		UK		South Korea		Taiwan	Japan	USA	Germany	UK	South Korea
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female						
	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	‰	‰	‰	‰	‰	‰
1995	71.9	77.7	76.4	82.9	72.5	78.9	73.3	79.7	74.0	79.2	69.6	77.4	15.5	9.6	14.8	9.4	12.6	16.0
1996	72.4	78.0	77.0	83.6	73.1	79.1	73.6	79.9	74.3	79.5	70.1	77.8	15.2	9.7	14.7	9.7	12.6	15.3
1997	73.0	78.6	77.2	83.8	73.6	79.4	74.0	80.3	74.6	79.6	70.6	78.1	15.1	9.5	14.5	9.9	12.5	14.8
1998	73.1	78.9	77.2	84.0	73.8	79.5	74.5	80.6	74.8	79.8	71.1	78.5	12.4	9.6	14.6	9.7	12.3	13.8
1999	73.3	79.0	77.1	84.0	73.9	79.4	74.7	80.7	75.0	79.8	71.7	79.2	12.9	9.4	14.5	9.4	11.9	13.2
2000	73.8	79.6	77.7	84.6	74.1	79.5	75.0	81.0	75.5	80.2	72.3	79.6	13.8	9.5	14.4	9.3	11.5	13.4
2001	74.1	79.9	78.9	84.9	74.4	79.8	75.6	81.3	75.7	80.4	72.8	80.0	11.7	9.3	14.1	8.9	11.3	11.6
2002	74.6	80.2	78.3	85.2	74.5	79.9	75.6	81.6	75.8	80.5	73.4	80.5	11.0	9.2	14.2	9.0	11.3	10.3
2003	74.8	80.3	77.6	84.4	74.4	80.1	75.5	81.4	75.7	80.7	73.9	80.8	10.1	8.9	14.1	8.6	11.7	10.2
2004	74.7	80.8	78.0	85.0	75.0	80.0	76.0	82.0	76.0	81.0	74.5	81.4	9.6	8.8	14.0	8.5	12.0	9.8
2005	74.5	80.8	78.5	85.5	74.9	80.7	75.7	81.8	75.9	81.0	75.1	81.9	9.1	8.4	13.9	8.4	12.0	9.0
2006	74.9	81.4	78.0	84.7	75.0	80.8	75.8	82.0	76.1	81.1	75.7	82.4	9.0	8.7	14.2	8.2	12.4	9.2
2007	75.5	81.7	…	…	…	…	…	…	…	…	…	…	8.9	…	…	…	…	…
2008	(f)75.5	(f)82.0	…	…	…	…	…	…	…	…	…	…	8.6					

Source：WHO (The World Health Report 2005) .

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