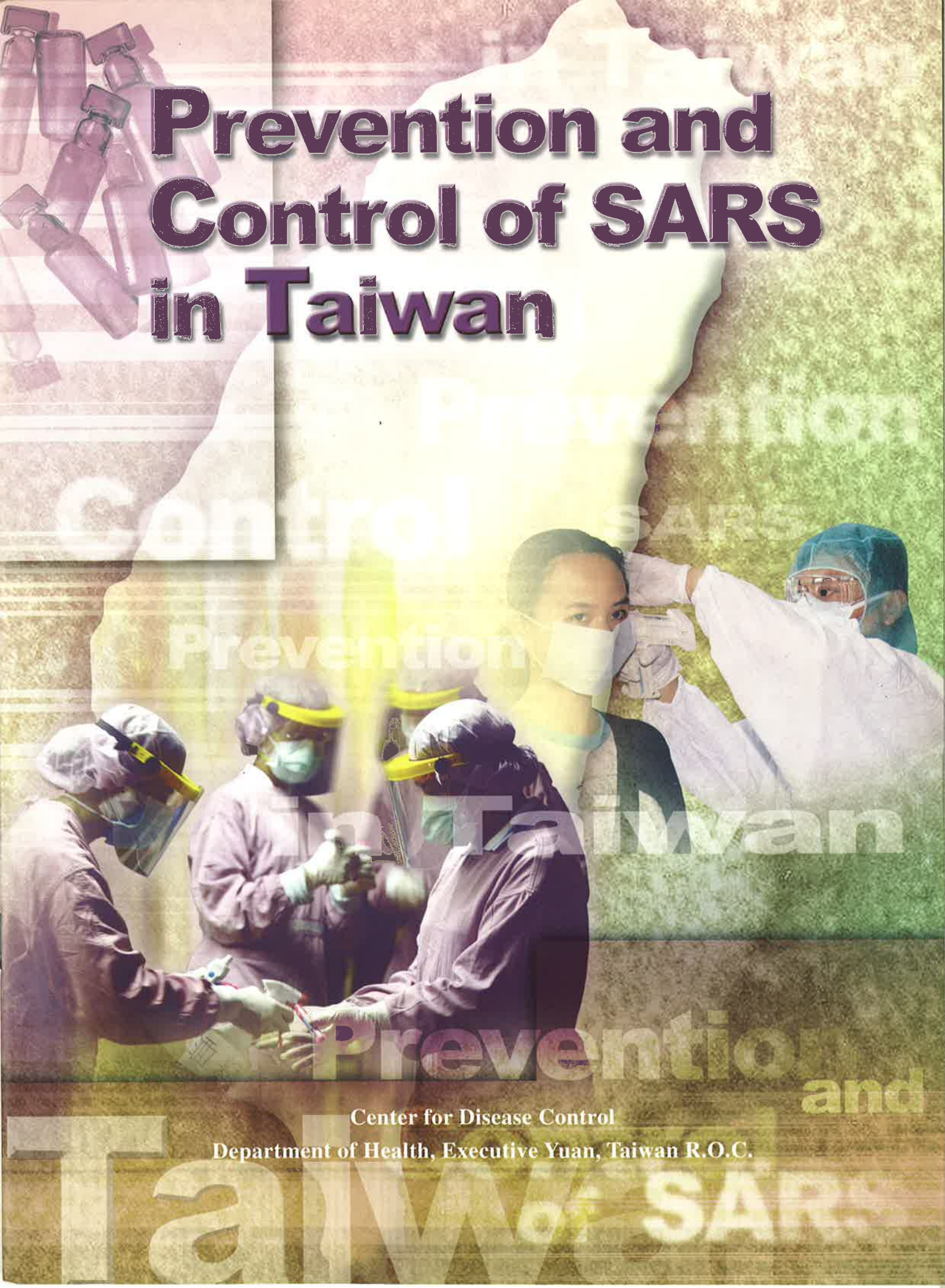
Prevention and Control of SARS in Taiwan



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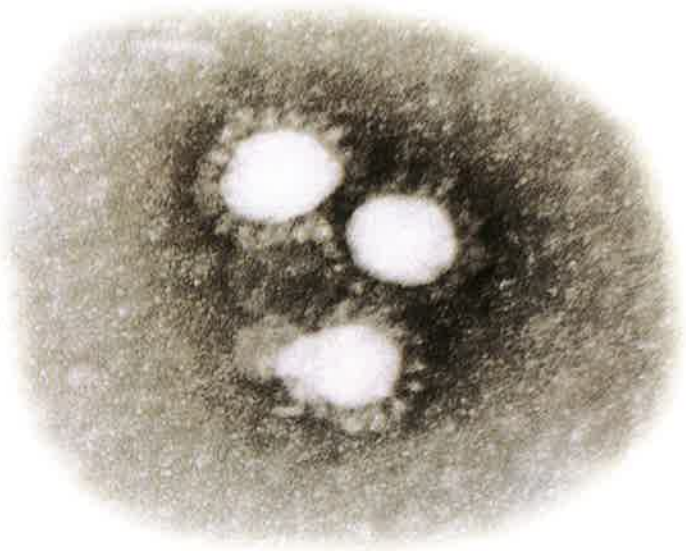

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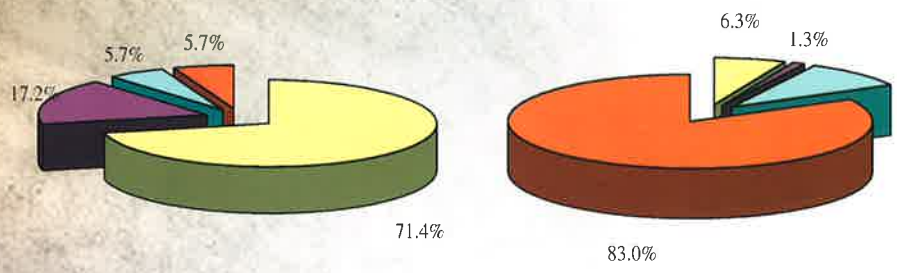
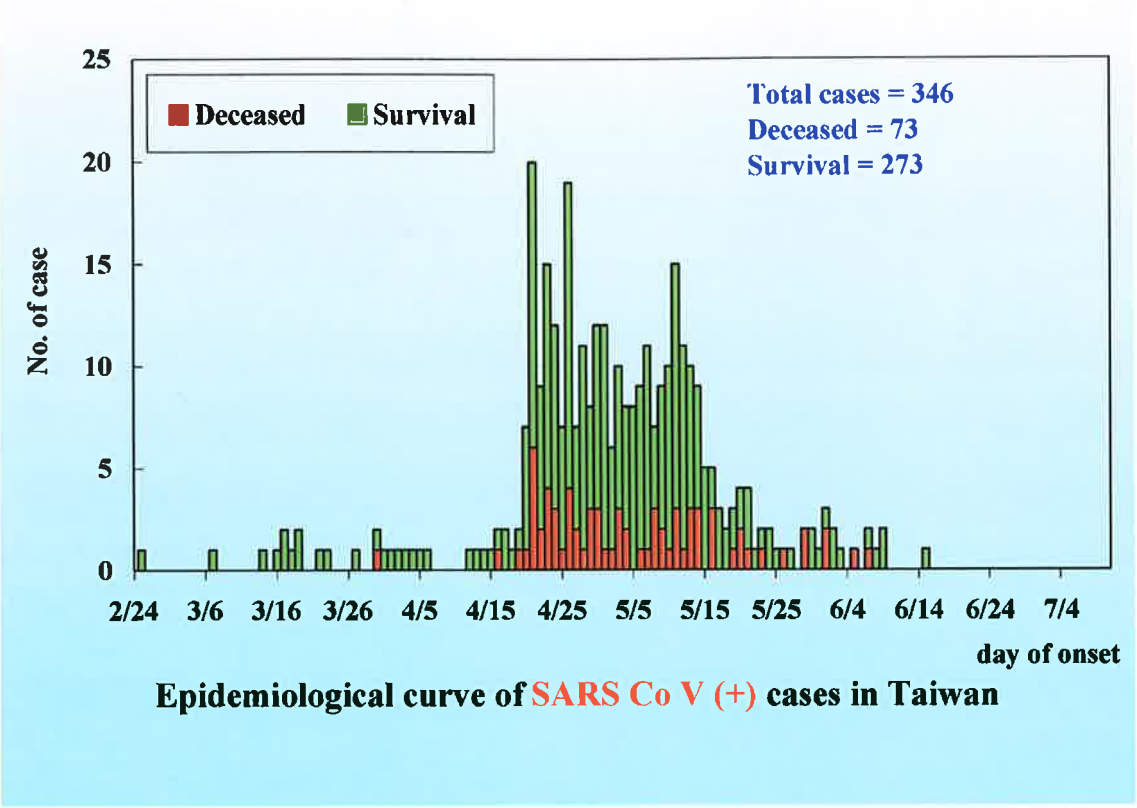
I. Analysis of the Epidemic

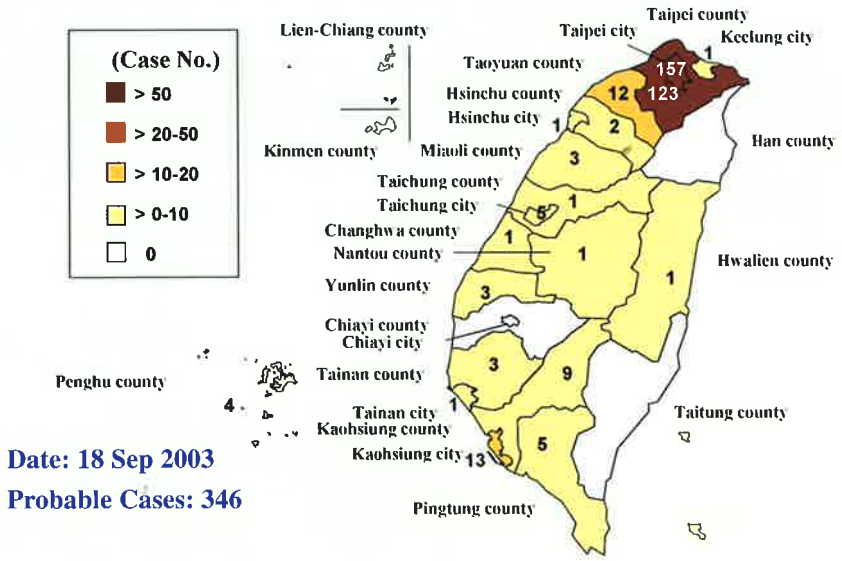
Since the National Taiwan University Hospital reported Taiwan's first suspected case of SARS on March 10, 2003, the cumulative number of probable cases had reached 346 by September 18. By route of transmission, before the outbreak of the Taipei Municipal Hoping Hospital on April 22, most of the reported cases were sporadic probable cases imported from abroad, accounting for about 71.4 percent. A few cases were family members, friends, and medical workers in close contact with patients. However, since the outbreak of the Taipei Municipal Hoping Hospital and subsequent cases of nosocomial infection, the situation changed and deteriorated rapidly, with nosocomial infection accounting for about 83 percent of all probable cases. Only after considerable effort by many parties did the epidemic gradually began to subside on May 20.



Analysis of Infection Sources in Probable SARS Cases in Taiwan



Epidemiological curve of SARS Co V (+) cases in Taiwan



Geographical Distribution of SARS Probable Cases in Taiwan

Medical personnel employ strict protective measures in the transportation of SARS patients.

Fatality Rate of Probable SARS Cases in Taiwan

Date:Sep. 4, 2003

	Number of cases A	Number of deaths B	Fatality rate B/A (%)
Total	346	73	21.1
Gender			
Female	218	34	15.6
Male	128	39	30.5
Age			
0-9 yrs	3		
10-19 yrs	15		
20-29 yrs	82	7	8.5
30-39 yrs	68	5	7.4
40-49 yrs	79	12	15.2
50-59 yrs	44	16	36.4
60-69 yrs	20	11	55.0
70-79 yrs	23	14	60.9
80~ yrs	12	8	66.7

II. Organizational Structure

1. On March 17, 2003, the Department of Health set up a SARS Coordination Center to integrate resources of the administration, the academic, medical, and private sectors to fight SARS.
2. On April 28, 2003, the Executive Yuan established a SARS Prevention and Relief Committee with Premier Yu Shyi-kun serving as its convener to coordinate and mobilize the Cabinet in the fight against SARS.

President Chen Shui-bian takes part in a meeting of the SARS Prevention and Relief Committee.

III. Legislation

On March 28 2003, the Department of Health classified SARS as a Type-4 notifiable communicable disease. On August 19 2003, SARS was redefined as a Type-1 notifiable communicable disease after its etiology and control measure had been confirmed.

In addition, Article 8 of the "Communicable Disease Control Rewarding Guidelines" and "Communicable Disease Isolation Hospitals Regulations" were modified to facilitate the implementation of administrative orders and

rewarding guidelines. Moreover, "The Detailed Implementation of the Law on the Control of Communicable Diseases" was set up and the draft of " Implementation Regulations on the Surveillance and Early Warning System for Communicable Diseases" received a second revision.

The "Provisional Regulations Governing the Prevention and Relief of SARS" was announced on May 2 2003 in response to the great impact brought by SARS outbreak. On June 18, its revision was published. The temporary regulations were effective on March 1 2003 and would be expired on December 31 2003 because they were supplementary to the Law and Act. On the other hand, the Center for Disease Control under the Department of Health had been actively revising the Law on the Control of Communicable Disease and would soon submit the proposed revision to the Legislative Yuan for review.

IV. Prevention Strategies

1. Quarantine

(1) Arriving passengers were required to complete a SARS survey form and were checked for temperature.

(2) Passengers arriving from SARS-affected areas were subject to 10-day home quarantine between April 28 2003 and July 3 2003. Beginning June 24, home quarantine was switched to vigilance for fever (i.e. measuring temperature twice daily) and respiratory symptoms for ten days

(3) Aircraft was disinfected following the Operational Procedures for the Disinfection of Aircraft Carrying Suspected SARS Patients announced on April 14, 2003.

Temperature scanners monitor air travelers as they wait to pass through immigration.

2. Monitoring

(1)Follow-up of cases was strengthened through reporting, investigation, and cross-checking against the national health insurance database.

(2)A national campaign of temperature-taking was initiated to check for fever.

Top to bottom:

Temperature readings play a vital role in preventing transmission at public events. Here, Premier Yu Shyi-kun has his temperature taken.

A national temperature-taking campaign has been launched to check the transmission of SARS through early identification of possible cases.

Free bleach is distributed for household sterilization.

At the Kunyang Street branch of the Center for Disease Control, staff equipped with protective clothing and oxygen tanks work on unraveling the secrets of the mysterious new virus.

Special organizations and groups were required to report cases with fever. Unusual increases were followed-up and monitored.

(3) The Taiwan Medical Association had been asked to set up a fever hotline, 177, for more professional counseling on the control of SARS.

3. Medical Care

A set of Guidelines on the Medication of SARS was formulated for the reference of medical care institutions. Contents of the guidelines included matters such as antiviral therapy, immunomodulating agents, and respiratory care including oxygen therapy, indications for intubation, post-intubation respiratory care, and principles for the removal of respirators.

SARS patients on offshore islands are transported by helicopter to Taiwan proper for medical treatment. (Central News Agency)

(1) Medical Care by Level

a.Fever screening stations had been set up in Taiwan's 136 hospitals at the district teaching level and above.

b.A plan for the medical care of SARS by level had been formulated and implemented to facilitate the efficient use of medical care resources.

c.The National Air Rescue Counseling Center had been requested to review and assess SARS patients on offshore island for transporting to Taiwan for treatment. The International SOS Rescue Organization was responsible for the air rescue.

(2) Control of Nosocomial Infection

a.Medical centers provided assistance and supervision to Taiwan's 69 regional hospitals. The regional hospitals in turn provided supervision to local hospitals in their districts in establishing an epidemic check and control network to enhance the understanding and control of nosocomial infection.

b.Facilities for the medical care of SARS by level and mechanism for

Outdoor emergency stations help minimize the chances of infection within hospitals. (Central News Agency)

Transmission Control had been established for the regular inspections of the quality of quarantine facilities, equipment, and operations at the designated SARS hospitals.

(3) Control of Community Transmission

A set of Procedures for the Management of Community Transmission of SARS and another set of Measures and Principles for the Management of Community Transmission of SARS were formulated to handle community transmission of SARS.

(4) Installation of "Communicable Disease Medical Network"

It was set up to activate medical care by level.

a. Primary Communicable Disease Medical Network Activation:
The infected patients would receive prior treatment at the beginning of the disease outbreak.

b. Secondary Communicable Disease Medical Network Activation:
The secondary communicable disease medical network would be activated when the epidemic spreads.

c. Tertiary Communicable Disease Medical Network Activation:
The tertiary communicable disease medical network would be activated when all the wards at the hospitals under primary and secondary epidemic network were occupied to allow more infected patients to receive hospitalization.

d. Quaternary Communicable Disease Medical Network Activation:
The Executive Yuan would activate the negative pressure rooms at the national medical centers in accordance with the needs of the disease outbreak.

4. Laboratory Diagnosis

On March 24, 2003, the US announced that the cause of SARS was a mutated coronavirus. A mutated coronavirus was also detected in family members of the first SARS case in Taiwan. The US CDC also confirmed the existence of this new form of coronavirus in specimens collected in Taiwan.

In mid-April, real-time PCR was used for the screening of SARS infection. Two systems were used in parallel. A report was issued only when the two systems produced the same result. When the results differ, nested RT-PCR was used for further confirmation.

On April 9, 2003, Taiwan cultured the first strain of SARS coronavirus in Vero-E6. By the end of May, 11 strains of coronavirus had been cultured and

People quarantined at the Third-phase Jihe Public Housing Project relax outside on the balconies, enjoying the fresh air and sharing words of encouragement. (Central News Agency)

the full sequence of 29,714 nucleotides for each strain had been determined to help understand the sources of the SARS epidemic in Taiwan.

In viral serology, in addition to an IFA test, a fast SARS antibody test kit was developed, which could produce results within 20 minutes. Preliminary successes had also been achieved with both EIA and neutralization tests. Practical applications were expected in the near future.

5. Home quarantine

All probable and suspected SARS cases recently discharged from hospital, and persons who might have come into contact with a SARS patient or an infected environment through living arrangements, medical care, or hospital

Experts from the World Health Organization and the US Centers for Disease Control and Prevention attend a meeting of the SARS Prevention and Relief Committee.

visits, were subject to home quarantine. They were issued a notice of home quarantine. Health and social affairs authorities deliver food and daily also necessitiesto to those under home quarantine. Authorities also installed remote video monitors in quarantine households. Subsidies were paid to those who had completed the home quarantine process for the satisfactory implementation of the home quarantine policy.

6. Health Education and Training

The Executive Yuan had consolidated information on SARS and set up a single integrated Severe Acute Respiratory Syndrome website at www.gov.tw/sars/. The site took advantage of the Internet technology to overcome the barriers of time and distance and provide the public with the latest information on SARS. Mass media such as TV, newspapers, leaflets, posters, and radio had been extensively used for public education. A platform for announcing news on the SARS outbreak and preventive measures had been established by the Department of Health. The Department also held daily press conferences at a set time to consolidate all information. A SARS prevention TV program was broadcast daily at regular hours to announce government measures and policies aiming at countering the epidemic.

A Department of Health SARS education and training program for professional staff had been formulated especially for medical teams in hospitals. The training included care of SARS patients, protection for medical personnel, the establishment of SARS prevention boundaries, self-protection measures,

The Department of Health hosts an International Symposium on SARS Outbreaks to encourage the exchange of ideas and opinions on SARS prevention and control.

and clinical procedures. The training program was available on the Internet to educate doctors and nurses. CDs had also been made available to all medical care institutions.

The home countries of foreign caregivers had been asked to conduct SARS prevention and control courses for caregivers before they come to Taiwan. SARS prevention materials had been printed in Chinese, Tagalog, Indonesian, Thai, and Vietnamese for distribution to employers, foreign labor brokers, and churches for reference of foreign caregivers.

(1) Promotion Medium:

a. Printed Materials — The message of SARS control was promoted and reinforced through publication of newspaper, magazines, posters, handbooks, leaflets, red banners and various memoirs. There were altogether 78 advertisements and articles about SARS control published on the newspaper, numerous reports on magazines during the period of March through July, handbooks for public transportation such as railway, mass rapid transport (MRT) and airplane, and publication of cards of care to support the family of the SARS patients.

b. Media — SARS control education was further reinforced through television, radio and LED displays. Educational CD-ROMs were also produced and available at school for distribution to the general public. Health care authorities were interviewed on television and

radio station to further strengthen SARS control. SARS prevention television programs were produced and broadcasted to announce government measures and policies that counter the epidemic.

c. "SARS Information Network" and "SARS News" were set up on the website to facilitate public access to the latest SARS update.

d. Enhancing SARS control by broadcasting promotion short films through means of corporations such as LED displays or websites.

e. The local bodies and communities cooperated on arranging a variety of promotion activities.

f. Different forms of press conferences were held regularly to provide the general public with updated disease control policies and implementation.

(2) Promotion Content:

The content of health education promotion varied according to different groups of targeted audience which could be categorized into the general public, students, soldiers, white-collars and blue collars, medical personnel, women, businessmen who frequently travel between China and Taiwan, travelers and foreigners. On the other hand, "Prevention and Control of SARS in Taiwan" was published and its copies were distributed to the participants at the WHO Global Conference on SARS held in Kuala Lumpur on June 16 to share our SARS control experiences in Taiwan with the foreigners.

7. **Compensation for Medical Personnel and Relief Measures for Industries**

The impact of SARS on industries such as airlines, travel agents, restaurants, hospitals and society as a whole had been enormous. The government had decided to provide them with relief measures and tax subsidies to assist businesses in overcoming this crisis. Subsidies and allowances were awarded to medical personnel to encourage doctors and nurses to join the battle against SARS, and to show appreciation for their contributions in the fight against SARS.

8. **Technology and Research**

(1) SARS research had been included in the national genomic and medical technology program to focus full efforts on SARS research.

(2) The Department of Health had brought together experts from all fields to conduct research on SARS. Research would focus on the following areas:

a. Epidemiology of SARS infection
b. Research and development of diagnostic tests for SARS
c. Pathogenesis of SARS
d. Development of drug screening programs
e. Research and development of a SARS vaccine
f. Establishment of a SARS safety network

9. International Cooperation

In response to the global spread of SARS, Taiwan was the first to host an international symposium on the epidemic on April 20 and 21. Experts from twelve affected countries were invited to share experiences in epidemiology, clinical medicine, and control measures. More than 400 participated. It was hoped that this symposium would enhance international cooperation in the prevention and control of SARS, as well as demonstrate Taiwan's spirit of humanitarian support.

In order to properly fulfill our role in maintaining world health, Taiwan took the initiative and promptly reported its epidemic situation to the World Health Organization as soon as SARS cases were detected in mid-March. At the Global Meeting on the Epidemiology of SARS organized by the WHO on May 16, Taiwan presented her SARS epidemic situation and the control and preventive measures taken. Delegates from Taiwan also exchanged opinions with those from other countries. Moreover, Taiwan was invited and participated in the "WHO Global Conference on Severe Acuter Respiratory Syndrome (SARS): Where Do We Go From Here?" on June 17-18. On the other hand, a group of government officials led by Minister Chien-Jen Chen attended the "APEC Special SOM Meeting and Health Minister Meeting" held in Bangkok, Thailand, on June 27-28 and they made two concrete suggestions during the meeting that respectively were: 1. Forming APEC Health Working Group 2. Setting up disease outbreak alert hot-line system for Health Ministers.

Taiwan wanted to ensure that information on our efforts to control SARS was accessible and transparent. We also wanted to help the international community understand our specific efforts and draw on the experience of others. Toward these ends, Taiwan invited experts from the US CDC and the WHO to Taiwan to develop a better understanding of the situation and provide necessary assistance.

V. Achievements in Prevention and Control

The Walk to Fight SARS encouraged people to beat SARS through exercise. (Central News Agency)

World Health Organization (WHO) announced travel advisory for Taiwan on May 8 and included Taiwan in the list of travel advisory on May 21. Taiwan had then been trying to control the disease outbreak and fulfill the five criteria provided by WHO in order to be removed from the list of travel advisory. The five criteria were as followed: 1. The epidemic curve was significantly lower, 2. The number of probable cases was less than five daily, 3. There was no exported SARS case, 4. There was a confirmed source of transmission for all the probable case, 5. The number of probable cases receiving treatment at the hospitals was less than 60. On June 17, Taiwan was removed from WHO's list of travel advisory. After two months of hard work, SARS pandemic in Taiwan was finally contained. On July 5, WHO lifted Taiwan from the list of areas with recent local transmission of SARS.

VI. Challenges for the Future

Sixty-eight singers collaborate on the medley "Hand in Hand" as part of the campaign against SARS. (Central News Agency)

In this era of globalization, diseases are easily transmitted across borders. At major crossroads of the world, Taiwan finds it virtually impossible to avoid epidemics. SARS is an emerging communicable disease that must be explored and gradually understood in all aspects. Therefore, direct access to the latest international information and the support of the WHO is most essential in dealing with the disease. Regrettably, Taiwan is not a member of the WHO. In spite of our strenuous efforts, Taiwan has been shut outside. Therefore, we must find a way to achieve equal standing among other nations and ensure that the health of the 23 million people in Taiwan is respected and acknowledged internationally. In light of the WHO's aim of "health for all" and on the basis of human rights, the people of Taiwan should not be isolated or neglected.

Drawing on our experience with SARS and the knowledge that the competition between humans and microorganisms was never-ending, we can anticipate that we will continue to face attacks from unknown emerging communicable diseases in the future. While the SARS epidemic has certainly exacted a heavy toll, we shall continue to upgrade and improve our technology, facilities, and manpower. Through international cooperation, we hope to undertake a united effort to prevent emerging diseases from threatening the health of humankind, and thereby instill ourselves with new confidence to face the next wave of challenges.

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