

### What have we heard?

- Public health legislation is outdated and should be reviewed
- There was inadequate or incomplete contact tracing
- Quarantine measures were introduced too late and were not strictly enforced
- Better contingency plans should be drawn up
- A centre for the control of infectious diseases is needed

### INTRODUCTION

7.1 Health protection is about the measures that public health authorities and others take to protect the population from communicable diseases and other public health hazards. As an international city, and the hub of international traffic, Hong Kong is at high risk of being affected by emerging infectious diseases like SARS. Existing control mechanisms have been effective in the past in containing the spread of communicable diseases like cholera, influenza and tuberculosis. It is vital that appropriate legislative and organisational arrangements are in place to protect the territory from new and emerging hazards of the 21st century.

### DH'S RESPONSE TO THE SARS EPIDEMIC

7.2 DH has responsibility for communicable disease control, including surveillance, immunisation programmes and enforcement of public health legislation. The Disease Prevention and Control Division, Regional Offices, Public Health Laboratory Centre, Port Health Office and Central Health Education Unit discharge these functions, and are supported by HA, particularly in respect of the surveillance function, at corporate, cluster and hospital levels.

7.3 In response to media reports on 11 February 2003 of an outbreak of atypical pneumonia in Guangdong, DH adopted a proactive approach in formulating, coordinating, implementing and monitoring public health control measures. The subsequent occurrence of a hospital outbreak of atypical pneumonia at PWH did, however, pose particular problems in public health

management. A system should be established to automatically involve DH, as the responsible public health authority, in all decisions relating to hospital outbreak control. DH only became aware of the outbreak from media reports on 11 March 2003. Probably because the outbreak was perceived as a hospital problem, it was not reported to DH by the hospital. DH immediately contacted PWH management and offered to attend the special meeting that was convened by them later that morning to understand the outbreak situation. DH attended subsequent meetings on issues regarding the outbreak situation, and discussions on the epidemiological study, contact tracing and related matters. There was a lack of common understanding from a population-based perspective on how to respond to a communicable disease outbreak of this scale and of the potential public health hazard that it posed. The hospital, rather than DH, led the initial outbreak response. The high level of anxiety and fear that surrounded the initial period of the outbreak exposed deficiencies in the system, including problems in relationships between hospital clinicians and public health professionals, academic and service staff, HA and DH, and public hospitals and private practitioners. It also uncovered weaknesses in hospital infection control.

7.4 From the early stages of the SARS epidemic, the regional offices undertook a wide range of activities including epidemiological investigation, contact tracing, and data analysis. There was a perception amongst clinical staff and others that contact tracing by DH was inadequate and slow. However, the Committee

found that DH had done a large amount of contact tracing in a short period of time. Uninformed of DH's work, the university staff initiated their own case investigation and contact tracing independently during the early phase of the outbreak. This led to patients inappropriately approached more than once, and by more than one agency. There is a need for absolute clarity in the roles and responsibilities of key players involved in the management of an outbreak. There is a further need to ensure that effective mechanisms are in place to coordinate the outbreak response particularly, as often happens, where it traverses organisational boundaries.

7.5 At DH, existing data and information management systems were very rapidly overwhelmed as the SARS epidemic progressed. There appears to have been an initial lack of leadership focus at the headquarters level on the problem of data management and its implications for public health response. However, the situation improved considerably after the setting up of a central database at headquarters level on 24 March 2003. In future, adequate systems need to be in place from the outset with a clearly identified senior public health person in charge, leading and coordinating outbreak support work.

7.6 During the course of the SARS epidemic, DH efficiently and effectively implemented a range of public health control measures focusing on enhanced surveillance, contact tracing and early isolation.

### Introduction of public health measures

Public health control measures used included –

- ◆ Enhanced surveillance
- ◆ Enhanced laboratory diagnosis
- ◆ Contact tracing
- ◆ Designated medical centres for contact surveillance
- ◆ Home confinement for household contacts
- ◆ A multi-disciplinary response team to follow up case clusters
- ◆ Border control
- ◆ Community and public education
- ◆ Infection control guidance and advice
- ◆ Collaboration with the Mainland, WHO and others.



Temperature check at border control point

A series of quarantine measures were introduced, including an isolation order on Amoy Gardens Block E (from 31 March 2003), designated medical centres for the early detection of cases in the community (from 31 March 2003), and a statutory home confinement scheme (from 10 April 2003).

7.7 Four designated medical centres, one in each DH region, started operation on

31 March 2003. They were originally established to conduct medical monitoring of close contacts and symptomatic social contacts of SARS patients in order to ensure early detection of secondary cases. Contacts were required to attend designated medical centres on a daily basis for 10 days after the last contact with a SARS case. The subsequent introduction of home confinement meant that household contacts of SARS cases were required to stay at home or in a holiday camp. The clientele of designated medical centres therefore changed to cater mainly for non-household contacts of SARS cases, including discharged non-SARS patients that had been exposed to SARS cases while in hospital. The earlier introduction of home confinement of close contacts would have been a better, albeit more resource intensive, public health measure. However, in reaching its decision, DH sought to take into account the balance between public interest and civil liberties in the context of infection control.

7.8 There was a similar interplay of factors for many of the policy decisions that were made on isolation, quarantine and border controls, including the availability of legal powers and the mechanism to rapidly introduce new regulations, the existence of adequate resources to promptly implement control measures, and the balance between public interest and civil liberties. Many of these decisions were not unique to Hong Kong and some, such as policies on border controls, were largely driven by WHO. DH is unlikely ever to have sufficient in-house resources and manpower to cope with public health

### Evaluation of public health control measures

In bringing the SARS epidemic under control, the Hong Kong authorities had implemented a four-pronged strategy, centred on “early detection, swift contact tracing, prompt isolation and quarantine, and effective containment”. The public health control measures arising from this strategy had the effects of shortening the interval between onset of symptoms and admission to hospital, limiting the infectious period of SARS cases, and preventing further spread of the disease.

The public health control measures implemented in Hong Kong had been the subject of a scientific evaluation, the outcome of which was published in a top-grade peer-reviewed journal. Entitled “Transmission dynamics of the etiological agent of SARS in Hong Kong: impact of public health intervention” and published in [www.sciencemag.org/cgi/reprint/300/5627/1961.pdf](http://www.sciencemag.org/cgi/reprint/300/5627/1961.pdf), the paper concluded that reductions in population contact rates both in the community and in hospitals, brought about by the Government policy of prompt isolation and quarantine, played the predominant role in achieving control of the outbreak. In addition, the public education programmes resulting in a more rapid presentation to medical facilities and therefore subsequent early hospitalisation further provided an important additional effect. Overall, Hong Kong’s public health control measures resulted in a significant drop in the basic viral reproduction number,  $R_0$ , from 2.7 (95% CI: 2.2 - 3.7) to 0.14 (95% CI: 0.09 - 0.35) by 10 April 2003.

emergencies on the scale of the SARS epidemic, and contingency plans need to reflect this. The collaboration with the Police on contact tracing is one example of how this might work.

## MAJOR OUTBREAK PLANS

7.9 DH has an emergency preparedness infrastructure, outbreak response mechanism and disease investigation protocol. However, at the time of the SARS epidemic, DH had no appropriate major outbreak control plan in place. Contingency planning is the basis for dealing with most health service and public health emergencies. This is no less true for communicable disease outbreaks. Plans should describe the process whereby an outbreak is called and an outbreak control team established. The roles and responsibilities of outbreak control team members should be clearly specified. A culture of reporting and writing up outbreaks should be cultivated in order to evaluate and disseminate lessons learnt.

## ESTABLISH A CENTRE FOR HEALTH PROTECTION IN HONG KONG

7.10 Although the existing communicable disease control mechanism has served Hong Kong well for many years, the SARS epidemic has exposed many weaknesses in the current system, particularly when faced with the threat of a major new disease. These include shortcomings in surveillance and information systems, problems with organisational

coordination related to the current structure of the health system, and deficiencies in manpower and specialist expertise in field epidemiology and infectious disease control.

7.11 The Committee recommends that a Centre for Health Protection (CHP) should be established in Hong Kong. It is important first to define the functions required of the CHP and to establish its place within the existing public health infrastructure in Hong Kong, rather than import an unsuitable model from elsewhere. It is vital that it meets the particular needs and circumstances of Hong Kong, eg its unique demographic features. The CHP should be set up within the Government since many of the core functions of the Centre, such as collecting sensitive data from patients and contacts for medical surveillance purposes, requiring healthcare institutions to comply with directives, and international liaison, could not

be performed effectively by non-government entities.

7.12 The CHP will be a new public health infrastructure for consolidating existing diseases control strategies and addressing new challenges. It will not only have professional knowledge and expertise in combating communicable and non-communicable diseases, but also the administrative skills and statutory power to coordinate various Government departments and the community when taking appropriate measures to tackle health threats and respond to outbreaks. The scale of the Centre will reflect the magnitude of risk faced by Hong Kong as an international city. The CHP must possess resilience, and be built on the principles of assessment, prevention, preparation, response and recovery.

### Communicable diseases functions of the CHP

The principal functions of the CHP should be –

- ◆ To conduct comprehensive public health surveillance on communicable diseases
- ◆ To develop strategies for the effective control of communicable diseases
- ◆ To establish partnerships with the healthcare professions, community, academics, Government departments, national and international authorities in the control of communicable diseases
- ◆ To develop and review contingency plans and to respond effectively to outbreaks, emerging and re-emerging infectious diseases
- ◆ To develop, support, implement and evaluate programmes on the prevention and control of communicable diseases (including hospital-acquired infections)
- ◆ To develop the research agenda and support applied research on the prevention and control of communicable diseases
- ◆ To build capacity and develop professional expertise on communicable diseases
- ◆ To act as the Government's advisor on communicable diseases. The longer-term function of the CHP should be broadened to cover environmental hazards and other non-communicable diseases.

7.13 In establishing the CHP, the first and most urgent priority is to develop its capacity in communicable diseases control. It will require an organisation of trained specialist communicable disease staff, properly resourced and with appropriate levels of administrative and information technology support. The role of the Centre will need to be clear, including its primacy in outbreak management and its ability to exercise legal powers where necessary. As it develops, the CHP should also have responsibilities in other areas of health protection, such as dealing with chemical incidents, and in other areas of public health, such as food safety and hygiene, veterinary issues, non-communicable diseases and their risk factors.

7.14 The CHP should have a clear focus on preparedness and contingency planning.

Particular emphasis should be placed on improving surveillance in Hong Kong and within the Pearl River Delta region, developing surge capacity, strengthening laboratory capacity, developing international back-up, training and cross-sectoral and regional collaboration. Training should be undertaken at two levels. First, there should be a training programme for CHP staff that emphasises field epidemiology and includes rotation through hospitals and other sectors, and rotation to other parts of the Pearl River Delta region. Second, the CHP should have the capacity to train other healthcare professionals in aspects of epidemiology and infection control in order to prepare for an emergency response. The following matrix illustrates the kind of health protection functions and skills required by the Centre.

Figure 7.1 Health and Protection Functions and Skills Required by the CHP

Skills	Functions		
	Communicable diseases	Environmental hazards	Other non-communicable diseases
Field epidemiology			
Data management			
Biostatistics			
Health education / promotion			
Communication			

For illustration only

7.15 The initial CHP should include the following four functional areas in relation to communicable disease control –

- ◆ Surveillance and epidemiology
- ◆ Prevention and control programme
- ◆ Public health laboratories
- ◆ Applied research and development.

In addition, the CHP will benefit from setting up a number of advisory committees in order to provide a forum for obtaining professional advice from leading local and international experts.

- ◆ The Government should establish a Centre for Health Protection (CHP) that will have responsibility, authority and accountability for the prevention and control of communicable disease. As it develops, this centre will also have responsibility for advising on all aspects of health protection, including food safety and hygiene, veterinary issues, non-communicable diseases and their risk factors, etc. It will also be responsible for maintaining close working relationships with national and international agencies for communicable disease control.
- ◆ The CHP, backed up by appropriate statutory powers, should include the following key functions –
  - Public health surveillance

- Investigative capacity in communicable disease and environmental epidemiology
- Analytical capacity in information technology, data management, and system development
- Training
- Surge capacity
- Health education and evaluation
- Applied research.

## INFECTIOUS DISEASE LEGISLATION

7.16 The Quarantine and Prevention of Disease Ordinance (Chapter 141 of the Laws of Hong Kong) and its subsidiary legislation provide the legal framework for the prevention and control of infectious diseases of public health importance in Hong Kong. Specifically, it provides the basis for statutory notification, and powers of prevention and control of a list of infectious diseases included in its First Schedule. The powers are mostly vested in the Director of Health.

7.17 Although many of the powers necessary for the control of SARS already existed, the epidemic did highlight some deficiencies in legislation, particularly in relation to border controls. New legislation, known as the Prevention of the Spread of Infectious Diseases (Amendment) Regulation 2003, came into force on 17 April 2003 –

- ◆ To empower authorised persons to take the body temperature of persons arriving in or leaving Hong Kong
- ◆ To empower health officers to carry out medical examination on persons arriving in or leaving Hong Kong for the purpose of ascertaining whether they had SARS
- ◆ To empower health officers to prohibit persons suffering from SARS, contacts or carriers from leaving Hong Kong.

These reflect the fact that legislation has not kept pace with modern developments such as the increase in international travel.

### Legal backing for public health measures implemented to combat SARS

The legal backing for public health measures implemented to combat SARS is provided by existing provisions or the making of amendment regulations (marked in asterisk\*\*) as set out below –

Public Health Measures	Relevant Legislation
<b>Adding SARS</b> to the <i>list of infectious diseases</i> specified in the First Schedule to the Quarantine and Prevention of Disease Ordinance (Chapter 141 of the Laws of Hong Kong) so that the provisions of the Ordinance and its subsidiary legislation can apply to this disease	The Quarantine and Prevention of Disease Ordinance (Amendment of First Schedule) Order 2003 made by the Director of Health (D of H) on 27 March 2003 enacts the amendment**
Medical practitioners to <b>notify</b> D of H of SARS cases in accordance with Regulation 4 of the Prevention of the Spread of Infectious Diseases Regulations (Cap. 141B)	The Prevention of the Spread of Infectious Diseases Regulations (Amendment of Form) Order 2003 made by D of H on 27 March 2003 amends the statutory form of notification**
Close contacts of confirmed SARS patients to attend <b>designated medical centres</b> for medical surveillance on a daily basis	Regulation 9 of Cap. 141B
Household contacts of confirmed and suspected SARS patients may be removed to hospitals or such other place as a health office may appoint, eg holiday camps, or directed to stay at <b>home</b>	Regulations 10, 11 and 12 of Cap. 141B

Persons arriving in Hong Kong to complete <b>health declaration</b> at boundary crossings	Sections 22, 31 and 34 of the principal Ordinance provide statutory powers to require persons arriving in Hong Kong by vessel and aircraft to provide information on their health as required by a health officer; those arriving by land transport are dealt with administratively
Empowering authorised persons to <b>take the body temperature</b> of persons arriving in or leaving Hong Kong (including transit passengers)	Regulation 27C(1) of Cap. 141B as introduced through the making of the Prevention of the Spread of Infectious Diseases (Amendment) Regulation 2003 by the Chief Executive in Council on 15 April 2003**
Empowering health officers or authorised medical practitioners to carry out <b>medical examination</b> on persons arriving in or leaving Hong Kong (including transit passengers) for the purpose of <b>ascertaining whether the persons concerned are likely to be infected with SARS</b>	Regulation 27C(2) of Cap. 141B as introduced through the making of the Prevention of the Spread of Infectious Diseases (Amendment) Regulation 2003 by the Chief Executive in Council on 15 April 2003**
Empowering health officers to <b>prohibit</b> persons believed or suspected to be suffering from SARS, have been exposed to the risk of infection of SARS by contact with a person suffering from that disease or a carrier of SARS <b>from leaving Hong Kong</b> (eg <b>barring close contacts</b> of confirmed SARS patients from leaving Hong Kong during their confinement period)	Regulation 27A of Cap. 141B as introduced through the making of the Prevention of the Spread of Infectious Diseases (Amendment) Regulation 2003 by the Chief Executive in Council on 15 April 2003**
<b>Isolating</b> Block E of Amoy Gardens from 31 March 2003 to 9 April 2003	Isolation Order issued by D of H under Regulation 24 of Cap. 141B
<b>Removing</b> residents of Block E of Amoy Gardens to holiday camps for temporary accommodation	Removal Order issued by D of H under Regulations 10 and 12 of Cap. 141B
<b>Disinfection</b> of Block E of Amoy Gardens	Disinfection Order issued by a health officer with the approval of D of H under Regulation 19 of Cap. 141B
Disposal of the <b>dead bodies</b> of deceased SARS patients	Regulation 17 of Cap. 141B

- ◆ There should be a review of the law on infectious diseases in order to –
  - Expand the list of notifiable diseases to assist harmonisation of communicable disease surveillance in the Pearl River Delta region
  - Establish the primacy of DH as the enforcement agency for communicable disease outbreaks whether they occur in hospitals or in the community
  - Ensure that both public and private sectors are required to cooperate and collaborate with DH when dealing with the threat of a communicable disease outbreak
  - Clarify the legal powers available to DH officers.