

What have we heard?

- ❑ Public health surveillance systems are poorly developed in the private sector and in community clinics
- ❑ There is no comprehensive laboratory surveillance system and the HA laboratory database was not linked in during the epidemic
- ❑ There was no comprehensive data management system linking HA and DH available at the early stage of the epidemic
- ❑ The existing contact tracing system proved inadequate to deal with the scale of the epidemic

INTRODUCTION

10.1 Good surveillance is the cornerstone of effective communicable disease control. Without it, it is impossible to track disease trends, recognise new disease threats, identify serious outbreaks, monitor control measures or design effective immunisation policies. Once a major outbreak occurs, it is vital to have a data management system that supports efficient data capture and information flow, and that can provide a master list of up-to-date case-based information in real time.

ENHANCING SURVEILLANCE SYSTEMS

10.2 Following reports of an epidemic of atypical pneumonia in the Guangdong Province

in mid-February 2003, an ad hoc surveillance system was set up by HA to report cases of severe community-acquired pneumonia. With assistance from DH, this was also extended to private hospitals and the system proved successful.

10.3 However, this initiative highlights some significant gaps in the existing communicable disease surveillance systems. Very little surveillance data are available from the private sector, apart from a sentinel surveillance scheme that is run with selected family doctors. Another major gap is the absence of comprehensive laboratory surveillance.

10.4 Efforts should be made to ensure that all microbiology laboratories promptly and routinely report all laboratory diagnoses of

public health importance to DH. Ideally, an electronic reporting system should be established. Making laboratory reporting of infectious diseases a legal requirement would help underpin such a system. A more fundamental and far-reaching reform would be to integrate all hospital microbiology laboratories within DH, thereby providing the means to strengthen surveillance, hospital infection control and outbreak management at the interface between the hospital and community. The final dimension to bear in mind is the importance and value of cross-boundary and international collaboration on surveillance.

- ◆ DH should make efforts to develop a comprehensive laboratory surveillance system for communicable diseases, to involve private hospitals in routine surveillance, and to extend the sentinel surveillance scheme in primary care.
- ◆ Laboratories in Government, HA and universities should agree protocols for sharing information for clinical, epidemiological and research purposes.

IMPROVING COMMUNICABLE DISEASE INFORMATION MANAGEMENT SYSTEMS

10.5 Before the SARS epidemic, DH generally relied on healthcare providers, including general practitioners and hospitals, to provide notification of infectious diseases through the mail or by fax. Public health staff then conducted case investigation and collected information on cases and contacts,

through interviews and field visits. This pre-existing system proved entirely inadequate in supporting the enormous volume of contact tracing required at the height of the epidemic.

10.6 DH and HA initially set up separate SARS databases for public health and clinical treatment purposes, at the start of the epidemic. The two organisations were unable to access directly each other's databases, and as a result, it was not possible to exchange information on suspected cases in real time.



Use of IT in contact tracing

10.7 HWFB, DH and HA made considerable efforts to rectify these problems within a very short period of time, through the development of the following data management systems in April 2003 –

- ◆ The **e-SARS system**, a comprehensive electronic web-based system jointly developed by HA and DH, providing real-time information exchange with DH about newly admitted SARS patients, thus facilitating DH in tracing and tracking contacts
- ◆ The **SARS-Case Contact Information System (SARS-CCIS)**, a data management system developed by DH,

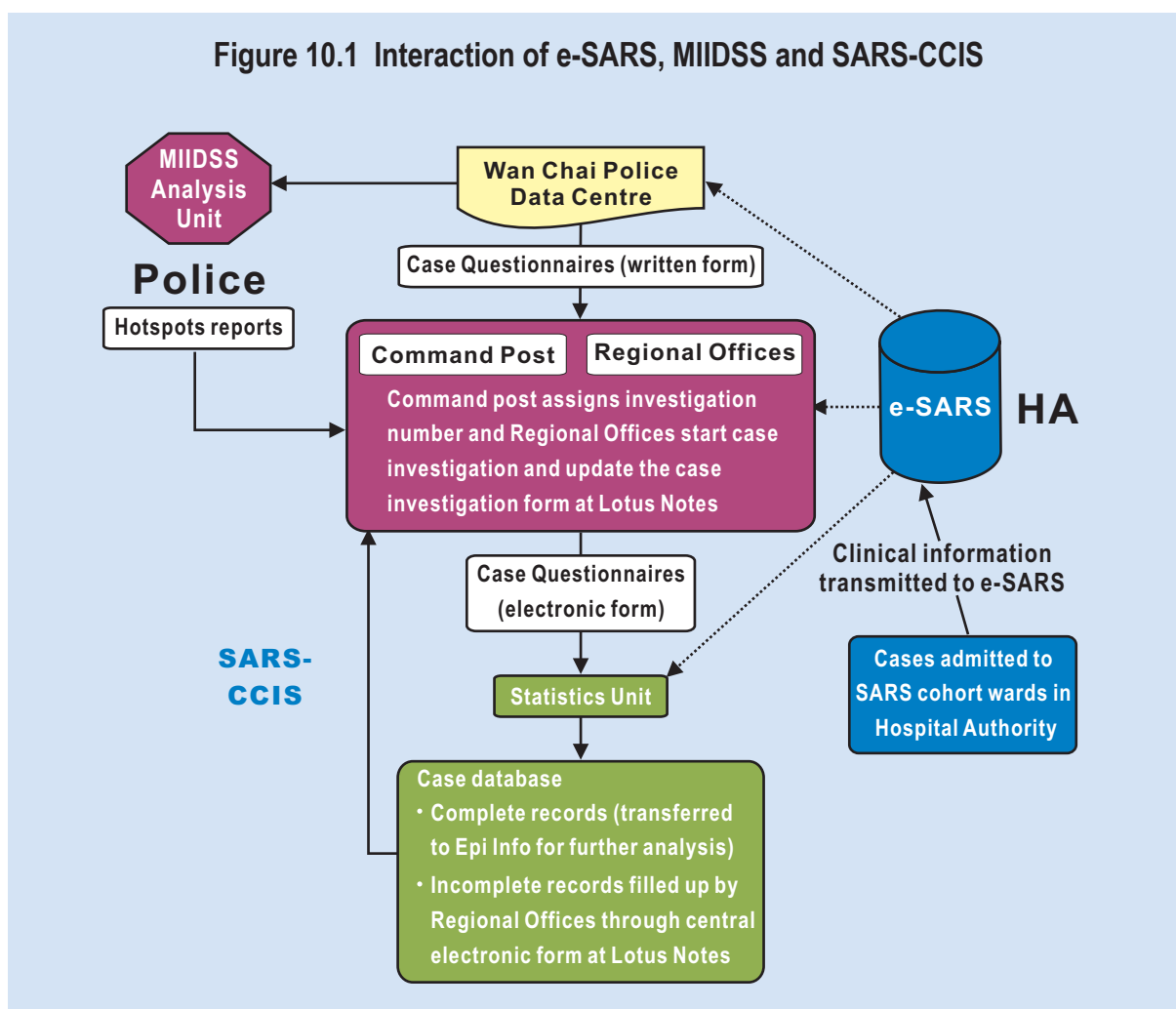
with cluster analysis function, for field epidemiologists to construct cluster trees and extract cases of identified clusters for analysis

- ◆ The **Major Incident Investigation and Disaster Support System (MIIDSS)**, a crime investigation programme used by the Hong Kong Police Force that had been adopted to help quickly identify linkage between cases and contacts and high-risk locations of SARS occurrence to enable rapid implementation of public health measures.

10.8 The interaction of these three systems is illustrated in Figure 10.1.

10.9 As directed by SHWF, development of e-SARS began on 28 March 2003. The new system was launched on 8 April 2003. It provided real-time sharing of case information not only among HA head office and hospitals, but also between HA and DH. It also enabled DH staff at the four designated medical centres and field staff to capture information about close contacts, and helped to monitor the ten-day medical surveillance of close contacts. e-SARS was an impressive achievement, both in terms of the speed with which the system was established, and the technical capability of the system.

Figure 10.1 Interaction of e-SARS, MIIDSS and SARS-CCIS



10.10 Another remarkable development began on 6 April 2003, when the Police was brought in to use its MIIDSS system to analyse the distribution of SARS cases, identify links between cases and report hotspots of SARS activity to DH. This greatly assisted DH field epidemiologists in their investigations. The interaction of these three systems was pivotal in supporting public health control measures, and containing the spread of SARS during the epidemic. The success of these systems developed in the midst of the crisis illustrates what is possible with the existing technology, and what can be achieved during a short span of time, when information technology is coupled with remarkable human efforts. Relevant features of systems such as e-SARS, MIIDSS and SARS-CCIS now need to be incorporated as permanent features in an enhanced information management system, to support communicable disease surveillance and control in Hong Kong.

10.11 The challenge is to build on the collaboration that was established between DH and HA, and DH and the Police, and to adapt these information technology developments for long-term use. Every person in Hong Kong has a unique identifier (identity card number), and this attribute could potentially form the basis for developing a population-based information system, linking all sectors of the healthcare system for disease surveillance and contact tracing.

10.12 The first step toward developing these information systems would be a commitment to provide better information technology

support for DH. This may be pursued in the context of Government's policy direction of developing a computer-based Health Information Infrastructure in the long term, to provide a platform for data sharing within the healthcare sector, both public and private.

10.13 The second step is to develop further collaboration across all sectors of the healthcare system, including HA, DH, the private sector and community clinics. Expertise and resources may need to be pooled and clear objectives set. To ensure the bi-directional flow of information within Hong Kong, it would be essential to provide regular feedback to the clinicians and others who provide the information. Public understanding of the importance of surveillance could also be improved, including improving awareness of DH's policy on privacy of information. There must always be an appropriate balance between public and private interests, for example, balancing the right to privacy of an employee who is suspected to have contracted SARS, versus the right of his/her employer or colleagues to know about the infection on public health grounds.

- ◆ HWFB, DH and HA should establish an enhanced information management system across the sectors for communicable disease control on a permanent basis. This should build on the success of the e-SARS, MIIDSS, and SARS-CCIS systems and should be –
 - *Instant* – incorporating real-time linkage of relevant data between the information systems of DH and HA

- *Inclusive* – encompassing links to all health sectors, including the private sector and community clinics
- *Interactive* – providing regular feedback to information providers, with greater frequency and targeted content as needed.
- ◆ DH should formulate and promulgate a clear policy of privacy of information, that balances public and private interests, in order to instil a sense of personal responsibility and foster community confidence in the implementation of public health measures against communicable diseases.