SARS & Quarantine (Part 12)

By Prof Chee Yam Cheng, Editorial Board Member

Editorial note:
The following article was submitted on 4 March 2004. Contents are current at the time of submission.

In an earlier article in this series, I had described Middleton Hospital and the Communicable Disease Centre (CDC) of Tan Tock Seng Hospital (TTSH). CDC now has two locations – CDC 1 at Moulmein Road (previously Middleton Hospital) and CDC 2 at Jalan Tan Tock Seng. After renovation, CDC 1 has 80 isolation rooms (opened and operational as at 20 May 2003), and CDC 2 has 64 isolation rooms (opened on 16 August 2003).

These facilities began in 1907 as a quarantine camp for the isolation and treatment of cases of small pox, cholera and plague prevalent at that time. Over time, as the environmental health and sanitation of Singapore improved, there appeared to be less need for isolation facilities. So CDC was named to reflect its role in Infectious Disease Control. Many of its recent patients, before SARS broke, suffered from infectious diseases like dengue fever, chicken pox, typhoid fever and malaria. Wards are reserved for HIV patients and TB patients, but the numbers of inpatients were small.

When the SARS outbreak happened, CDC was not well-equipped to handle the patients, so the new TTSH building was designated SARS Central, and bore the brunt of the load for inpatient care. Staff not posted to CDC but to TTSH, together with reinforcements from Alexandra Hospital, KK Women's and Children's Hospital, and Singapore General Hospital (SGH), did their job marvellously well. The Infectious Disease Specialists operated from both TTSH and CDC.

When it was scientifically established that SARS was spread by droplets and close contact, this gave rise to a whole machinery of contact tracing. The question that arose then was: after the contacts were traced, what then? Quarantine? Yes. Then, where and for how long?

INFECTIOUS DISEASES ACT

On Monday, 24 March 2003, the Ministry of Health (MOH) invoked the Infectious Diseases Act (IDA) and quarantined 740 people including 340 children. *(The New Paper, 25 March 2003, pg. 12.)* Before this announcement, the paper had polled 55 Singaporeans on their awareness of SARS by a telephone straw poll. 50 knew about SARS, and 48 knew how it was spread in Singapore. 65 people were down with SARS, of whom five who were hospitalised earlier (from beginning of March) had been discharged with 12 still in intensive care at TTSH. The issue of school closure was brought up, and one parent thought that if things became more serious, schools should close. On this day, Little Skool House, a workplace childcare centre at SGH was shut down and would remain so for the next seven days. The Serangoon centre of the Pat School House kindergarten chain had been shut for 10 days so that its 140 pupils could stay home. Another 200 students from Pei Cai Secondary School in Serangoon were told to stay home for a week.

Under the IDA, MOH compelled all those exposed to SARS patients to stay home for 10 days. If they were caught leaving home, they could be fined up to S$5,000 for the first offence, and up to S$10,000 for the second offence. The Minister for Health said that these measures were necessary to prevent the disease from spreading. He said: "This (SARS) comes wave after wave. If it is not under control, each wave will be bigger. This is not something which we can declare victory in a matter of days or in one or two weeks." He also said that given the number of patients in intensive care, the country should be prepared to accept that "one or two" may die. The 10-day rule was imposed as it may take that long to check if a person had SARS. The incubation period of the virus is usually about three to seven days, but it some cases, it could go up to 10 days. National Environment Agency Officers would check daily on those quarantined to see if any of them developed the symptoms of SARS; those who did would be referred to the CDC and TTSH for further diagnosis and treatment. Those who did not develop any symptoms after 10 days were considered unlikely to have contracted SARS. *(The New Paper, 25 March 2003, pg. 13.)*

It was on Saturday, 22 March 2003, that TTSH was declared SARS Central. CDC was ill-equipped to handle the situation, and its isolation facilities were inadequate. It was not possible to use CDC or TTSH as a quarantine centre (TTSH has 1100 beds in operation). So, the concept of home quarantine was applied. That meant somebody else had to ensure that those quarantined stayed home, and even while at home, stayed separate from other members of the household. This meant the entire household, including maids, aunties, grandparents, and others.

HQO

Home Quarantine Order (HQO) is under Section 15(2) of the IDA (Chapter 37). It determines six categories of SARS-related persons. These are, a SARS patient, suspected to have SARS, contact of SARS, suspected to be a contact of SARS, has recently recovered from SARS, and recently been treated for SARS. As the Director of Medical Services needs to execute this Act by proxy, he appointed "Health Officers" under the IDA who were then delegated the powers to impose HQOs on people defined as above. As Chairman of Medical Board of TTSH, I was one of the appointed Health Officers. In my letter to those

Page 7 ►

About the author:
Prof Chee Yam Cheng MBBS(S)(1973), PPA, FRCP(Lond)(Edin)(Glasg), FRACP, FACP(Hon), FCFPS, is a Senior Consultant Physician, Department of General Medicine, Tan Tock Seng Hospital, Clinical Professor of Medicine, Faculty of Medicine, National University of Singapore, and Assistant CEO (Clinical), National Healthcare Group.

◄ *Page 6 – SARS & Quarantine (Part 12)*

served the HQO, the letter stated: "The Director has delegated to me his powers under Section 15(2) of the Act to order patients who are due to be discharged from TTSH to remain and be isolated at home on account of the SARS. SARS is an infectious disease under the IDA." Section 15(2) states: "The Director may order any person who is, or is suspected or continues to be suspected to be, a case or carrier or contact of an infectious disease, or who has recently recovered from or been treated for such a disease, to remain and to be isolated and (if necessary) be treated, in his own dwelling place (a) for such period of time as may be necessary for protection of the public; and (b) subject to such conditions as the Director may consider necessary for this purpose."

In my letter, it is stated: "In the exercise of my powers under Section 15(2) of the Act, I hereby order you to remain and be isolated in your home (at address) from (date) until (date) in accordance with this order. You must go home immediately upon your discharge from the hospital."

During the period of home quarantine, the person:

(1) must not leave the home at anytime without the Director's permission;
(2) must comply with all conditions set out by the Director; and
(3) must not come into contact with anyone except the following persons:
   - family members and other persons who reside in the home;
   - healthcare workers acting on behalf of the Director;
   - CISCO Officers acting on behalf of the Director;
   - any person carrying out any statutory power or function;
   - any person who needs to gain access into your home in order to carry out any works; and
   - such other person as the Director may allow from time to time.

Failure to comply with this order may lead to:

(a) a requirement to wear an electronic tag to enable the monitoring of the person's movements throughout the remaining period of the HQO;
(b) the imposition of such other condition as the Director may deem necessary; or
(c) an order on the person to be detained and isolated in a hospital or other place.

Breach of this order also disallows the person or his employer to claim under the SARS HQO Allowance Scheme. Non-compliance with the order renders the person guilty of an offence with the possibility of arrest without warrant. These are set out in Sections 15(3) and 56A(1) of the IDA. The punishment for a first offence is a fine of up to S$10,000, or a term of imprisonment not exceeding six months or both (Section 65(a) of the Act.) For second or subsequent offences, the punishment is a fine of up to S$20,000, or a term of imprisonment not exceeding 12 months or both (Section 65(b) of the ACT.) (These penalties were revised by Parliament on 24 April 2003 after an open letter by the Prime Minister to all Singaporeans on 22 April, when he lamented: "I am deeply concerned about the behaviour of some persons served the HQO. They refused to cooperate. They did not answer telephone calls from our officials, or told our officials not to bother them. Also, 14 persons are known to have broken their orders.")

SOCIAL IMPACT

"Food left at doorstep by relatives because family of six not allowed to go out at all to see others." "Home alone for 10 days." These were the headlines of SARS Quarantine on the front page of The New Paper on 27 March 2003. HQO had profound social impact on families. Once a family is served a HQO, it means they cannot leave the confines of their homes for 10 days – not even to go to school, work, or the market nearby. Relatives have to deliver food to them. It also meant the family's income came to a halt. Hence, the SARS HQO Allowance Scheme was set up. Take for example the lorry driver who was served a HQO. As the family's sole breadwinner who earned a daily rated pay of some S$40-70, he had to stop working, and it was a period of frustration, anxiety and fear. This family of six lived in a three-room flat – husband, wife, in-laws and two children, 13 and 14 years old. The contact was the daughter whose schoolmate had SARS. An order arrived via a MOH official who also told them their relatives would need to help them buy food, which should be left at the doorstep for them to collect only after they had left. *(The New Paper, 27 March 2003, pg 2.)* There were two deaths the previous days – both men.

The Straits Times, on 30 March, reported a family in self-quarantine. A Dr Teo, not under HQO, and her three kids did not leave home for close to a week to play it safe. She felt the situation was pretty serious so she was doing this as a preventive measure. There were some 1,500 people on HQO at this time, and their children had to stay home too. These numbers were expected to rise when the contacts of the fourth index case, the lady who flew in from Beijing on CZ 355, and took a cab to SGH, were traced. Hospital staff members accounted for about one in six of the current numbers, while another 700 were classified as people in school or work who were in touch with the patients. No one had contravened the orders so far (30 March).

Home Quarantine allows health officials to catch those who develop any signs of SARS early and move them straight to a hospital for medical attention. Thirty-one of them reported getting sick, but only 26 had symptoms and were sent to the CDC. None was warded on suspicion that they had caught the disease.

HOSPITAL STAFF

If any of the staff of the National Healthcare Group were served HQOs, they could choose not to go home, to spare their family of any inconveniences for 10 days. The choice of alternative accommodation was made possible by the staff

Page 8 ►

◄ *Page 7 – SARS & Quarantine (Part 12)*

observation facility – a stay-in facility at Pearl's Hill Terrace, Block 201. The facility had 28 fully furnished units equipped with bathroom and kitchenette with meals provided. It was meant for staff on HQO or on medical leave with fever, wishing to stay in a home away from home. There were no takers.

Hospital staff of TTSH could have been classified as contacts of SARS patients. After all, the staff in the wards and intensive care units were nursing these patients. But they were not served HQOs. Otherwise there would be inadequate staff to run the hospital. In order to prevent the nosocomial spread of SARS, all TTSH staff carried thermometers and checked their temperatures thrice daily. If febrile, they put on a surgical mask, stopped work and reported sick to the Emergency Department. If there was a likelihood of SARS as the diagnosis, the staff was warded. Otherwise, the staff could go home and be in self-isolation (without actually being served a statutory HQO). Staff behaved as if they were under HQO when none was actually served. TTSH heads of department were in constant contact with them to monitor their health, need for hospitalisation, and fitness to return to work.

When SARS broke at TTSH, the doctors' initial diagnosis was atypical pneumonia. The first case was isolated on 6 March, after an alert from World Health Organisation (WHO). Her friend was warded at SGH, and a third woman back from Hong Kong was warded in TTSH for atypical pneumonia. On 10 March, when a TTSH nurse fell sick, the connection was still not made. On the same day, the initial case's mother was also warded. Two days later, a second nurse took ill. On 13 March, WHO sent out the global alert on SARS. Only on 14 March, when the initial case's father and four more TTSH staff were warded, did a picture of the disease appear. The differential diagnosis had often been dengue fever. Alerts from Hong Kong at this time suggested bird flu. By the time it was realised that this was a totally new bug, contagious and potentially deadly, many people had been infected. It was a huge headache at TTSH trying to trace staff who had attended to these patients, and who else had come in contact with them as visitors to the ward. This included patients beside them, who on transfer to other wards, passed the virus on. When the contacts were traced, they were issued HQOs as they were members of the public.

HOLIDAY CAMPS?

In a letter to the Straits Times Forum *(4 April 2003, pg. 22, col. 2-5)*, the writer lamented: "SARS quarantine: Don't treat families like animals." She said that she was appalled by the behaviour of some of her neighbours towards her and her family. She added it was both emotionally and physically hard for the patients to overcome this illness, and stressful for family members who were under quarantine. So the government set aside Loyang chalets for those served HQOs who did not wish to stay at their home address. This scheme started on 12 May. Those served HQOs could choose to be quarantined at the government chalets at Loyang instead of at home. At this time, if a parent was placed under HQO, the children would also have to be quarantined at home. But if the parent moved into a Loyang chalet, the children could still attend school.

The quarantine server had to pay a subsidised rate of S$25 a day, which paid for lodging and four meals during the 10-day quarantine period in a four-bedroom bungalow unit. *(Today, 13 May 2003, pg 6.)* But this was no holiday. No visitors were allowed and those under quarantine could not wander about the grounds or use the swimming pool or tennis courts. Cisco personnel conducted daily checks on these people and monitored their health. Webcams were installed in each unit so that Cisco could make spot checks. The Minister of State for Health launched this initiative and said: "We are sure that when you stay here, you cannot leave. There is a fence around this place and we ensure that you are actually serving the HQO." Those issued HQOs on the same day may be assigned to the same chalet or bungalow unit. Each person had an air-conditioned bedroom, but amenities such as TV, telephone, refrigerator and microwave oven within the units were shared.

Those who had recovered from SARS and discharged from hospital could also opt to serve their HQOs at the chalets. However, each of them would receive a two-bedroom unit all to themselves. The facility could accommodate up to 10 such patients. To ensure that those who fell ill were immediately isolated, health officials were at the chalet 24 hours a day to provide medical help. With 38 units in total, the Loyang chalets could house up to 122 HQO servers. To use this service, a hotline 1800-333-999 was provided, and arrangements were made for Citycab and other modes of transport to ferry people from a hospital or home, to the chalets.

2400 HQOS

"Home quarantine for 2400." This was the headline in the Straits Times on 21 April 2003, page H1. It referred to the outbreak at the Pasir Panjang wholesale market where there were three SARS victims, one of whom had died. The three worked at separate buildings in the market which housed 800 tenants in 26 blocks. Because the authorities were not able to trace who the three men might have mingled with at the 24-hour market, the entire place was shut down. All stall holders and their hired hands were placed on a 10-day quarantine from 20 April. The Minister explained that this was to isolate the stallholders and employees at home and cut the chain of infection: "This will then prevent the spread to the community." The assumption was that each of the 800 tenants hired two helpers, so 2,400 people in total would be quarantined. Financial aid would be given to them. This was the largest group to be issued HQOs, since 740 people were told to stay at home four weeks previously. Besides the estimated 2,400, another 83 people outside the market were also served HQOs. Fifty of them were traced to a wholesaler, one of the SARS-hit trio from the market. The other 33 cases were traced to a taxi driver who was hit by the bug after ferrying another member of the SARS trio from the wholesale centre.

The Minister was asked about SARS at Pasir Panjang. *(Today, 22 April 2003, pg. 1.)* Has the government been somewhat

Page 9 ►

◄ *Page 8 – SARS & Quarantine (Part 12)*

slow in taking action? Should not the market have been closed earlier – and not at least 10 days after the vegetable wholesaler who started the infections was diagnosed with SARS? Although up to 2,400 people were already under HQO, an appeal was made to customers and trades people who had visited the market – and they could number several thousands – to quarantine themselves, or seek treatment if they developed SARS symptoms.

"In the next two weeks, Singaporeans need to be extra vigilant to make sure the spread does not take root," said the Health Minister. He was asked: "Why wasn't an alert sent soon after the wholesaler was diagnosed with SARS? That way all the workers could have been more vigilant." He said that contact tracing had been done and made this appeal: "This is very difficult work. Please give my men a chance. They are not detectives." His appeal underlined the extent of the spread of SARS within the community, a departure from the earlier trend when most SARS transmissions occurred within the healthcare setting or within the patient's familial network, usually within home. Mr Lim used to allay fears when he said: "Take heart, for the spread is not within the community." – words which brought comfort to many who feared getting SARS from, for example, strangers coughing, as in the confines of a lift. Now, this degree of comfort was significantly lowered with the Pasir Panjang outbreak.

Prior to this, Singapore took pride in the fact that it did not have the problem of community infection.

TOUGHER LAWS

Singapore's tough legislation came under the world's spotlight. On 25 April 2003, the Parliament passed tougher laws to contain SARS. One Member of Parliament put himself in voluntary quarantine after he (a doctor) treated a SARS patient, and he addressed Parliament from his home via video linkup. The changes to the IDA were effective immediately, and gave the necessary powers to control the outbreak of SARS. They would allow the government to

(1) Come down hard on quarantine breakers. They can now be jailed for six months and fined S$10,000 even for a first offence. The penalty doubles for subsequent offences. Quarantine prevents potential patients from passing the virus to others.
(2) Isolate premises and even destroy goods and structures.
(3) Punish anyone who suspects he is infectious but leaves his home, thus putting others at risk. This applies only to specific diseases. SARS is the only such disease at the present time.
(4) Punish anyone who gives false information or refuses to cooperate. People had refused to answer phone calls from the Ministry; others had lied.
(5) Apply strict burial and funeral rules to limit the possibility of the virus spreading, even in unconfirmed cases. *(Straits Times, 26 April 2003, pg. 1.)*

WORLD VIEWS

Foreign reports on Singapore's stance could be summarised thus: The authoritarian government imposed draconian measures and trampled on the civil liberties of citizens in tightly controlled Singapore. *(Straits Times, 3 May 2003, pg. H11.)* A Toronto Star report spoke of more than 2,500 people being "under virtual house arrest" and there were others facing "even more intrusive surveillance" – electronic wrist tags. "People in Singapore face mounting fines, possible imprisonment up to one year, and the threat of being publicly identified if they break the government ordered quarantine. There is also constant monitoring of suspected SARS carriers, including electronic tracking of those in isolation – extreme measures the authoritarian government there insists are the best way to combat the continuing threat from the mystery illness."

In Canada, anyone who needs to be quarantined is first asked to do so voluntarily. But medical officials have the authority to order them to stay home. Anyone who refuses at that stage may be escorted to a hospital by police. In the USA, President Bush signed an executive order on 4 April, giving public health officials the authority to confine people, against their will, if necessary. This was prompted by the actions of a female traveller who arrived in a West Coast airport with SARS symptoms. Refusing an evaluation by health officials, she left the airport on the MRT but was subsequently traced and admitted to hospital. In the UK, newly recruited nurses (1,200) from China, Hong Kong and the Philippines were quarantined *(Straits Times, 30 April 2003, pg. A5)*, as well as more than 140 boarding school students from Singapore, China and Hong Kong who returned to Britain.

In Singapore, we did what needed to be done. If that meant telling a chunk of the population to stay home, we did it. If it meant locking somebody up for repeatedly ignoring simple instructions to stay home, we also did it. This way, we avoided the WHO "travel advisory warning." *(Straits Times, 30 April 2003, pg. 18.)*

CISCO TO THE RESCUE

Contact tracing is arduous, difficult work. There was just not enough manpower at MOH or at the hospitals to do this efficiently and within 24 hours. A huge workforce from Mindef was roped in and occupied the ground floor of the College of Medicine building to do contact tracing and fever monitoring. But this was still not enough. Who was there to go and serve the HQOs? On 10 April 2003, Cisco, a statutory board under the Ministry of Home Affairs, was tasked to help Singapore fight SARS. This was because a handful of people breached their HQOs and risked taking the outbreak into the community. *(Straits Times, 10 May 2003, pg. H2.)* Cisco had the resources, and transformed a part of itself into the "quarantine army".

Initially, Cisco was told to expect 70 to 80 orders each day. Then on 10 April, for their first assignment, they received 235 orders. They were shocked. That was the day MOH announced a new cluster of cases at SGH. Officers on standby were recalled and lists of who should get the HQOs worked out. The next day, 80 officers went to the homes to deliver the slips. At the height of the crisis, when more than 1,500 orders had to be served to vegetable sellers at the Pasir Panjang Wholesale Centre in the

Page 10 ►

◀ *Page 9 – SARS & Quarantine (Part 12)*

shortest time, up to 200 officers armed with masks and gloves were out delivering them. About half of them had to be roped in from the Singapore Civil Defence Force, so that Cisco could continue its regular security services.

On their visits, they installed electronic cameras and briefed those quarantined about the cameras and the helplines. At Cisco's call centre, telephone operators made at least three calls each day at random times to check on those quarantined. Those linked to Pasir Panjang were checked on at least five times a day, including during their usual working hours in the wee hours of the morning, to ensure they were home. On their rounds, Cisco officials found most families cooperative. These officers were supported by staff from the People's Association, hospitals and the Singapore Armed Forces, among others, who were doing the contact tracing.

For example, after a directive was issued on 20 April to the People's Association to get in touch with more than 1,200 vegetable sellers, and everyone they had been in contact with, within 48 hours, grassroot leaders had all the names tracked, 12 hours before the deadline. The job of serving HQOs had been possibly Cisco's biggest and most unusual to date. It had handed out over 6,000 HQOs and slapped electronic tags on nine quarantine breakers.

REVISED HQOS

Sometime in May 2003, after having gone through six weeks of the SARS crisis, the HQOs were revised. There were now two types of HQOs. The first for well persons in the community, and the second for patients discharged from hospitals. For the first, they were issued a 10-day order from the last date of exposure because they were contacts of cases diagnosed as probable, suspect or observation cases. (Blood tests were now available for SARS.) Contacts of patients classified as observation cases may have their status / diagnosis changed as the clinical course progressed and the laboratory results became known. With this re-categorisation, if the patient was no longer a suspect probable SARS, the HQO issued to their contacts would be withdrawn.

For patients discharged from hospital, HQO was issued as follows:

(1) Patients upon discharge who were
   - Probable cases – 14 days HQO
   - Suspect cases – 10 days HQO from 9 May onwards (This HQO is a precautionary measure.)

(2) For non-SARS patients upon discharge who were from SARS wards (where transmission occurred), or with chronic illness, or on immunosuppression, and those on peritoneal or haemodialysis, the HQO was 10 days from the date of discharge. This was to minimise risks from patients who were inpatients in TTSH, SGH and NUH and who may have had exposure to SARS.

Accordingly, my letter to patients as the Health Officer under the IDA was modified. Chronic illnesses were specified to mean chronic lung disease, diabetes, heart failure, or other chronic heart diseases, chronic liver or kidney disease, malignancy and chronic haematological or autoimmune disorders. I continued to act with these powers till 30 June 2003.

CONCLUSION

The battle against SARS rekindled something from history books – quarantine. Quarantine means restraining the movement of people to prevent the spread of infectious diseases. Unworkable? Ineffective, obsolete, impractical? Before the germ theory of disease, quarantine was useless. The germ theory taught that epidemic diseases resulted from bringing uninfected people into contact with infected ones. Quarantine of road, rail, ship traffic, home or hospital isolation of patients and their contacts – all this helped to combat contagion.

Has global travel made quarantine impossible? No. Where no medical cure is available – as with SARS – quarantine is a valuable resource not to be ignored. Some figures to support its use follow.

48 in folk dance class quarantined. A community dance group was quarantined because one of its members, a nurse had SARS. *(Straits Times, 14 April 2003, pg. H2, col. 5-6.)* 400 quarantined at home in Beijing. *(Straits Times, 26 April 2003, pg. 4, col. 3-6.)* Thousands quarantined in Shanxi, China. (*The New Paper, 2 May 2003, pg. 30.)* Hanoi quarantines 135 students – they were returning from China. *(Straits Times, 4 May 2003.)* Migrant workers put under mass quarantine in China. Some 203 migrant workers returning from SARS-affected areas of Guangdong and Beijing to the less developed provinces of Sichuan, Anhui, Guangxi, Hunan and Hubei were placed under two weeks quarantine. *(Straits Times, 9 May 2003, pg. A1, col. 6.)* Toronto put 500 people under quarantine as the city braced itself for a new SARS outbreak, less then two weeks after it was taken off the WHO list of affected areas. *(Straits Times, 26 May 2003, pg. A2, col. 6.)* Are there quarantine breakers overseas? Yes, 200 breach quarantine order. *(Straits Times, 12 May 2003, pg. A1, col. 1-2.)* This was in Taiwan where the 200 were among 500 residents of a housing block on HQOs, after a suspected SARS death and two other suspected cases led to the block being sealed off.

A study published in October 2003 stated that experts believed only a third of the 30,000 people confined in Beijing earlier in the year actually needed to be quarantined. "Focussing only on persons who had contact with an actively ill SARS patient would have reduced the number of persons quarantined by approximately 66%." *(Straits Times, 1 November 2003, pg. 10.)* The study found that only those people who had direct contact with feverish SARS patients were in any real danger of catching the virus. People who cared for SARS patients had the highest risk. Members of all other quarantined groups – people who visited hospitals where SARS patients were treated, and those who came into contact with SARS patients who had not yet developed symptoms – did not catch the respiratory virus.

So maybe we too need a refinement of our quarantine policies, with greater focus on the groups who really need to be quarantined. But is it not better to be safe than sorry? ■