

(This letter has been edited to protect confidentiality and privacy.)

DH/CR/PUB/31
HA CON 101/83/1

18 August 2003

HA Review Panel on SARS Outbreak
Hospital Authority
Room 410S, 4/F Hospital Authority Building
147B Argyle Street
Kowloon

Dear

HA Review Panel on SARS Outbreak

Thank you for your letter of 2 August. The secretary to your Review Panel has asked for our response by not later than 18 August.

2. To facilitate your review, we have taken a while to put together a comprehensive response. We have also included some background information to enable the Review Panel to better understand the position.

Events outside Hong Kong

Guangdong Province

3. On 10 February, there was local media coverage about an outbreak of pneumonia in Guangzhou. The Director of Health in HKSARG (Director) immediately tried but in vain to contact by phone the Municipal Health and Anti-epidemic Station of Guangzhou and the Director General of the Department of Health, Guangdong Province. The

Department of Health in HKSARG (DH) followed up with a letter faxed to the two officials to enquire about the reported outbreak. As subsequent phone calls were also unanswered, the Director approached the Director General of the Department of International Cooperation, Ministry of Health (MoH) for assistance.

4. On the following day, the Guangzhou Bureau of Health held a press conference informing the public that the situation in Guangzhou was under control. Details were uploaded onto the Internet ([Annex 1](#)). Separately, DH made verbal enquiries with the Hospital Authority (HA), private hospitals and sentinel doctors and they reported that no unusual pattern of influenza-like illness or pneumonia in Hong Kong was detected. With the information from Guangzhou and enquiry results in Hong Kong, the Director conducted a stand-up briefing and issued a press release ([Annex 2](#)) in late afternoon on 11 February on the reported outbreak in Guangzhou and provided health advice that should be observed in the usual peak season of influenza in Hong Kong (January - March).

5. DH had since maintained regular contacts with Beijing officials on the outbreak. On 7 March, the Mainland MoH verbally advised that no definite cause had been identified to account for the Atypical Pneumonia (AP) outbreak in Guangdong Province. The usual causative agents like influenza A, influenza B, adenovirus or chlamydia were isolated.

6. I should mention that the World Health Organization (WHO) stationed a team of experts in Beijing for two weeks in the latter part of February and early March to check media reports of the outbreak. On 16 August 2003, the South China Morning Post reported the visit, which took place between 23 February and 9 March, as “hitting a brick wall”.

7. I now turn to efforts made in Hong Kong at the wake of the outbreak in Guangdong Province. I would first say that DH had all along been monitoring the pattern of pneumonia cases in Hong Kong. HA had an existing Task Force in Infection Control and DH became a co-opted member since its 24th meeting on 18 November 2002.

8. With the outbreak in Guangdong Province, HA set up on 11 February 2003 a Working Group on severe community acquired pneumonia (SCAP) cases with membership built on that of the Task Force. The aim was to review the statistics, clinical presentation and laboratory findings related to SCAP cases admitted into HA hospitals.

Rather than setting up a separate mechanism, DH joined the HA's Working Group to strengthen the surveillance system from the 2nd meeting. Under this arrangement, both HA and private hospitals were required to notify DH of SCAP cases to enable DH to co-ordinate actions on prevention and control measures.

Hanoi, Vietnam

9. On 3 March, WHO informed DH that an American Chinese with recent travel history to Hong Kong was hospitalized with severe pneumonia in Hanoi. Serological tests revealed positive IgM for influenza B. In response to an enquiry from WHO, DH replied that influenza B was prevailing at that time in Hong Kong and there were severe cases due to influenza B in the previous three weeks.

10. On 5 March, WHO notified DH that the American Chinese was being transferred from the French Hospital in Hanoi to Hong Kong for treatment upon request of the family. Seven Health Care Workers (HCWs) who had assisted the patient in Hanoi reported high fever, malaise, headache, but not respiratory symptoms. DH immediately contacted a consultant in Princess Margaret Hospital (PMH) but he was not aware of the transfer. DH verbally informed PMH as well as HA Head Office of the above details.

11. The American Chinese arrived Hong Kong on 6 March and was directly transferred to the intensive care unit (ICU) in PMH. He was too ill to be interviewed. A DH Nursing Officer tried to interview his wife on 7 March but in vain. Attaching great importance to this case, DH sent a health team of a Senior Medical & Health Officer (SMO) and a MO to approach the wife again on 8 March. Although she agreed to be interviewed, difficulties were encountered. She did not have full details of her husband's travel history.

12. Based on clinical history and information provided by the wife, it was learnt that the American Chinese travelled from the US to Shanghai in mid-January unaccompanied and visited Hong Kong by himself in mid to late February to apply for a visa. He stayed in Hong Kong for a few days and continued his journey to Hanoi. He was admitted to the Hanoi French Hospital in Vietnam on 26 February. His condition deteriorated rapidly after admission.

13. During the interview with the wife, two relatives from Shanghai were also present. They advised that the American Chinese did not have any contact with relatives in Shanghai. The wife and the relatives exposed to the American Chinese in PMH were put under medical surveillance. Health advice on the prevention of respiratory infections and personal hygiene was given to them and they remained asymptomatic at the end of the surveillance period.

14. On 8 March, the DH health team discussed with the attending physicians on the condition of the American Chinese and understood that PMH was aware that more than 10 HCWs who had taken care of him in the French Hospital were hospitalized. We noted that PMH had implemented strict infection control measures during the American Chinese's stay and no HCW was infected.

15. Despite active treatment in Hong Kong, the American Chinese's condition further deteriorated. He finally succumbed on 13 March.

16. Results of extensive laboratory investigations conducted by the University of Hong Kong (HKU) and the Government Virus Unit (GVU) were negative. Autopsy specimens were sent to the Centres for Disease Control and Prevention, US on 17 March and the case was subsequently diagnosed on 22 March, as reported during inter-laboratories teleconference, as a SARS case.

WHO Global Alert

17. On 11 March, there was media coverage that more than 10 HCWs in Prince of Wales Hospital (PWH) Ward 8A reported respiratory infection symptoms in the previous three to four days. DH immediately contacted PWH for case investigation and contact tracing. After assessing the situation, DH notified WHO of the outbreak on the following day (12 March). WHO immediately issued a global alert ([Annex 3](#)), raising awareness all over the world. As a result, we had received reports from Singapore and Canada which had led to the discovery of Hotel M cluster and the source of infection in Hong Kong.

Singapore

18. On 13 March, the Singapore MoH issued a press statement

— (Annex 4) about three persons who had traveled to Hong Kong at the end of February and who were admitted to hospital for pneumonia after they had returned to Singapore. None of the hospital staff attending to these patients had reported ill. In sending the press statement to DH, the Singapore MoH also mentioned that its investigations had identified no causative organism and that laboratory tests were negative for flu, paraflo, chlamydia, legionella or mycoplasma. The common factor was that the three cases stayed at Hotel M in Hong Kong around 20-25 February 2003.

[Note: The Singapore MoH first discussed with DH on the three patients in the course of a telephone conversation on another subject on 8 March. It was noted that they had all stayed in Hotel M in Hong Kong and two were friends. Laboratory investigations were pending and the patients' illnesses improved with antibiotics treatment. As there was insufficient evidence that their illnesses were related to Hotel M, DH asked the Singapore MoH to keep it posted of positive laboratory findings if any.]

19. On 15 March, DH was aware of a second press statement made by the Singapore MoH dated 14 March (Annex 5) and noted that some HCWs who had attended the patients got infected. In view of the PWH outbreak among HCWs, DH asked the Singapore MoH for more details of the incident, hoping to get more information on cause of the illnesses, mode of spread, clinical presentations, etc. Replies were received on 15 and 16 March. Nothing significant was observed.

20. On 19 March, with the suspicion of Hotel M (paragraphs 23-24 below) being the place where an outbreak might have occurred among residents, DH made further enquiries with the Singapore MoH to find if there were any linkages between the three Singapore cases and AA, the index case of Hotel M. A reply was received on 20 March but no definite route of transmission could be established.

21. I would like to point out here that JJ was initially suspected as the index case for PWH on 13 March and it was confirmed on 14 March (paragraphs 66-69 below). JJ was not a guest in Hotel M at the material time. It was only on repeated questioning that he admitted that he had visited a friend in Hotel M around that period (paragraph 23 below). The information provided by the Singapore MoH could not and would not help us in any way to identify him as the index case for PWH.

Toronto, Canada

22. On 18 March, Health Canada sent DH some information on three cases in Canada who had traveled to Hong Kong prior to their illnesses. Hotel M was mentioned for one of the patients.

Hotel M Cluster

23. Having been aware that the Singapore tourists were residing in Hotel M before onset of their illnesses, the information from Canada triggered off an immediate investigation by DH on the same day (18 March). DH searched the patient records on the SCAP list and PWH cases, and interviewed all cases. By the following day, DH found a total of seven cases related to Hotel M. We inspected the hotel environment and 9/F immediately and found the general hygiene satisfactory. At the same time, DH verbally advised HA of the cluster. In the evening (19 March), DH announced the findings in a press conference. AA was identified as the index case as he had onset of symptoms on 15 February and he resided in the hotel on 21-22 February 2003.

24. On 20 March, WHO informed DH that the American Chinese from Hanoi had also stayed in Hotel M around that time. Announcement was made to the media again. More cases were subsequently found related to the Hotel M Cluster.

AA and Kwong Wah Hospital Cluster

25. On 24 February, DH received notification that a tourist from Guangzhou AA admitted to the ICU of Kwong Wah Hospital (KWH) at around noon time on 22 February was suspected to suffer from SCAP. He was fully sedated and intubated for supported ventilation on 23 February. The fever did not subside and his condition continued to deteriorate. He subsequently suffered from multi-organ failure and succumbed on 4 March.

26. DH initiated immediate and extensive epidemiological investigation in the afternoon upon receipt of notification. According to his wife and daughter, AA worked in a Guangzhou hospital as a doctor in the out-patient clinic of Medical Department. In the week preceding his onset of symptoms, he came into contact with two patients presenting with high-grade fever and chest symptoms. CXR of both patients showed

haziness and AA referred them to the Accident and Emergency Department (AED). AA was not exposed to any poultry two weeks prior to the onset of symptoms.

27. AA had good past health. In the evening of 15 February, he had a sudden onset of fever (39°C), chills and rigor. He took oral antibiotics that night. He later developed cough and sputum. CXR done on 17 February showed haziness in the left lower zone. He changed the antibiotic to intravenous Pencillin that day. Repeated CXR on 20 February showed increased haziness. As he had to attend the wedding banquet of his nephew (sister's son), he came to Hong Kong with his wife on 21 February by coach. They arrived Hong Kong at 12.30 hours and resided in Room 911 of Hotel M. In the night time, he had increased cough, shortness of breath, fever and peripheral cyanosis.

28. Contact tracing further revealed that AA's wife had fever (38.4°C) in the afternoon on 24 February. She returned to Guangzhou where she was hospitalised that evening. AA's daughter, who separately arrived in Hong Kong on 22 February, accompanied her mother on the return trip on 24 February. She was also admitted to a hospital in Guangzhou on 27 February for fever. In Hong Kong, AA's sister was hospitalised on 1 March and her husband (i.e. AA's brother-in-law) on 28 February, both for fever, cough and sputum. AA's brother-in-law subsequently died on 19 March. All other family members related to AA eventually recovered.

29. AA died on 4 March. Results of extensive laboratory investigations carried out in HKU and the GUV were all negative, except a 4-fold rise in adenovirus antibody titre.

30. With a number of persons fallen sick and although it appeared it was an intra familial spread due to close contact, the situation was a cause for concern. The Director had many discussions with one of the attending physicians and the Consultant of the GUV to explore further actions required for identifying the causative agent. AA's specimens were subsequently tested positive for coronavirus by polymerase chain reaction in mid-April.

31. There were two infected HCWs whose infection might be related to the three patients in AA's family. The first case concerned a Registered Nurse who was hospitalised on 28 February. She did not have direct contact history with AA. On 22 February, she worked in a cubicle

next to the one where AA stayed. She wore surgical mask at the time because she was having flu symptoms herself. She recovered well and was discharged on 18 March. DH was not notified of this case because she did not suffer from SCAP.

32. In the second case, the infected Health Care Assistant had a history of contact with the brother-in-law of AA – she was working in the isolation room where he stayed. She attended KWH's AED on 6 March and was discharged with two days' sick leave. She re-attended KWH's AED on 7 March and was admitted into an isolation room. She was intubated and transferred to ICU on 12 March. DH was notified on 13 March when action on case investigation and contact tracing was immediately initiated. She was eventually discharged on 27 March.

Clusters by 24 March 2003

33. There were the following clusters by 24 March 2003 -

- (a) the Metropole Hotel Cluster including tourists / patients from Vietnam, Singapore and Canada;
- (b) the Kwong Wah Hospital Cluster;
- (c) the Prince of Wales Hospital Cluster;
- (d) two clusters involving medical practitioners' clinics;
- (e) the Pamela Youde Nethersole Eastern Hospital Cluster;
- (f) the St Paul's Hospital Cluster;
- (g) the Queen Elizabeth Hospital Cluster;
- (h) the Baptist Hospital Cluster; and
- (i) Flights CA112 / CA115.

34. I have set out in details in the above paragraphs DH's actions on the clusters in (a) and (b). Cluster (c) will be dealt with below from paragraph 35 onwards while clusters (d) – (i) are covered by [Annex 6](#).

The PWH Cluster

35. Community Physician (New Territories East) [CP(NTE)] was the directorate officer in charge of case investigation, contact tracing and follow up action for the PWH cluster.

36. In view of the magnitude of the cluster, I think it would assist the Review Panel by setting out in the following paragraphs a day-by-day account of work undertaken by DH colleagues at the initial stage (11-21 March). DH staff's attendance at meetings with PWH was confined to understanding the outbreak situation and discussions on the epidemiological study, contact tracing and related matters. We did not participate in discussions on operational matters of the hospital.

11 March 2003

37. On reading media reports about an abnormal pattern of sick leave among PWH Ward 8A staff, CP(NTE) immediately rang PWH management colleagues and managed to speak to a senior staff in PWH on the phone at about 10:45 a.m. The latter confirmed the media reports and advised that there would be a special meeting at PWH at 11:00 a.m. CP(NTE) volunteered and attended the meeting.

38. PWH informed the meeting that more than 10 staff had reported sick. The cluster appeared only involved staff of Ward 8A and no abnormal pattern had been observed in in-patients. Admission and discharge of Ward 8A had been stopped and visitors restricted.

39. CP(NTE) advised PWH to isolate cases, screen other wards and monitor the sick leave pattern of staff. It was agreed that the DH New Territories East Regional Office (NTERO) would design a questionnaire and conduct an epidemiological survey for the list of staff reported sick and that PWH would provide the list by the afternoon. The survey would help better understand the cluster and provide a basis for working out the case definition and estimating the incubation period.

40. PWH further advised that it would set up a special staff clinic in the evening and recall staff for screening. PWH would also complete the questionnaire as designed by NTERO for those turning up at the special staff clinic and return the completed questionnaires to NTERO for case and contact follow up and epidemiological analysis. A copy of the questionnaire was sent to PWH later in the day.

41. A list of 36 affected staff was obtained from PWH in the evening. NTERO successfully interviewed 26 of them that night. Most were found to have symptoms of fever and chills. NTERO advised all of them to seek immediate medical treatment at the PWH special staff clinic. Advice on personal hygiene was also given. The remaining 10 could not be reached or refused interview, and they were followed up on the following day. The survey data were analysed for clinical and epidemiological features.

12 March 2003

42. CP(NTE) attended a meeting at PWH. PWH advised that more than 20 staff had been admitted and isolated. The 8th floor of the main building of PWH had been made a restricted area. There was no abnormal sick leave pattern for staff in other wards. CP(NTE) requested PWH to provide a master list of cases for follow up and contact tracing.

43. CP(NTE) then presented the preliminary epidemiological findings and the epidemic curve was tabled. The probable mode of spread was discussed and droplets and fomites were incriminated. The incubation period was estimated from one to seven days. The survey findings on clinical features were shared and PWH and NTERO agreed on a working case definition for active case finding and surveillance. As positive CXR findings were observed in some cases, CP(NTE) advised PWH to include CXR as one of the screening tools. He also advised PWH to freeze movement of staff who had been exposed in Ward 8A.

44. After the meeting, CP(NTE) asked a PWH staff to provide a list of patients who had stayed in Ward 8A on or after 24 February but had since been discharged home. The objectives were two-fold: to help identify the source of infection and active case finding.

45. DH set up a special Control Team in NTERO to deal with the PWH outbreak, including case follow-up, contact tracing and surveillance, epidemiological analysis, and prevention of spread to community.

13 March 2003

46. To facilitate communication, outbreak investigation and contact tracing, DH stationed a team of staff at PWH (in addition to the Control

Team at NTERO). The DH Team comprised an experienced Medical & Health Officer (MO) and two Nursing Officers.

47. The DH Team doctor attended a meeting at PWH in the morning. The meeting discussed the latest progress of the outbreak, including figures on the number of affected staff, the number of specimens collected and laboratory results. The arrangements on control measures were also discussed. The meeting agreed on a proposal to step up infection control by separating staff into “clean team” and “dirty team”.

48. The DH team started interviewing patients of Ward 8A to identify the source of the outbreak and assess the risk of spread to other patients. Communication with the special staff clinic was strengthened to facilitate return of questionnaires to speed up contact tracing and data compilation. Information on sick leave pattern of nursing and minor grades of all specialties of PWH was presented to the DH Team. No abnormal pattern of sick leave was observed in all other specialties except in medical wards.

49. A master list of cumulated cases was provided by PWH to the DH Team in the evening. Upon receipt of the master list from PWH, the Control Team at NTERO immediately sorted out new cases from the master list for follow up and contact tracing.

50. CP(NTE) attended a further meeting at PWH in the evening. CP(NTE) presented the latest epidemiological findings. He observed that some staff outside Ward 8A, who did not have regular contacts with staff/medical students in that ward but who had attended to patients there, had contracted the disease. He therefore said that the source of infection from Ward 8A patients or from patients of other wards should be explored.

14 March 2003

51. Consultant (Community Medicine), Disease Prevention and Control Division of DH [Con(CM)] and CP(NTE) met senior PWH staff in the morning. Surveillance strategies were discussed, in particular the exploration of the inclusion of positive CXR findings in case definition.

52. In the evening, Con(CM) and CP(NTE) visited PWH again to share the updated epidemiological findings. They were joined by the doctor of the DH Team. The findings of the index case was shared and discussed (details are set out in paragraphs 66-69) and he was immediately isolated. It was agreed that PWH would follow up staff, medical students and in-patients exposed to JJ (index case) while DH would follow up discharged patients (non-SARS) and hospital visitors exposed to JJ (index case). DH would also follow up community contacts of reported cases. CP(NTE) further advised that the first wave of cases was likely to have peaked but another wave from those of the affected close contacts incubating the disease might prop up in the following week and asked PWH to prepare for it.

15 March 2003

53. With the assistance of PWH, the DH Team found 36 patients who had been exposed to JJ by having been in the same cubicle with him. Among the 36 patients, five had been investigated into and followed up by DH as reported cases.

54. DH immediately traced the remaining 31 patients (some of whom had already been discharged) and found they had 133 close contacts / hospital visitors. All of them were contacted for investigation, medical advice and medical surveillance. Symptomatic persons were advised to seek early medical treatment. Others were put under medical surveillance. At the end of the surveillance period, we found a total of 15 patients and 19 close contacts / visitors had developed symptoms. They were subsequently diagnosed as SARS cases.

55. The exercise to trace contacts who had been exposed to JJ identified a total of 34 (15 + 19) cases. This had helped prevent the further spread of SARS into the community.

56. The DH Team doctor attended the usual PWH meeting when the latest progress of the cluster and the arrangements of control measures were discussed. The meeting also discussed issues on the index case, contacts and secondary cases, including the possible mode of spread of infection from the index case.

16 March 2003

57. CP(NTE) confirmed with PWH that the hospital had already adopted positive CXR as a parameter for confirmation as a clinical case. Accordingly, the new case definition was adopted for epidemiological analysis with effective from the following day with consequential changes to the guidelines on contact tracing.

17 March 2003

58. Con (CM) and the DH Team doctor accompanied WHO experts on a visit to PWH. They discussed with a senior PWH staff the epidemiological findings of the outbreak and the clinical presentation of the disease.

18 March 2003

59. CP(NTE) attended the PWH meeting in the evening at which a CUHK staff asked if the spread of the disease could be air-borne, as suggested by the CDC. CP(NTE) replied that current data supported the earlier findings that the spread was primarily through droplets.

60. CP(NTE) asked if control actions in the hospital had been in place. PWH confirmed that Ward 8A had been closed and infection control measures strengthened. Attendance figures of infection control seminars were reported at the meeting.

61. To speed up the flow of information and enable prompt follow up of cases and contacts, CP(NTE) asked if PWH could assign an officer to provide the necessary support. In response, PWH designated a doctor to be the contact point for DH.

19 March 2003

62. CP(NTE) met with a senior PWH staff in the afternoon to update PWH of the epidemiological findings and discuss ways to further streamline data collection. CP(NTE) also expressed the need to follow up patients and visitors who had been to Ward 8A before ward closure other than those confined to the same cubicle as the index patient.

63. CP(NTE) attended another meeting with PWH and the WHO for the latter to better understand the outbreak position.

20 March 2003

64. Con(CM) and CP(NTE) presented the latest epidemiological findings at a meeting in PWH and discussed matters with a senior PWH staff on management of contacts.

21 March 2003

65. Deputy Director of Health (1) [DDH(1)], CP(NTE) and Principal Medical & Health Officer (1) [PMO(1)] had a meeting with PWH. At the suggestion of DDH(1), PMO(1) was redeployed to oversee the operation of the joint contact surveillance centre at PWH control room. Surveillance on visitors to all acute wards in PWH commenced.

Investigation into the source of outbreak

66. At the initial stage of the outbreak, PWH advised (on 11 March) that only staff of Ward 8A were affected while no abnormal pattern was observed in in-patients of the ward. An epidemiological survey conducted in the same evening found that medical students and some staff not of Ward 8A but having visited Ward 8A had been affected. Further interview of these non-ward 8A staff and medical students on 12 March supported that they had no close contact with Ward 8A staff. They went to Ward 8A to attend selective patients. NTERO and PWH visualized the need to explore if one or some patients in Ward 8A were involved or served as the source. NTERO and PWH conducted joint investigation on 13 March by reviewing the contact and clinical history of Medical Ward 8A in-patients and patients who were discharged from Ward 8A since mid-February with respiratory or unexplained febrile illness.

67. Review of the clinical history of a Ward 8A in-patient JJ suggested his symptoms were compatible as a case, and he had the earliest onset date of 24 February. He had fever and respiratory symptoms before admission. Most of the initial cases including a number

of the medical students had history of having visited the cubicle where JJ stayed.

68. On 14 March, NTERO identified four cases with fever admitted to PWH on late 13 and early 14 March were relatives of JJ. Another relative of JJ was noted to be admitted to Baptist Hospital (BH) on 13 March with fever. While two were household contacts, other relatives only met JJ during his stay in PWH Ward 8A.

69. NTERO also informed PWH of the linkage, and the latter immediately reviewed exposure history of sick staff and identified a number of them had contact with JJ during the incubation period. The above discoveries and other epidemiological findings supported JJ as the index case. JJ was isolated on 14 March. PWH later postulated that the use of nebuliser in JJ had played an important role in the spread of the disease.

Special Control Team at NTERO

70. I would now like to sum up the deployment of resources to deal with the PWH outbreak. DH staff normally operate from Regional Offices in carrying out case investigation, contact tracing, surveillance, epidemiological analysis and prevention of spread of diseases to the community. In recognition of the scale of the outbreak at PWH, we set up a Special Control Team at NTERO within 24 hours of learning the outbreak (i.e. on 12 March). The team was strengthened on the following and subsequent days through redeployment from the Disease Prevention and Control Division (DPCD) and other service units to cope with increasing workload. By 25 March, there were 40 staff compared to the original figure of 14. A detailed day-by-day breakdown is at [Annex 7](#).

DH Team at PWH

71. In view of the magnitude of the outbreak, the non-specific nature of the symptoms, the lack of a quick diagnostic test for the syndrome and the speed with which workload and cases were increasing, there was much confusion in the flow of information of cases from PWH to DH at the working level in the initial days. To facilitate communication, outbreak investigation and contact tracing, DH started to station a team of staff at PWH (in addition to the Special Control Team at NTERO) on 13 March. The DH Team spent a lot of time in wards

interviewing cases and reviewing medical notes. In the light of developing situations, we had since 21 March put all visitors to acute wards (i.e., extending beyond those who had visited cases) under medical surveillance by the DH Team.

72. An experienced Medical & Health Officer headed the DH Team from 13 to 20 March and a Principal Medical & Health Officer from 21 March. The daily manpower provision is at [Annex 8](#).

73. Both the Special Control Team at NTERO and the DH Team at PWH worked extended hours voluntarily throughout the period under review, very often late into the evenings and over weekends. Having regard to the reported caseload, there were less staff on Sundays but there was a standby arrangement to ensure that sufficient staff were available to cope with developing situations.

Workload Statistics

74. As an indication of workload generated in the PWH cluster, we have included at [Annex 9](#) the number of referred cases interviewed and contacts (including hospital visitors) followed up. As at 25 March 2003, we had successfully interviewed 386 cases, of which 134 were confirmed to be SARS eventually. A total of 1 884 contacts were successfully followed up and subsequently 59 developed SARS.

75. Given that case interview and contact tracing form only part of the case investigation and medical surveillance, it was not possible to quantify separately the workload of the Special Control Team at NTERO and the DH Team at PWH. Suffice it to say that the workload generated for the Special Control Team at NTERO was much greater than that for the DH Team at PWH and hence the greater number of staff in the former office. For example, for each referred case processed by the DH Team at PWH, the Special Control Team at NTERO had to deal with a number of contacts and put them under medical surveillance for two weeks following the last day of exposure to cases during which they were followed up several times by the Special Control Team. NTERO had also to deal with various enquiries, prevention and control measures in institutions, deliver health talks and process SARS cases reported from hospitals other than PWH.

Index Patient of Amoy Gardens Outbreak

76. With regard to the index patient of the Amoy Gardens outbreak, we would advise that the index case, YY, traveled between Hong Kong and Shenzhen. He required haemodialysis and he was followed up at PWH. On 14 March 2003, he had onset of fever, malaise, chills, rigor and diarrhea. He visited his brother's family in Block E of Amoy Gardens, stayed overnight and used the toilet there. On 15 March, when he was followed up at PWH, he showed symptoms compatible with SARS and was hospitalized. Later, Nasopharyngeal aspirate was found positive for influenza A. Upon hospital discharge on 19 March, he stayed at his brother's flat and passed stools in the toilet. On 22 March, he was re-admitted due to shortness of breath.

[Note: YY returned to Shenzhen on 20 March and attended PWH direct from Shenzhen for scheduled haemodialysis on 22 March. The earliest onset dates of Amoy Gardens Block E residents were 21 March (3), 22 March (4), 23 March (9), 24 March (41) and 25 March (26).]

77. DH was aware that YY appeared in the patient list referred by PWH to NTERO in the evening on 16 March. After sorting out newly reported cases from old cases, DH staff embarked on case investigation on 17 March. It was likely that by the time we were to interview YY, he had already been tested positive for influenza A. Hence no follow up action was required. His name was subsequently dropped by PWH from the list.

78. YY stayed for the night in Amoy Gardens on two occasions: 14 and 19 March. On either days, DH would not have been able to prevent him from spreading SARS to Amoy Gardens residents. DH was notified of YY's case on 23 March and we commenced tracing of his close contacts on the same day. His two relatives in Amoy Gardens were admitted as suspected SARS on 24 and 28 March respectively and later with the diagnosis confirmed on 26 March and 9 April respectively. All three finally recovered.

Contact Tracing and Medical Surveillance

79. The chief purposes of contact tracing are to confirm the diagnosis, determine the extent of secondary transmission, and identify control measures (Oxford Textbook of Public Health, 4th Edition).

Together with medical surveillance, contact tracing has been an important public health tool employed by DH in the control of communicable diseases. It helps in facilitating early diagnosis, isolation, treatment of a disease among contacts and prevention of its spread in the community.

80. I have explained in the above paragraphs for the PWH cluster the involvement of HA in contact tracing in connection with an unknown disease. In particular, I would draw your attention to the following -

- (a) the success of contact tracing depends to a large extent on the timely flow of information from HA and there were difficulties in the initial days;
- (b) CP(NTE) had drawn to the attention of PWH on the likely workload arising from the second wave of cases (para 52). This should have assisted in HA contingency planning;
- (c) the PWH index case is discussed in para 66-69;
- (d) the deployment of resources is explained in para 70-75;
- (e) the Amoy Gardens index case is described in para 76-78.

81. As you would appreciate, our contact tracing and surveillance arrangements were enhanced as we gained more knowledge of the disease. The evolution is described in the following paragraphs.

82. The scope of DH's contact tracing for SARS covered both close contacts and social contacts. Under the WHO definition close contacts include those who have lived with, cared for, or handled respiratory secretions of SARS patients. Persons who have had contact with a person with SARS but do not satisfy this definition are defined as social contacts by DH.

83. Once a SARS notification was received, the DH Regional Offices promptly initiated case investigation and contact tracing. Information required for contact tracing was obtained from the cases or their family members through face-to-face or telephone interviews. Medical staff of the Regional Offices called up contact households regularly and asked about their health status, especially if they had any fever, chills, myalgia, cough and respiratory symptoms. Contacts who reported compatible symptoms of SARS were referred to hospital.

Asymptomatic contacts were advised of the symptoms to watch out and the appropriate precautionary actions to take in case symptoms appeared, such as wearing mask and observing general hygiene. They were also asked to contact Regional Offices if they developed symptoms. Household contacts were advised not to go to work or school during the surveillance period. Since March 31, close contacts of SARS cases were required to report daily to one of the four Designated Medical Centers (DMCs). They were required to undergo a temperature check. Depending on the presence of significant symptoms (fever, cough, shortness of breath), a CXR examination might be performed on the spot. Suspected cases were referred to hospital for further investigation and management. Close contacts were otherwise advised to stay at home and medical leave was granted for them. Social contacts were subject to telephone surveillance.

84. With effect from 10 April, household contacts of probable SARS patients were required to undergo home confinement. Home confinees were required to stay at home for a minimum of ten days after last contact with SARS case. They were not allowed to leave home without the permission of a Health Officer. Visiting health teams comprising nurses visited the confinees regularly for medical monitoring. The Police conducted spot checks to ensure compliance. Non-compliant confinees would be removed to camp upon repeated warnings. Confinees who developed symptoms were either referred to DMCs for screening or directly to hospitals for further management. The measure was further extended to household contacts of suspected SARS patients from 25 April onwards.

85. In contact tracing related to hospital SARS outbreak, Regional Offices of DH followed up on cases referred by hospitals and covered hospital visitors exposed to SARS patients. As a further measure to improve the integrity of our contact tracing system, beginning in April, non-SARS patients discharged from SARS wards were referred to DMCs for daily medical surveillance for 10 days.

86. DH gave particular emphasis to contact tracing in elderly homes, which was vulnerable to SARS outbreaks. When a SARS case involving a patient of an elderly home arose, the concerned Regional Office would immediately alert the home and initiate case investigation. The Elderly Health Services (EHS) would also be informed. Medical surveillance and health advice on infection control would be provided by EHS with on-site visits, detailed advice and on-going support during the

medical surveillance period.

87. Over 26 000 persons, including close contacts and social contacts, have been traced by DH during the SARS outbreak and about 280 of them were subsequently found to be SARS cases, representing 16% of all SARS cases in Hong Kong.

88. According to a study which evaluated the impact of public health measures in the control of SARS, it was concluded that contact tracing and the other public health measures had been successful in greatly reducing the reproduction number of the SARS outbreak in Hong Kong. (Transmission dynamics of the etiological agent of SARS in Hong Kong: impact of public health interventions. Science. 2003 Jun 20; 300(5627):1961-6).

89. Finally, I now turn to your enquiry regarding legal powers. My responses are -

- (a) According to r.24 the Prevention of the Spread of Infectious Diseases Regulations (Cap. 141B), the Director is empowered to order areas or premises to be isolated for the prevention of the spread of any infectious disease. Movement in any isolation area or premises is restricted further under r.25 of Cap. 141B. In other words, the Director may order any public or private hospital as an isolation area or designate a particular block of a hospital as isolation premises and restrict movement thereof to achieve the practical effect of shutting down a hospital from service.
- (b) Technically speaking, the Director did not have the legal authority to designate a hospital as an isolation place under r.24 of Cap. 141B prior to March 2003 because –
 - Section 2 of the Quarantine and Prevention of Disease Ordinance (Cap. 141) stipulates that “infectious disease” means any disease specified in the First Schedule to the principal Ordinance.
 - First named by WHO as a disease entity on 15 March 2003, SARS was included as an infectious disease in the First Schedule to the principal Ordinance of Cap. 141 on 27 March 2003.

- In other words, the provisions of Cap. 141 and its subsidiary legislation were applied to SARS only after 27 March 2003.
- (c) Yet, being the authority under s.72 of Cap. 141 which may amend the First and Second Schedules of the principal Ordinance by order in Gazette, the Director indeed has the power to include SARS as an infectious disease so that provisions of Cap. 141 would apply with immediate effect so long as she sees a need to do so in the interest of public health. Such need is established only if the risk of spread from a hospital and the threat to public health is greater than the downsides of this drastic option e.g. disruption to services to patients.
- (d) Apart from resorting to legal authority under Cap. 141 to order a public hospital as an isolation area, the Director may also escalate to the Chief Executive, HKSAR, through SHWF, who may then instruct CE/HA, the public hospital management authority, to close a public hospital administratively. Alternatively, the Director may persuade CE/HA direct for closure of a public hospital as long as the need is established. Indeed, the escalation and persuasion route allows CE/HA to assess the need for hospital closure and other issues related to the control of SARS from the hospital management perspective. Even if the need for drastic measure to close a public hospital is not established, CE/HA may take administrative measures to improve infection control measures or patient management in the hospital.
- (e) Hypothetically, if PWH were a private hospital licensed under the Hospitals, Nursing Homes and Maternity Homes Registration Ordinance (Cap. 165), the Director could also take advantage of the licensing conditions of private hospitals i.e. accommodation, staffing or equipment as provided by s.3 of Cap. 165, to exert control over PWH even in mid-March 2003 when SARS was not yet included as one of the infectious diseases of which the provisions of Cap. 141 apply.

90. I hope you find the above information useful.

Yours sincerely,

SIGNED

(Dr Margaret Chan)
Director of Health