Chapter 13 Infection control measures in hospitals

Finding of facts

Number of healthcare workers infected

13.1 One of the main areas of concern of the Select Committee is infection control measures in public hospitals as during the SARS epidemic, 386 healthcare workers (HCWs) were infected and eight of them died. The number of HCWs infected was 22% of the total number of persons infected. In some of the previous Chapters, the Select Committee has examined the various infection control measures taken in a number of hospitals of the Hospital Authority (HA), including the provision of personal protective equipment (PPE) for HCWs. In this Chapter, the Select Committee sets out its general observations and comments in this regard.

13.2 To assist the Select Committee in its study of this area of concern, 10 hospitals were requested to complete a questionnaire entitled "Measures relating to Personal Protective Equipment during Outbreak of Severe Acute Respiratory Syndrome". These 10 hospitals are -

(a) Alice Ho Miu Ling Nethersole Hospital (AHNH);
(b) Kwong Wah Hospital (KWH);
(c) Pamela Youde Nethersole Eastern Hospital (PYNEH);
(d) Prince of Wales Hospital (PWH);
(e) Princess Margaret Hospital (PMH);
(f) Queen Elizabeth Hospital (QEH);
(g) Queen Mary Hospital (QMH);
(h) Tai Po Hospital (TPH);
(i) Tuen Mun Hospital (TMH) ; and
(j) United Christian Hospital (UCH).

The questionnaire and an analysis of the responses of these 10 Hospitals to the questionnaire are set out in Appendices X and XI respectively. The main points discussed in the analysis are highlighted in this Chapter.

Guidelines on infection control

13.3 The Select Committee noted that numerous guidelines on infection control were issued during the epidemic. A memorandum on surveillance on Severe Community-Acquired Pneumonia (SCAP) was issued by the Head Office of HA (HAHO) on 12 February 2003. Between 21 February and 12 March 2003, four sets of Frequently Asked Questions (FAQs) on the Management of SCAP were issued. All the four sets of FAQs were produced in English, without any Chinese version.

13.4 In addition, between 18 March and 30 June 2003, various sets of guidelines entitled the "Guideline on the Management of SARS", or "HA Guideline on the Management of SARS", or "HA Guideline on SARS", or "HA Information on SARS", or "Infection Control" were issued. With the exception of the "Guideline on the Management of SARS" issued on 18 March 2003 which was in Chinese, all the other sets of guidelines were in English.

13.5 In response to the Select Committee's questionnaire, eight Hospitals, namely AHNH, PYNEH, PWH, PMH, QMH, TPH, TMH and UCH, indicated that they issued their own guidelines on infection control, in addition to those issued by HAHO, the main reason being that it was necessary to adapt the guidelines of HAHO to suit their own situations. The Select Committee noted that UCH produced its own guidelines in Chinese.

Promulgation of and training on guidelines on infection control

13.6 According to the Convenor of the Central Committee on Infection Control (CCIC) and the Working Group on SCAP, Dr LIU Shao-haei, the FAQs on the Management of SCAP were issued to hospitals through the Infection Control Officers (ICOs), the Infection Control Nurses as well as the members of CCIC and the Working Group on SCAP. With effect from 19 March 2003, the various sets of information on SARS were posted on the dedicated webpage on the HA intranet for access by staff.

13.7 The Select Committee noted that in his letter dated 13 March 2003 to all HA employees, the Chief Executive of HA, Dr William HO Shiu-wei,

reminded them that wearing face masks and washing hands after having contact with patients, especially those with flu-like symptoms, were effective means of prevention. In another letter to all HA employees dated 17 March 2003, Dr HO again called on them to wear face masks and adopt universal precautions.

13.8 The Select Committee also noted that a daily newsletter entitled "Battling SARS Update" for disseminating essential infection control messages and news on the epidemic was published since 31 March 2003. A 24-hour "SARS Hotline" was also set up to improve communication with the frontline HCWs and to provide immediate response to SARS-related enquiries. Regular staff forums were conducted by the Hospital Chief Executives (HCEs) and the Cluster Chief Executives (CCEs) in their respective hospitals to update HCWs on the development of the epidemic as well as to collect direct feedback and address operational issues. Hospital-based infection control resource centres were also piloted.

13.9 According to Dr LIU, HAHO required all the hospitals to provide mandatory training for all HCWs, including supporting staff and contractors' employees. Refresher training was also required to be provided as and when necessary. The Public Affairs and Human Resources Sections of HAHO produced posters and provided multi-media training resources to facilitate communication with and training for HCWs in hospitals.

13.10 It was noted from the responses to the Select Committee's questionnaire that all the 10 Hospitals used "email messages" and "websites" to disseminate instructions or guidelines on infection control. Staff forums, briefings and training sessions were the most common forum for providing training. Notices, ward manuals and posters were also used to disseminate information on infection control measures. Some hospitals also adopted unique ways to disseminate information. For instance, KWH used "staff ambassadors", while AHNH and PMH set up a hotline enquiry service to communicate with the frontline workers.

13.11 Regarding the comment made by some HCWs that there were too many guidelines on infection control issued to HCWs during the epidemic, the

Director (Professional Services and Public Affairs) of HA, Dr KO Wing-man, explained to the Select Committee that it was difficult to achieve the right balance. On the one hand, as SARS was an emerging infectious disease, a lot of information needed to be disseminated to HCWs. On the other hand, there was the problem of inundating HCWs with too many guidelines such that HCWs simply did not have time to read them. Dr KO admitted that it was difficult for the frontline HCWs to digest the large amount of information communicated to them during the epidemic.

13.12 The Select Committee noted that there was also the comment made by some HCWs that they were not aware of the guidelines on infection control issued by HAHO at the early stage of the epidemic.

Compliance with guidelines on infection control

13.13 According to Dr LIU, "a structured inspection of all workplaces to assess the level of compliance and effectiveness of SARS precaution program was conducted in April and May 2003". An Infection Control Enforcement Team was set up in each hospital, and depending on the available expertise in the hospital, the Infection Control Enforcement Team or HAHO would organize independent inspection. Infection control wardens were also designated in each hospital to remind the frontline HCWs of the importance of good infection control practices and the proper use of PPE when attending to SARS patients.

13.14 In the Select Committee's questionnaire, the 10 Hospitals were asked to provide details of incidents of non-compliance with the guidelines on infection control. PWH and TPH responded that they had no recorded incident of non-compliance with the guidelines or instructions on the infection control measures issued by HAHO during the SARS epidemic, but PWH did point out that some lapses in infection control practices had been noticed. Based on the responses of the 10 Hospitals to the questionnaire as well as their respective audit reports on infection control, the Select Committee noted that the more common incidents of non-compliance with infection control guidelines and instructions included -

(a) inadequate washing of hands;
(b) inadequate changing of gloves;
(c) not all staff having received training;
(d) inadequate changing of uniform;
(e) improper wearing of masks;
(f) gowning areas not well-guarded against intrusion; and
(g) lack of warning notices/shortage of posters.

13.15 All the 10 Hospitals reported that actions were taken to rectify non-compliance with infection control guidelines or instructions after such incidents had been identified. The most common action taken to rectify non-compliance was the provision of training on infection control practices and the proper use of PPE. Reminders on washing of hands were issued. Notices and signs were also posted to identify gown-up and gown-down areas.

Responsibilities of an Infection Control Officer in an infectious disease outbreak in a hospital

13.16 HA informed the Select Committee that each hospital formulated its own policy and procedures on handling an outbreak, which were updated and endorsed by the Hospital Infection Control Committee. According to the contingency plan of PYNEH which was provided by HA to the Select Committee as a sample of the contingency plans of HA hospitals, the responsibilities of an ICO in the management of an outbreak of an infectious disease included -

(a) notifying the Department of Health;

(b) advising the medical staff on appropriate investigation and treatment of patients and staff;

(c) organizing the laboratory facilities necessary for the investigation into the outbreak, and requesting assistance from other sources, e.g. Public Health Services laboratories if needed; and

(d) informing HCE about the current situation.

13.17 The Select Committee asked Dr William HO and Dr LIU whether it was the duty of the ICO concerned to visit the infected ward(s) in an outbreak at a hospital. Dr HO told the Select Committee that prior to the SARS outbreak, there were requests from some ICOs themselves and other HCWs in the hospitals that apart from carrying out researches in laboratories, ICOs should be encouraged to provide specific on-site advice on infection control measures. The issue was raised at the HA Service Management Meeting. Dr HO considered it undesirable for the ICO concerned not to visit the infected ward(s) following an outbreak at a hospital. Dr LIU also told the Select Committee that the role and functions of an ICO included investigating an outbreak of an infectious disease in a hospital and taking necessary follow-up actions. To carry out the investigation, the ICO concerned would be expected to lead an investigation team comprising a microbiologist to inspect the infected ward to find out the cause of the outbreak.

Guidelines on the use of personal protective equipment

13.18 The guidelines on infection control issued by HAHO also included guidelines on the use of PPE. Dr LIU explained to the Select Committee that standard provisions of PPE were recommended having regard to the latest knowledge of "the mode of transmission of the coronavirus and local experience of breakthrough infections". Clinical areas were risk-stratified based on the level of risk of exposure. Assessments of the effectiveness of the different types of PPE were conducted, and the updated information was disseminated via the SARS webpage of the HA internet and intranet.

13.19 According to HA, adoption of infection control measures in hospitals was "an evolutionary process". Recommendations on the use of PPE were revised in the light of new knowledge that had surfaced with new experience at different phases. Initially, upon the advice provided by the Working Group on SCAP, HCWs were reminded to adhere to the infection control measures adopted for handling patients suffering from SCAP, namely droplet precautions in addition to universal precautions. The recommended/ mandatory items of PPE for what HA called the "preparatory and early phase" of the epidemic, i.e. from 21 February to 23 March 2003, were as follows -

(a) universal precautions: use of barrier apparel (gown and gloves) when coming into contact with patients' blood and body fluid; and

(b) droplet precautions: use of a mask was required when working within three feet of the patient; staff with respiratory symptoms were required wear masks. As from 10 March 2003, patients with respiratory symptoms were required to wear masks.

13.20 According to HA, the recommended/mandatory items of PPE for the "peak phase" of the outbreak, i.e. from 24 March to 6 April 2003, were the same as those for the previous phase, plus the following -

(a) HCWs attending to SARS patients were required to put on surgical or N95 masks, goggles or protective eye gear, gowns and caps; and

(b) HCWs attending to non-SARS patients were required to put on surgical or N95 masks.

13.21 The Select Committee noted that HA coined the periods from 7 April to 20 April 2003 and from 21 April to 23 June 2003 the "plateau phase" and the "resolution phase" of the epidemic respectively. Other than the items of PPE recommended for the previous phases, the following additional PPE items were recommended/made mandatory -

(a) the "plateau phase": working clothes for staff; and mandatory eye protection gear for HCWs undertaking procedures involving close patient contact; and

(b) the "resolution phase": HCWs attending to dependent, confused or uncooperative patients should also wear tight-fitting goggles, full face shields and water repellent gowns; and those HCWs undertaking high risk procedures and nursing patients with high infectivity should also wear "cover-all-suits and full PPE".

13.22 The Select Committee noted that in the memorandum on surveillance on SCAP issued by HAHO on 12 February 2003, HCWs were advised to wear surgical masks within one metre of a patient. However, in the four sets of FAQs on the Management of SCAP issued between 21 February and 12 March 2003, HCWs were only advised to "wear a mask" when working within three feet of patients. The Select Committee noted that the Consultant of the Accident and Emergency Department (AED) in KWH, Dr WU Chun-wah, and the HCWs concerned wore paper masks while examining *AA* when he was admitted to KWH on 22 February 2003. When asked about her interpretation of the phrase "wear a mask" in the FAQs, Dr Melissa HO, ICO of KWH, told the Select Committee that a mask used for droplet precautions could mean "N95 mask, surgical mask, or paper mask unless it is very thin". The Select Committee also noted that in one entry dated 24 February 2003 in the occurrence book of Ward 12A in UCH, HCWs were advised to wear a paper mask or surgical mask.

13.23 Dr LIU explained to the Select Committee that any reference to a mask as a tool for protection against infection should be understood to mean a surgical mask. It was not clearly specified in the guidelines probably because no special attention was paid to such details at that time. He admitted that the Working Group on SCAP, on reflection, would probably agree that it could have done better with these details.

13.24 The Select Committee also noted that in the set of FAQs on the Management of SCAP issued on 7 March 2003, HCWs in AEDs were reminded to put on a mask when attending to patients with respiratory symptoms. The Select Committee asked Dr LIU whether HCWs in AEDs should have been advised to put on a mask before attending to patients, as it might be too late to put on a mask after an HCW discovered that a patient had respiratory symptoms. In reply, Dr LIU agreed that this might be the case, but the relevant guideline in the set of FAQs of 7 March 2003 did not provide such details. However, in the subsequent guidelines issued by HAHO, HCWs in AEDs were required to wear masks when attending to patients[12], and AEDs were classified as high risk areas. The Select Committee noted that it was in

[12] The Select Committee was told by some witnesses that HCWs in AEDs all wore masks from 13 March 2003 onwards.

the "HA Guideline on SARS" issued on 3 April 2003 that AEDs in hospitals were classified as high risk areas.

13.25 The Select Committee noted that following the outbreak at the Prince of Wales Hospital, numerous enquiries were made by HCWs regarding the use of "self-provided" PPE. Dr KO Wing-man told the Legislative Council Panel on Health Services on 30 April 2003 that HAHO had already clarified with hospitals that "self-provided" PPE items were allowed on condition that they were safe to use. The Select Committee learnt that the principle of not forbidding staff to provide themselves with additional protective gear unless it was categorically harmful was agreed to at the Daily SARS Round Up Meeting in early May 2003, and that CCEs would communicate the principle to their staff and educate them on the use of PPE.

13.26 The Select Committee also noted that the guidelines on the use of "self-provided" PPE were not published in the "HA Guidelines on SARS" until 21 May 2003. When asked by the Select Committee why there was the delay in issuing the written guidelines and whether the hospitals knew what to do in the interim, Dr KO explained that some technical issues needed to be sorted out with the hospitals before issuing the guidelines to HCWs. Dr KO admitted that the delay was unsatisfactory.

Procurement and supply of personal protective equipment

13.27 As discussed in the previous Chapters, prior to and at the early stage of the SARS epidemic, individual hospitals were responsible for their own procurement of PPE. The Select Committee noted that an Internal Audit Report entitled "The Management & Control of Hospital Acquired Infection" of September 2001 found that there was scope for more involvement of Infection Control Teams (ICTs) in certain support services, including the purchase of equipment. The Report stated that hospitals should ensure that its ICT would be consulted when planning the purchase of equipment.

13.28 The Select Committee, however, learnt from ICO of KWH, Dr Melissa HO, that she was not involved in making recommendations on the specifications of masks, such as their thickness. HCE of KWH, Dr LUK Che-chung, likewise informed the Select Committee that Dr HO did not have any role to play in relation to the technical specifications of masks (such as their thickness) in the procurement process.

13.29 The Select Committee noted that the central procurement of PPE, starting with the purchase of surgical masks, N95 masks and disposable isolation gowns, commenced in the last week of March 2003. Under the direct supervision of the Senior Executive Manager (Business Support Services), a Sub-Command Centre was set up on 29 March 2003 which responded to all enquiries or requests for PPE. The Centre monitored the consumption of PPE and coordinated the forecasts of weekly and monthly demand for PPE prepared by the clusters. The Centre also coordinated reallocation of stock among clusters to meet increase in demand.

13.30 The Select Committee also noted that from 9 April 2003 onwards, the supply situation of PPE items was detailed in the "Battling SARS Update" for the information of HA staff.

13.31 According to HA, the stock of surgical masks remained stable throughout and the supply was able to meet the actual demand, although global supply of N95 masks was limited. The Business Support Services team tried vigorously to secure more deliveries from overseas suppliers. From 21 April 2003 onwards, the supply of N95 masks, including the small size ones, started to improve. The central purchase of goggles commenced in the first week of April 2003. The stock level started to rise from 7 April 2003 and by 26 April 2003, the supply of goggles had improved. The central purchase of face shields commenced in the first week of April 2003 and before sufficient numbers could be purchased, the Prosthetic and Orthotic units of some hospitals helped in producing small quantities of such shields. From 14 April 2003 onwards, the supply began to improve and the stock level began to rise.

13.32 The 10 Hospitals were asked whether they were able to maintain no less than seven days' supply of PPE during the SARS epidemic. QEH was

the only Hospital which responded that it was able to maintain no less than seven days' supply of PPE during the SARS epidemic. As regards the supply of N95 masks and surgical masks, four Hospitals, i.e. PWH, QMH, TMH and UCH, indicated that they had supply of less than seven days at various times during the SARS outbreak. PYNEH responded that it had less than seven days' supply of N95 masks of a certain brand and surgical masks at various times during the SARS epidemic. The replies given by AHNH, KWH, PMH and TPH were unclear as to whether these Hospitals had supply of no less than seven days.

13.33 Eight Hospitals, i.e. AHNH, KWH, PYNEH, PWH, PMH, QMH, TMH and UCH, informed the Select Committee that prior to the commencement of central procurement, HAHO or the cluster was involved in monitoring the stock supply, liaising with suppliers, procuring PPE items, and arranging deliveries. Even after the commencement of central procurement, AHNH, KWH, PWH, PMH, TMH and UCH did attempt to procure additional PPE, while PYNEH and QMH indicated that they did not have such need. As regards QEH, it was able to maintain no less than seven days' supply of PPE during the SARS epidemic. TPH answered "not applicable" to the question as to whether HA was notified of the shortages of PPE.

13.34 Except TPH, all the other nine Hospitals indicated that they had no less than seven days' supply of shoe cover. The response of TPH was unclear as to whether it had no less than seven days' supply of shoe cover.

13.35 The Chairman of HA, Dr LEONG Che-hung, pointed out to the Select Committee that between the end of March and mid-April 2003, the numbers of surgical masks and N95 masks used were some six million and 610 000 respectively. Prior to the SARS outbreak, the number of surgical masks used per month was only 60 000. The Board members of HA, regardless of whether or not they were from the medical sector, had tried their best to help source these PPE items.

13.36 Dr William HO explained to the Select Committee that the procurement of PPE was very testing for the supplies personnel in HAHO when the demand for certain items suddenly increased by hundreds or

thousands folds, in the midst of worldwide shortages owing to competing sourcing by countries across the world. HAHO quickly implemented central purchasing and distribution when it became clear that the epidemic was territory-wide and, except for certain brief periods during which the stock levels of certain items were near critical, there were no instances of PPE items being out of stock.

13.37 Dr William HO also pointed out that weaknesses in certain areas of communication gave rise to dissatisfaction among HCWs. However, "the degree of difficulty in dealing with such complex and often emotional circumstance should also be recognized". The Business Support Services in HAHO and hospitals tried extremely hard in negotiating with overseas suppliers to obtain whatever stock that was available, testing large varieties of new PPE products expeditiously in response to demand, and ensuring effectiveness in the supply logistics. Dr HO told the Select Committee that through tireless efforts, new production lines were secured in the Mainland to supply certain items of great demand.

13.38 Dr William HO admitted to the Select Committee that during the SARS epidemic, he did not follow the established procedure of HA for the purchase of PPE on some occasions, and that he had to seek retrospective approval of the HA Board for these purchases. The Select Committee noted that in accordance with the procurement policy manual of HA, urgent purchase up to $1 million per order can be made directly with vendors without the need to go through the tendering process. During the SARS epidemic, retrospective approval for urgent acquisition of various PPE items from mid-March to the end of July 2003 which amounted to $311.5 million was sought from the HA Board on 31 July 2003.

13.39 In response to the Select Committee's question about his remark made in a radio programme that requests made by some HCWs to wear certain PPE items were "emotional" and not rational, Dr KO Wing-man explained that because of the tight supply of certain items, such as small size N95 masks, distribution had to be made based on the result of risk assessment. However, there were HCWs who, even though they worked in lower risk areas, preferred to wear N95 masks because they felt that such masks were safer. Dr KO

pointed out that the middle management needed to strike a balance between meeting immediate requests of employees for the use of such masks and maintaining adequate supply for ongoing use.

13.40 Dr KO informed the Select Committee that the supply situation of PPE was discussed at every Daily SARS Round Up Meeting. He admitted that there were problems with the supplies of certain PPE items, in particular N95 masks. The problems were eventually resolved, except that the supply of N95 masks remained tight. Dr KO also informed the Select Committee that although he had designated staff to handle procurement matters, he did, at a certain stage, personally meet with the suppliers to discuss the procurement of some PPE items.

13.41 The Select Committee noted that the HA Board approved the formation of a Central Task Force on Supplies and Environmental Control on SARS at its meeting on 26 April 2003. The Task Force was set up on 2 May 2003 under the chairmanship of Dr FUNG Hong to, inter alia, review the efficiency and adequacy of PPE supplies.

Complaints about unavailability of personal protective equipment

13.42 The Select Committee noted that complaints relating to PPE were received by individual hospitals as well as through the "SARS Hotline". According to HA, the complaints were mainly related to problems with the supply or availability of certain PPE items, in particular N95 masks, and the poor quality of certain PPE items.

13.43 The 10 Hospitals were also asked in the questionnaire whether they had received complaints about unavailability of PPE. KWH, PWH and UCH responded that there was no complaint from employees about unavailability of PPE. As for the other seven Hospitals, PYNEH, QEH and TMH each had one complaint; TPH two; AHNH three; QMH 10; and PMH 11.

13.44 The 10 Hospitals were asked whether, at the time when HAHO issued/revised guidelines to require HA employees to wear certain PPE items, there was adequate supply of such items. Seven Hospitals, i.e. AHNH,

PYNEH, PWH, PMH, QEH, TPH and TMH, indicated that they had adequate supply of PPE. KWH indicated that it had supply in the Hospital but did not clarify whether the supply was adequate. QMH indicated that there was limited supply of surgical masks in late March/early April 2003. UCH did not provide a direct answer but indicated that there was less than seven days' stock of disposable gowns (fluid resistant), goggles, eye shields, face shields, N95 masks and surgical masks at various times during the period from March to May 2003, and that HAHO was notified of such shortages.

Occasions on which staff were not allowed to put on personal protective equipment while on duty

13.45 In response to the Select Committee's questionnaire, AHNH, KWH, PYNEH, PWH, PMH, QEH, TPH and UCH indicated that there was no occasion on which HCWs were not allowed to put on PPE while on duty. In QMH, some HCWs were advised not to put on N100 masks and were reminded that it would be at their own risk to do so. TMH responded that inappropriate wearing of PPE while not carrying out duties with infection risks outside the patient care areas was not allowed. Apart from masks, all forms of caps, disposable gowns and linen gowns, shoe covers, gloves, eye goggles, or face shields were not allowed to be worn in communal areas except when carrying out duties with infection risks. According to TMH, the reason for issuing such an instruction was that it was impossible to differentiate between contaminated PPE and non-contaminated PPE, and that inappropriate wearing of these items in communal areas without infection risks would pose difficulties for the Hospital to enforce infection control measures to safeguard staff and patients.

Requests from staff wearing their own personal protective equipment

13.46 Seven Hospitals, namely, KWH, PYNEH, PWH, PMH, TPH, TMH and UCH, responded that they did not turn down any requests from staff to put on their own PPE items, which were considered by the staff concerned to be offering a higher level of protection than those specified in the guidelines or instructions issued by HAHO at the time when such requests were made. AHNH reported that its HCE was not aware of any such requests being turned

down. QEH indicated that it advised against the use of self-purchased P100 masks because it was a non-standard PPE item at the time, and that there were doubts about the quality of the item and reliability of the vendor. In the case of QMH, there were two occasions on which HCWs in the Adult Intensive Care Unit had requested to use additional PPE. HCE of QMH and its ICT held meetings with the staff concerned, who were subsequently convinced to follow the hospital guidelines.

Infection of healthcare workers and personal protective equipment

13.47 When asked by the Select Committee whether he considered the provision of PPE for HCWs adequate during the SARS epidemic, Dr LEONG explained that the provision of PPE was inadequate at the early stage of the epidemic, and that even nearly one year after the outbreak, there were not enough small size N95 masks. Dr LEONG, however, pointed out that the provision of PPE items was only one aspect of infection control, and that it was important for HCWs to know how to use them properly. Some items, such as the Barrier-man suits, could result in the users being infected, if the proper procedure for using them was not followed.

13.48 Dr William HO told the Select Committee that it was clear from subsequent observations that over-reliance on the "so-called" high level PPE could do more harm than good, as HCWs had the propensity to relax when wearing such PPE. Emphasis on basic practices was sometimes unfortunately misinterpreted as excuses of the management for not providing the "best PPE", a notion which was sometimes played up in the media. The more HCWs contracted the disease, the more fear among them; hence the inclination towards over-protection. It took some time before this situation could be turned around.

13.49 Dr William HO also told the Select Committee that at the beginning of the SARS epidemic, certain PPE items, such as shoe covers, head covers and the Barrier-man suits, were used. They were later found to be likely to increase the chance of infection. For instance, HCWs in PWH had requested to use the Barrier-man suits and the request was accepted by HAHO. The use

was stopped after a trial period because some HCWs were infected while wearing them.

13.50 Dr William HO pointed out to the Select Committee that throughout the epidemic, controversy surrounded the infection control practices as well as the provision and distribution of PPE. It was difficult at the time of the epidemic when there was no expert consensus. Even at the time of the Select Committee's hearing, much was still unknown regarding the transmission of the SARS virus and the effectiveness of the various types of PPE. Making changes to infection control guidelines was not unique to Hong Kong, and conversely Hong Kong was affected by changes in guidelines overseas because knowledge of the unknown disease was evolving. The management of HA had worked closely with experts from different hospitals, the University of Hong Kong and The Chinese University of Hong Kong, constantly making reference to the latest scientific information. A huge amount of effort was spent in harmonizing professional opinions so that consistent messages could be put across to the frontline HCWs. Dr HO considered that the basic principles of the HA guidelines had stood the test of time.

Commitment of the Administration

13.51 The Director of the Chief Executive's Office, Mr LAM Woon-kwong, told the Select Committee that the Chief Executive was very concerned about the infection of HCWs. The Secretary for Health, Welfare and Food, Dr YEOH Eng-kiong, had an "open blank cheque" from the Chief Executive and the full support of the Administration for reducing the level of infection among HCWs. During the period from late April to early May 2003, the Chief Executive had asked Dr YEOH and Dr LEONG to reduce the number of new cases of infection of HCWs to five, and then to zero.

13.52 Dr YEOH told the Select Committee that the Administration gave HA the indication that "they could go out and get whatever protective gear that was needed and that we would pay the bills".

13.53 The Select Committee noted that the issue of the procurement of masks was discussed by the Chief Executive's Steering Committee (CESC) on

a number of occasions. It was agreed at the meeting on 25 March 2003 that the Government Supplies Department (GSD) be asked to purchase 10 million masks for use by civil servants and members of the public. At the CESC meeting on 27 March 2003, the Secretary for Financial Services and the Treasury, Mr Frederick MA Si-hang, reported that GSD had already sent a team to Shanghai to secure the supply of masks. The Chief Executive directed that this should be secured as soon as possible, and that he was prepared to talk to the relevant Shanghai authorities to expedite the matter. At the CESC meeting on 28 March 2003, Mr MA reported that a stock of 880 000 masks would arrive the following Monday. Continuing efforts were being made to ensure further supply from Shanghai. The Chief Executive again asked that this had to be done as quickly as possible, and that he could talk to the leaders of the Shanghai government if necessary. Dr YEOH said at the meeting that it would be particularly essential to ensure the supply of masks to private doctors.

13.54 The Select Committee noted that the Administration had provided the Mainland authorities with information on the specification requirements and samples of the PPE items in need. The PPE items donated by the Central People's Government (CPG) were delivered to HA between 8 May and 29 May 2003 in three batches. The types and quantities of PPE delivered were as follows -

	Type of PPE items	Quantity (in pieces)
(a)	isolation gown	600 000
(b)	surgical mask	800 000
(c)	face shield	20 000
(d)	eye shield (frame)	30 000
(e)	eye shield (lens)	100 000
(f)	goggles	10 000
(g)	N95 mask (small size)	36 000
(h)	N95 Mask (regular)	164 000
(i)	barrier-man suits	113 000
(j)	shoe cover	100 000

13.55 According to the Administration, all the PPE items delivered complied with the specified requirements. On receipt, HAHO determined the allocation of the PPE items donated by CPG at the hospital cluster level, having regard to the stock position of individual clusters. On receipt of the PPE items, the clusters distributed them to their hospitals to meet operational requirements. HA also provided the Barrier-man suits to different government departments, including the Agriculture, Fisheries and Conservation Department; Electrical and Mechanical Services Department; Fire Services Department; Food and Environmental Hygiene Department; Government Logistics Department and Department of Health.

13.56 The Select Committee learnt that the PPE items donated by CPG had been fully consumed with the exception of the Barrier-man suits. As at April 2004, there was a remaining stock of 13 325 Barrier-man suits which were kept by HAHO as contingency stock.

13.57 In the document entitled "Appraisal on SARS infections amongst Health Care Workers (HCWs) in public hospitals" dated 6 August 2003 given by the Administration to the Select Committee, it was stated that, "PPE is as important as other infection control measures, such as appropriate environment control, prompt identification and isolation of patients, and compliance with good infection control practices, in the prevention of staff infection and patient cross-infection. Appropriate use of adequate and suitable PPE should offer optimal protection to staff whereas undue reliance on PPE and improper use exposes staff to higher risks of infection and impairs operational efficacy. Knowledge of the SARS-coronavirus and SARS is still evolving. There is as yet no international consensus regarding the optimal PPE standard to be applied to various risk stratified clinical areas for preventing SARS transmission."

13.58 The Select Committee noted that there were no more cases of infection of HCWs after 4 June 2003, almost three months after the outbreak in Ward 8A in PWH on 10 March 2003.

Analysis

13.59 The Select Committee notes that guidelines on infection control, including those on the use of PPE, were updated and issued by HAHO as and when more information about SARS was available during the epidemic. The Select Committee considers that there was room for improvement in this regard. For instance, some of the guidelines were unclear and not issued in a timely manner, as discussed in paragraphs 13.22 to 13.26 above. Furthermore, all the guidelines should also have been issued in Chinese, for the benefit of the frontline HCWs.

13.60 The Select Committee agrees with the findings of the Internal Audit Report on "The Management & Control of Hospital Acquired Infection" of September 2001 that ICTs headed by ICOs should be consulted when planning the purchase of equipment.

13.61 The Select Committee notes that the supplies of certain PPE items, in particular small size N95 masks of a certain brand, were tight during the SARS epidemic, and that there were complaints made by HCWs about inadequate supply of PPE. The Select Committee understands the fears and stresses of HCWs in having to face the risk of contracting SARS at work and in turn infecting their families. HCWs were justifiably worried about the adequacy of their protective gear.

13.62 The Select Committee notes that in order to expedite the purchase of PPE, Dr William HO did not follow the established procurement procedure of HA on some occasions. The Select Committee appreciates the efforts made by HAHO in procuring PPE items for HCWs in the face of worldwide shortages of certain items.

13.63 The Select Committee also appreciates the efforts made to keep HCWs informed of the supply situation of PPE, for instance, by publishing such information in the "Battling SARS Update" from 9 April 2003, and to explain to HCWs that certain PPE items, such as the Barrier-man suit, might not necessarily offer a higher level of protection.

13.64 The Select Committee notes that it was not until 3 April 2003 that AEDs were classified as a high risk area in the guidelines on infection control issued by HA. The Select Committee also notes that the decision to allow the use of "self-provided" PPE items was made at the end of April 2003. The principle of not forbidding staff to provide themselves with additional protective gear unless it was categorically harmful was agreed to at the Daily SARS Round Up Meeting in early May 2003 and CCEs would communicate the principle to their staff. Written guidelines on the use of "self-provided" PPE items were, however, not issued until 21 May 2003. The Select Committee finds such delay in providing the necessary guidelines for HCWs not satisfactory.

Performance and Accountability

13.65 The Select Committee is concerned that certain expressions used in the guidelines on the use of PPE issued by HAHO might have given rise to different interpretations as they were unclear. For instance, in the four sets of FAQs on the Management of SCAP issued between 21 February and 12 March 2003, HCWs were only advised to wear a mask when working within three feet of patients, but the four sets of FAQs did not specify the type of mask that should be worn. Dr LIU Shao-haei, as the Convenor of CCIC and the Working Group on SCAP, did not appear to appreciate fully that the frontline HCWs might have different interpretations of the phrase "wear a mask" at the initial stage of the outbreak. Furthermore, Dr LIU as well as CCIC and the Working Group on SCAP, at the initial stage of the outbreak, were not fully alert to the risk faced by Triage Nurses in AEDs while treating incoming patients before any preliminary diagnosis was made; hence did not advise them to put on PPE at all times while on duty.