

CONFIDENTIAL

TO



PRINCESS MARGARET HOSPITAL

瑪嘉烈醫院

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19th March 2004

Select Committee
Legislative Council
Hong Kong Special Administrative Region of the People's Republic of China
Hong Kong

Dear Sirs/Madams

Re Select Committee to inquire into the handling of the
Severe Acute Respiratory Syndrome outbreak
by the Government and Hospital Authority.

I, Thomas Anthony Buckley, have prepared the following report in response to the questions put to me by the above Select Committee. My qualifications and experience are attached in Appendix one.

Preparedness and readiness of Princess Margaret Hospital (PMH) to serve as a SARS ^{detached} hospital
Prior to the SARS epidemic the ICU at PMH was situated in C2 of the Main Block. It consisted of 14 beds and contained 2 isolation rooms. It was staffed by 52 Registered Nurses, three Nursing Officers and 6 Doctors (one COS/CON, one SMO, two specialist MOs, 1 ICU trainee MO and 1 rotating MO). As is usual practice within ICUs staff changing facilities and call rooms were located within the ICU. My impression from conversations with staff is that both medical and nursing staff concentrated purely on clinical management of patients during normal working hours.

I am not in a position to comment on the preparedness and readiness of PMH to serve as a SARS hospital as I did not arrive at PMH until it was well and truly engulfed by SARS.

However, when the decision to designate PMH as the SARS hospital was announced, it was greeted with general disbelief at the Prince of Wales Hospital (PWH) for the following reasons.

- a) PWH which had less than 200 SARS cases was brought to its knees over a 2-3 week period. It seemed illogical that PMH could be requested to admit up to 1000 cases.
- b) Based on the PWH cohort it was known that 20% of patients could be predicted to require admission to ICU. The first response to the announcement that there would be a total of 100 ICU beds was that this would not be enough. The next response was disbelief that the Hospital Authority (HA) could find enough experienced ICU staff to care for critically ill patients.

Common sense dictates that any system that attempts to expand to five – seven times its normal size over a short period, even with appropriate planning, training and resources is bound to fail.

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After arriving at PMH and assessing the situation I have formed the impression that the PMH ICU was not capable of expanding beyond it's 14 beds let alone to 64 adult ICU beds even with all of it's staff fit and healthy for the following reasons

1. The PMH ICU medical staff level was unacceptable for a 14 bed ICU and hence was not capable of absorbing additional workload. When four of the six staff contracted SARS then the medical structure and organization failed completely. Medical staff introduced either had no training in the care of critically ill patients or if they did were unaware of the procedures in the PMH ICU.
2. The PMH ICU nursing manpower was unacceptable. The HAHO guidelines dictate a total nursing establishment (bedside + senior nurses) of 4.2 nurses per ICU bed under normal situations. With only 55 nurses the ratio in the PMH ICU was only 3.9. International figures suggest that total bedside nurses required should be in excess of 5 per ICU bed. The result was that ICU nursing manpower was not capable of absorbing extra work. Nursing staff introduced either had no training in the care of critically ill patients or if they did were unaware of the procedures in the PMH ICU.
3. The view has been expressed that extra nurses and doctors could be deployed from other areas. This suggests a lack of appreciation by the Hospital Authority of the skills and experience required to be an Intensivist or an ICU nurse. There is a lack of recognition of the specialized skills required by medical, nursing and other staff to provide complex multi-system life support for an indefinite period. Just as an ophthalmologist would never be asked to carry out a total knee replacement it is equally unjustifiable to request a non ICU specialist to care for a critically ill patient.

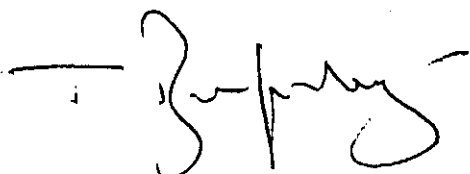
Infection control measures in PMH during the SARS outbreak

My comments are covered comprehensively in the answers to specific questions from the Select Committee but only cover infection control measures within the ICU environment.

Infection of health care workers in PMH

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Yours sincerely



Dr TA Buckley
Chief of Service
Intensive Care Unit
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In answer to specific questions from the Select Committee I have the following comments to make.

1. **When did you take over from Dr YAN Wing-wa as the Chief of Service of the Intensive Care Unit (ICU) of Princess Margaret Hospital (PMH)? How many Severe Acute Respiratory Syndrome (SARS) patients were there in the ICU of PMH when you took over? How many healthcare workers (HCWs) of the ICU of PMH had contracted SARS when you took over? Were there non-SARS patients in the ICU of PMH when you took over? If yes, how many? Did you recommend that they be moved out? Did any non-SARS patients in the ICU contract SARS while they were in the ICU of PMH?**

Answer:

Dr YAN Wing-wa took sick leave on the 7th April 2003. I was requested to transfer to the Intensive Care Unit of Princess Margaret Hospital on the afternoon of the 9th April 2003 and began duty on 10th April 2003. Dr CHEUNG King On (COS MED CMC) was in charge during the interim period. I was provided a thorough initial briefing by Dr CHEUNG. We continued to communicate frequently until his departure on 14th April 2003. We agreed that I would concentrate on infection control and clinical management while his role would be to liaise with the hospital administration, as I was unfamiliar with PMH. I also do not speak Cantonese. Dr CC LUK (HCE KWH) became responsible for "overall management of ICU" on 14th April and I was allocated the role of "clinical administration team in charge" on the same date. I did not become acting COS until 28th April 2003.

There were 43 SARS patients in the ICU of PMH when I took over? The patients occupied wards C2, D2 and A2 on the second floor of the Main Block. There were no non-SARS patients in the expanded ICU of PMH when I took over?

I am not aware of any non-SARS patients in the ICU prior to my arrival contracting SARS while they were in the ICU of PMH. After my arrival non-SARS patients were not admitted to the ICU until 30th May 2003. There were only 1-2 non-SARS patients at any one time until the hospital reopened on the 1st July. These non-SARS patients were admitted to C2, whereas SARS patients remained on D2. None of the patients in C2 developed SARS.

Twenty-two healthcare workers of the ICU of PMH had contracted SARS when I took over (Appendix Two). This included the

1. Chief of Service
2. Four Medical Officers (two of whom had been deployed from Anaesthesia)
3. Eleven Registered Nurses
4. Personal Secretary of COS
5. Four Ward Attendants
6. One Ward Steward

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2. Please describe the facilities and manpower available at the ICU of PMH when you took over from Dr YAN Wing-wa? Did you consider the facilities and manpower available adequate to cope with the SARS patient load? If yes, what was the basis of your views? If not, in what areas/aspects did you consider the facilities and manpower inadequate? Did you raise your concern with the hospital management? If not, why not? If yes, what was the response of the hospital management? Did you take any action to rectify the situation? If yes, what action did you take?

Facilities:

Prior to my arrival the male and female change rooms, the MO call room and the staff tea room which had been part of the ICU (C2) had been relocated to the Operating Theatre complex on LG1. There was a dedicated lift from the second floor to the LG1.

When I arrived the facilities consisted of three separate ICUs ((C2 (16 beds), D2 (16 beds), B2 (14 beds)) with the development of the fourth in progress (A2 (14 beds)). It had been proposed that patients would be moved from D2 to B2 the day after I arrived because of concerns with the ventilation systems within D2. It was felt that many of the staff had contracted SARS because of ventilation problems within D2. It was proposed to deep cleanse D2 before re-opening. While I expressed reservations about this I did not object because I had literally just walked in the door. I also realized that there was a crisis of confidence amongst the nursing staff and that if deep cleansing of D2 would help restore some confidence then I would not object. There were also plans afoot to open the fourth ICU on the 15th April. I expressed my reservations about this to Dr CHEUNG but as I had just arrived I decided to observe in the meantime.

Dr CHEUNG worked diligently to try and understand the ventilation systems within the ICUs. We both felt this was beyond our areas of expertise. Extractor fans had been included in some of the patient areas but not all. Installation of further extractor fans was an ongoing process.

Equipment (Appendix Three):

Within C2 and D2 the number of monitors (Spacelab) and the number of ventilators (Siemens) was satisfactory. ICU trained medical and nursing staff were able to use these without too much difficulty.

Within A2 and B2 the physiologic monitors were portable monitors while the ventilators were new and relatively unsophisticated. While staff with ICU experience were able to work out how to use the physiologic monitors no-one including myself was familiar with the ventilator. The different modes of ventilation had unfamiliar names and deciding which mode was which was decided by trial and error. Staff did not have a "feel" for this relatively unsophisticated ventilator. Patients in the ICU of PMH had a very high incidence of barotrauma which may in part be explained by staff's inexperience with the ventilator, the ventilator itself and/or the disease process. Despite requesting a company representative to provide onsite training no one appeared.

For staff **not trained** in Intensive Care, both doctors and nurses, the presence of complex physiologic monitors and ventilators was a daunting experience.

The numbers of syringe pumps, infusion pumps, ECG machines, manual resuscitators and defibrillators were sufficient. There was only one blood gas analyzer but three more arrived on the 11th April. There did not appear to be tympanic thermometers. They arrived on the 14th April.

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Manpower:*Medical*

On the day that I arrived the medical manpower for the three ICUs consisted of FOUR specialists. Dr CK KOO (Cons ICU QEH) and myself increased this to SIX. Only one of the six was a specialist from the ICU of PMH and therefore familiar with the structure of PMH. This specialist developed SARS two days later and took sick leave on 13th April.

Junior medical staff consisted of TWO PMH ICU staff and NINE Medical Officers from the PMH Departments of Medicine and Geriatrics and Anaesthesia. There was ONE Medical Officer and ONE Resident from two other hospitals within the cluster. Few of the junior medical staff had ICU experience, even fewer had PMH ICU experience and none had any experience with the ICU specialists now on site. The following day THREE more Accident and Emergency Medicine Medical Officers without ICU experience arrived.

My impression was that the ICU junior medical staff was deficient in both number and experience. I anticipated that there would be a lack of cohesion due to unfamiliarity and inexperience. The specialists while adequate in number were unfamiliar with each other's practices. There was considerable flux in manpower especially with regards the specialist manpower.

I do not remember the specifics of a telephone conversation I had with Dr CHIU (CCE PMH) on the 12th April but later on that day I faxed a memo to Dr CHIU, in which I refer to the telephone conversation, outlining the requirements for providing a minimally acceptable standard of care for the ICUs (Appendix Four). I had previously requested through Dr CHEUNG that 15 MOS with ICU experience capable of working semi-independently be made available to care for 3 ICU wards.

In addition, after discussion with Professor Tony GIN (COS AIC PWH) it was decided ONE Specialist from the PWH ICU would come on a voluntary basis to PMH ICU starting from Monday the 14th of April. This happened up until the 25th April.

Having observed the situation I decided that the most appropriate action was to split the junior medical staff into three separate and independent teams (one for each ward) and to create a separate call roster. Each of the wards would be headed by a Specialist in Intensive Care. Depending on medical manpower availability I decided to roll this out on Monday the 14th April. Dr HO Tat-fai (COS ICU YCH) and Dr KUNG Man-chiu (CONS ANA PMH) became responsible for the roster. Some modification was required when the remaining PMH ICU Specialist went off sick on the 13th April.

On the 13th April I also decided that it would be inappropriate to open the fourth ICU on the 15th April. However, on the morning of the 14th April I was informed that the PMH SARS Committee had agreed independently not to open the fourth ICU. The facsimile concerning medical manpower was again presented on the Monday morning. In reality I accepted that the Hospital Management could not possibly supply experienced ICU staff.

Nursing

There were a high percentage of nurses untrained in the basic management of the critically ill patient. Providing the most basic of care to critically ill patients, e.g nursing observations, turning of patients, infusions of sedative and inotrope agents, catheter care, airway suctioning, strapping of endotracheal tubes, nasogastric feeding, all became major challenges. Nurses

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were unfamiliar with the physiologic monitors, syringe pumps, infusion devices, dialysis machines and most importantly the ventilators.

In describing the lack of experience of both junior medical and nursing staff I am in no way implying criticism of their efforts to care for these patients. Every staff member behaved professionally and made strenuous efforts to provide the highest level of care to the patients.

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3. Was additional manpower deployed from the other Departments in PMH and/or other hospitals to the ICU of PMH during the SARS outbreak at PMH? If not, why not? If yes, what were the details of the deployment? Was the deployment made according to an existing mechanism or contingency plan for dealing with a sudden shortage of staff at the ICU of a particular hospital?

Answer

Additional manpower was deployed from the other Departments in PMH and other hospitals to the ICU of PMH during the SARS outbreak at PMH (Appendix Two and Five).

Deployment was not made according to an existing mechanism or contingency plan for dealing with a sudden shortage of staff at the ICU of a particular hospital. This is an impractical solution to a difficult problem. ICU medical staff require 6 years of training to become a specialist. Rotating junior medical staff require 3-6 months exposure to a particular ICU to become semi-independent. A Registered Nurse requires 2-3 years experience before she/he would be regarded as being proficient in the care of the critically ill patient.

An ICU is a specially staffed, and equipped, separate and self contained section of a hospital for the management of patients with life threatening and potentially reversible organ failure. It utilizes specialized skills of medical, nursing and other staff to provide complex multi-system life support for an indefinite period. These skills and resources are most efficiently concentrated in one area of a hospital. Within each ICU policies, protocols and guidelines are developed so as to standardize care. A team approach to clinical management evolves which is achieved within the framework of agreed policies. Part of the process involves documentation, and demonstrable procedures for formal audit, peer review and quality assurance.

As such every ICU develops it's own personality. It is very much like a professional orchestra under the guidance of a conductor. In an evening performance the harmony, synchronization and teamwork are highlighted. The audience marvels at the complexity and beauty of the performance. Unfortunately the principal clarinet, followed by the principal violin fall ill. Replacements new to the orchestra take their place. The conductor falls ill and the coordination between various sections of the orchestra deteriorates. Many other members of the orchestra leave the stage to be replaced by individuals who cannot play the violin, the cello or the trombone. The performance degenerates into a cacophony of sound.

This is what happened in the ICU at PMH. It lost its shape and became increasingly unable to meet the demands placed on it.

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4. Did the HCWs deployed from the ICUs of other hospitals to the ICU of PMH encounter any difficulties in their work? If yes, what were these difficulties? Why were there difficulties and how were they resolved? Were non-ICU staff deployed to work in the ICU of PMH? If yes, why were they deployed? Did they encounter any difficulties in their work? If yes, what were the difficulties and how were these difficulties resolved?

The HCW from other hospitals ICUs encountered many problems.

- a) HCW were unfamiliar with each other, not even knowing each other's names or their level of experience. This was compounded by staff being unrecognizable because of the PPE.
- b) HCW were unfamiliar with the PMH ICU routines. For example a nurse or doctor familiar with one drug dilution, when changing shift would hand over the case to another doctor or nurse completely unfamiliar with that particular drug dilution.
- c) All staff at one time or other experienced unfamiliarity with equipment. This was most evident regarding the new ventilators. Imagine being requested to play a clarinet following a brief introduction to the fingering positions. A ventilator is a complex piece of equipment that requires many hours of hands on experience before one understands it's performance.
- d) Communication was a particular concern as I had been aware at PWH that communication within the ICU was essential to calming nerves and decreasing anxiety. There did not appear to be effective channels of communication as anxiety levels were extremely high. My impression here may have been compounded by the fact that I do not speak Cantonese.

Non-ICU staff (both medical and nursing) were deployed to work in the ICU of PMH. I do not know why they were deployed as I was not part of the decision making process but I was informed that no other staff were available. In addition to the above problems they had the following problems.

- a) No experience of caring for critically ill patients who required mechanical ventilation for respiratory failure, inotrope and vasopressor infusions to support the circulation and renal replacement therapy. Patients in renal failure could not be provided with an acceptable standard of renal replacement therapy. There were insufficient experienced staff available as many of the nurses trained in dialysis had contracted SARS. Patients were provided with peritoneal dialysis as an alternative.

I thought it necessary that order needed to be re-established in terms of

- a) Staffing arrangements
- b) Clinical management
- c) Infection control
- d) Communication processes

Many of the problems were only partially resolved. Training a nurse or a doctor to care for critically ill patients takes time under normal circumstances. During the SARS epidemic the following measures were introduced.

- a) Training: Doctors received on the job training. For example, the three A&E doctors who had not worked in ICU before were supervised by the PWH Specialist. Non-ICU nurses received an ICU crash programme. This was commenced on the 11th April.
- b) Protocols: were introduced for drug dilutions, organ support objectives and SARS management. These were discussed in small group sessions and then posted outside every patient cubicle.
- c) Physiotherapy services were reintroduced to the ICU. These had previously been on a

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consultation basis only.

- d) Severity of illness: ICUs usually keep a database of all critically ill patients admitted to ICU so as to assess severity of illness. This had stopped at PMH so I constructed a simple database of patients for future reference.
- e) Orientation programme: This was commenced for all newcomers on the 10th April.
- f) Infection control talks
- g) Demonstration on the use of PPE
- h) Internal communication: This significantly improved with Dr CC Luk's arrival. He introduced
 - Staff Notice Board in the Operating Theatre Recovery Room (15/4/03)
 - Updated useful SARS information on Flip Chart (15/4/03)
 - Additional notice board set up in each ICU ward for useful SARS information/ Policy/ Infection Control guideline (15/4/03)
 - Hard copies of useful SARS information distributed to ICU staff at Tea Room, MO Room and Call Rooms 17/4/03

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5. Did you make an assessment of why so many HCWs in the ICU of PMH had contracted SARS? If yes, what was your assessment? Did you step up the infection control measures in the ICU of PMH after you took over? If not, why not? If yes, how were the infection control measures stepped up and were they effective?

Answer:

On my arrival at the ICU of PMH, my first priority was to assess the existing infection control procedures. Rumours abounded about the lack of infection control measures in the ICU of PMH. Even if implemented there was an apparent lack of compliance as so many staff had contracted SARS. I was told on several occasions that prior to the 2-3 days before my arrival that infection control measures were not being implemented to any great degree.

Having assessed the situation I planned to impose the infection control standards that had been developed at PWH which had proven to be effective in preventing the transmission of SARS.

I noted the following factors, which I felt need to be changed:

Structural factors

The ICU had been divided into 'hot', 'warm' and 'cold' areas. A hot area was an area containing patients. A warm area was the corridor connecting patient areas and a cold area was part of an office that had been designated for the MO to sleep. Patient folders had been moved out of the patient areas into the warm zone.

The link bridge connecting the 2F Main block to G1 was open. Staff from other wards used this link bridge as a short cut to the canteen. Staff with no PPE were walking through the corridor linking ICU wards.

Patient factors

Several ventilators did not have high efficiency viral filters in place.

Most ventilators did not have an effective scavenging system for removal of expired gases even though they had been filtered.

Closed suction systems were on all ventilators.

Overcrowding: The ICUs were crowded and one patient area actually contained six patients.

Staff factors

Adherence to infection control guidelines was not 100%. Greater than 95% of staff were observing some form of the guidelines but I felt the compliance rate was unacceptably low.

While a mask fit programme had been discussed it was not particularly active.

PPE factors

PPE stations had been developed outside each ward area but within a warm area. While all PPE was present there was no systematic organization of the process to both gown and degown.

While there were 'policemen' present their role appeared to be relatively passive in enforcing rigid compliance to infection control guidelines.

In summary while infection control measures had been introduced I believed that improved co-ordination, organization and enforcement was required. The following measures were immediately taken as a means of stepping up the infection control practices.

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1. All PPE was to be centralized in the lift lobby. While there was some resistance to this it was overcome through a meeting at 5pm on 10th of April where I categorically stated that this would happen. The whole process of gowning and degowning was organized and to the credit of the staff of the PMH ICU the concept was developed into a very sophisticated and efficient procedure over the next few weeks.
2. I declared the whole ICU an ULTRA-HIGH RISK ZONE. There was to be no hot, warm or cold areas. Everything within the ICU was to be regarded as contaminated. Full PPE was to be worn at all times upon leaving the lift lobby to enter each of the corridors leading to the two ICUs at each end of the lift lobby. The patient folders were to be moved back to the bedside.
3. No staff were to eat, drink or sleep in the ICU.
4. Invigilators of the gowning and degowning procedure were given the authority to be actively involved at enforcing the guidelines. Compliance with the guidelines was to be enforced.
5. Staff were encouraged to look after their own personal PPE but at the same time monitor each other for lapses. Blatant disregard of PPE procedures were dealt with by me.
6. High efficiency viral filters were fitted for all expired gases on ventilators, manual ventilators and transport ventilators.
7. The Evac 180 scavenging system was attached to all Siemens ventilators.
8. Other ventilators had plastic tubing attached to scavenge gases to the outside environment
9. Exhaust and ventilation systems had previously been reviewed and while not perfect had been upgraded.
10. Closed suction systems were attached to all endotracheal tubes and their importance emphasized.
11. Procedures regarding disposal of body wastes were reinforced.
12. The patient area containing six patients was reduced to four.
13. A mask fit programme became mandatory for all staff working in the ICU.
14. An infection control education programme was commenced for all staff working in the ICU.
15. Stair access to the 2F Main Building and the link bridge to G1 were closed.

I reasoned that in bringing about these changes I would have to wait 10 days to be sure of their effectiveness. I did not concern myself as to whether or not these changes were too draconian. Following these changes only three staff (one SMO, one RN and one HCA) contracted SARS and this was within the next two to three days. I am completely indebted to Ms HO [REDACTED] who was responsible for instituting many of these changes and who brought to my attention many issues that needed attention. Communication was improved to stress the importance of infection control as previously mentioned. This was achieved by personal communication by senior nurses, senior doctors and announcements by the General Manager of Nursing over the public address system. Dr CC LUK enhanced communication through regular meetings with staff.

In the months following I formed the opinion that so many staff in the ICU contracted SARS because of a number of factors.

1. Increasing rates of patient admission to ICU resulting in an ever increasing work load.
2. Limited number of experienced staff providing patient care without appropriate education on Infection Control.
3. Introduction of inexperienced staff without appropriate education on Infection Control.
4. Noncompliance with infection control measures.

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6. A series of staff forums were held for the Kowloon West Cluster commencing 27 March 2003. Did you and/or any of the HCWs under your charge attend these forums? If not, why not? If yes, what was your and their assessment of the usefulness of these forums?

Answer:

I attended a staff forum on the 7th of April prior to my deployment to PMH. I had been requested by my COS at PWH to provide moral support to Dr Florence YAP (SMO PWH ICU) who had been invited along with other Prince of Wales staff to talk on infection control. This meeting was well attended by several hundred staff. I cannot gauge the usefulness of this forum as I do not speak Cantonese but there was certainly plenty of audience participation. After my arrival at PMH I did not attend a staff forum as I was fully occupied elsewhere. I do not know if other staff attended.

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7. Did your experience in the handling of the SARS outbreak at Prince of Wales Hospital (PWH) help you cope with your work at the ICU of PMH during the SARS outbreak at PMH? If not, why not? If yes, in what ways had your experience at PWH helped?

Answer:

My experience in the handling of the SARS outbreak at PWH when I was acting Director of the ICU was of immeasurable value in helping me to deal with the situation in the ICU of PMH.

Following the request for me to transfer to PMH for 2-3 weeks, but before I agreed to the transfer, I needed time to discuss the situation with my family and to consider whether or not I had the ability to make a difference at PMH. I had been informed that the situation was chaotic in the ICU at PMH, that there was a very rigid culture that I would be unable to change and that I had specifically been rejected as a possible candidate to transfer to PMH. I also did not know anyone at PMH and finally I do not speak Cantonese sufficiently well.

Despite these potential barriers I requested I would have overall responsibility for infection control and clinical management and that a Nursing Officer from PWH ICU, Ms HO [REDACTED], be permitted to accompany me. She is a very experienced Nursing Officer with an interest in infection control.

Infection control

ICUs generally have very high standards of infection control because the risks of cross infection from one critically ill patient to another significantly impact on morbidity and mortality. In addition, ICU staff do not generally become infected from patients. As the SARS epidemic took hold at PWH, I had reasoned that the ICU staff must be protected from the patients. Infection control measures were continuously reviewed within ICU by all staff. I had argued that unless staff could be protected then I could not reasonably expect them to stay working in ICU especially as so many staff on the General Wards had contracted SARS. I assumed that the Infection Control standards at PMH had for some reason slipped.

I decided that our first priority would be to review the Infection Control practices at PMH ICU. Because so many staff had contracted SARS at PMH ICU, I assumed that there were still staff members who were possibly incubating the disease. The PWH ICU infection control measures at the end of March appeared to offer satisfactory staff protection. I decided that, barring unforeseen circumstances, this would be the standard I would attempt to introduce to the ICU at PMH.

Personal protective equipment

PPE availability, its centralized location and the enforcement of the standards were crucial lessons learned from PWH which were transported to PMH. Appropriate education prior to deployment was essential.

Teamwork

PWH ICU had been built up over many years such that staffing of the ICU had been relatively consistent over the previous five years. Medical and nursing staff were familiar with each others abilities and characters. As such a very high standard of care had been provided for many years.

The Intensivists had a good relationship with the Anaesthetists in the Department of Anaesthesia and Intensive Care. Anaesthetists having rotated through the ICU as part of their

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Anaesthesia training continued to provide night cover and occasional day cover. Their continued exposure to the PWH ICU environment enabled a large team of doctors to be familiar with the protocols, policies and guidelines of the PWH ICU. When SARS developed and surgery was cancelled there was a large pool of PWH Anaesthetists who moved seamlessly into the Intensive Care. During the early days at PWH I really began to appreciate the importance of this teamwork and the extra buffer provided by staff not normally working fulltime in the ICU. In essence PWH ICU maintained it's shape.

When I arrived at PMH neither was there a buffer nor was there teamwork as described above. There was no shape. Many of the staff had contracted SARS to be replaced by medical and nursing staff unfamiliar with the policies, procedures and guidelines of PMH. The anonymity of the ICU at PMH highlighted to me the importance of teamwork. Under the circumstances I considered that the only reasonable objective was to have each of the three ICU wards working independently with their own medical and nursing staff. My second priority was therefore to restore order and hence shape to the PMH ICU.

It is a testament to the staff at PMH from the CCE down that strenuous efforts were made to bring the situation under control. All staff worked to their absolute maximum ability to create a more palatable environment in which to care for patients with an appropriate standard of care.

Transparency

At PWH ICU, the extreme anxiety felt by all staff was manifest in several ways. I personally found that talking to staff and listening to their views helped me to cope with the anxiety. I also realized that many staff raised points I had not even considered. Providing information to the staff whether it be positive or negative appeared to decrease anxiety levels. Each morning I would discuss the situation with staff prior to the ward round. Following the Hospital Management Meeting I would provide feedback to the nursing and medical staff.

At PMH, due to my anonymity and poor Cantonese I was not in a position to be so transparent. Dr CC LUK assumed the administrative responsibilities of Dr KO CHEUNG when he returned to Caritas Medical Centre and became an important conduit for nursing staff. I concentrated on the medical staff.

Leadership

From the PWH experience I quickly learnt the most appropriate method for me to address this crisis was to compartmentalize areas of responsibility, prioritize and focus on the problems within that area and then make a decision. In moving to PMH I tried to follow these personal guidelines but realized that in providing leadership one is very dependent on the relationships one has with staff. At PMH I had no such relationships with staff.

Limits

One of the most important lessons learned at PWH was that limits were required as to how many patients with SARS could be admitted to ICU so as to maintain control. The ICU was the rate limiting step in determining how many patients could be admitted to the hospital. There was much discussion between Professor Tony GIN (COS AIC), Dr Amy CHO (CONS AIC) and myself regarding the ability of the PWH ICU to expand the number of ICU beds without compromising quality of care. Relevant factors included

1. availability of appropriate bed spaces
2. availability of equipment
3. availability of experienced nursing staff
4. availability of experienced medical manpower

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8. Was the respiratory equipment used in the ICU of PMH equipped with filters? If yes, was the respiratory equipment only equipped with filters during the SARS outbreak? If yes, when was the equipment fitted with filters and on whose advice?

Answer

When I arrived some of the ventilators used in the ICU of PMH were not equipped with closed suction systems, filters. I do not know what the standards of scavenging, filters and suctioning were prior to the SARS epidemic. Following my initial assessment I requested that high efficiency viral filters be connected to the expiratory end of each ventilator and closed suction systems be used in all patients on ventilators. Numerous discussions were held with Dr KO Cheung regarding scavenging systems. The Evac 180 scavenging apparatus was attached to all Siemens ventilators. High efficiency viral filters were also fitted to all manual ventilation systems and portable ventilators.

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9. On 11 April 2003, PMH began transferring "potential ICU" patients to other hospitals. Were they non-SARS patients? Did you know in which forum was the decision made and who were involved in the discussion? Did you know who made the decision and what were the considerations? Were you involved in the discussion? If not, why not? If yes, what views did you express? Did you know why the decision was taken at that point in time?

Answer:

I was not involved in the decision nor discussion to transfer "potential ICU" patients from PMH to other hospitals. Nor do I know in which forum the decision was reached nor what the considerations were. Dr KO CHEUNG at this stage was liaising with the Hospital Administration on my behalf. Dr KO CHEUNG informed me that "potential ICU" patients were to be transferred to other hospitals. As far as I am aware they were all SARS patients.

Appendix Two

Staff Situation and Deployment in ICU

Date	Patients in ICU	ICU Doctor	ICU Nurse	Non-ICU nurse	Supporting staff	Staff contracted SARS	Total ICU staff
10/3/03	9	6	52	0	5		63
11/3/03	11	6	52	0	5		63
12/3/03	10	6	52	0	5		63
13/3/03	9	6	52	0	5		63
14/3/03	10	6	52	0	5		63
15/3/03	11	6	52	0	5		63
16/3/03	10	6	52	0	5		63
17/3/03	10	6	52	0	5		63
18/3/03	9	6	52	0	5		63
19/3/03	11	6	52	0	5		63
20/3/03	12	6	52	0	5		63
21/3/03	10	6	52	0	5		63
22/3/03	12	6	52	0	5		63
23/3/03	12	6	52	0	5		63
24/3/03	14	6	52	0	5		63
25/3/03	14	6	52	0	5		63
26/3/03	11	6	52	0	5		63
27/3/03	12	6	52	0	5		63
28/3/03	12	6	52	0	5		63
29/3/03	17	6	52	0	5		63
30/3/03	19	6	52	0	5		63
31/3/03	19	6	59	19	5		69
1/4/03	26	7	59	19	5	2 MO	90
2/4/03	29	7	57	24	5	2 RN	93
3/4/03	34	7	57	45	5		114
4/4/03	36	10	57	60	5	1 RN	132
5/4/03	39	10	62	108	18	IPS	198
6/4/03	43	10	62	110	18	2 MO(deploy from Ana.), 1 RN	200
7/4/03	43	9	66	120	18	1 COS, 5 RN 2 WA	213
8/4/03	44	9	73	131	18	1 RN, 1 WS, 1 WA	231
9/4/03	43	9	78	129	18	1 RN, 1 WA	234
10/4/03	43	19	80	129	18		246
11/4/03	44	22	80	129	18		249
12/4/03	43	27	79	129	18	1 RN	253
13/4/03	44	27	79	128	18	1 SMO, 1 WA	252
14/4/03	42	26	88	122	18		254
15/4/03	40	26	88	122	18		254
16/4/03	40	28	88	122	18		256
17/4/03	40	27	88	122	18		255
18/4/03	41	27	88	122	18		255
19/4/03	33	27	88	122	18		255
20/4/03	32	27	88	122	18		255
25 staff							

Source of no. of patient in ICU: CDARS - from Statistical Officer, PMH.

Equipment Set-up in ICU
No. of Medical Equipment Available (BY DATE)

Appendix three

	No. of Pt in ICU	Ventilator	Physiologic Monitor, portable	Syringe pump	Infusion pump	ECG Machine	Defibrillator	Blood Gas Analyzer	Resuscitator, Manual	Tympanic Thermometer	Scavenging system (Servo Ventilator)	Close Suction System (Servo Ventilator)
29/3	17	17	9	16	17	6	5	1	20	0	7	5
30/3	19	17	9	16	17	6	5	1	20	0	7	5
31/3	19	25	9	16	17	6	5	1	20	0	7	13
1/4	26	25	9	16	17	6	5	1	20	0	7	13
2/4	29	25	29	16	17	6	5	1	26	0	7	16
3/4	34	46	29	16	17	6	5	1	26	0	9	16
4/4	36	50	34	86	17	6	5	1	26	0	9	17
5/4	39	66	34	86	17	6	5	1	26	0	9	17
6/4	43	66	34	86	17	6	5	1	26	0	9	17
7/4	43	68	38	86	17	6	5	1	26	0	9	17
8/4	44	68	63	86	17	6	6	1	70	0	9	17
9/4	43	68	63	86	17	6	6	1	90	0	9	17
10/4	43	68	63	124	17	6	6	1	90	0	19	34
11/4	44	68	63	124	28	8	6	4	90	0	19	34
12/4	43	68	63	124	39	8	9	4	90	0	19	34
13/4	44	68	63	124	39	8	9	4	90	0	19	34
14/4	42	68	63	124	39	8	9	4	90	100	19	34
15/4	40	68	63	124	73	8	9	4	90	100	19	34
16/4	40	68	83	124	73	8	9	4	90	100	39	34
17/4	40	68	83	124	73	8	9	4	90	100	39	34
18/4	41	78	83	124	73	8	9	4	90	100	39	34
Date(s) of Request		28.3.03	28.3.03 4.4.03	28.3.03 2.4.03	8.4.03	7.4.03	7.4.03	8.4.03	28.3.03 3.4.03	7.4.03	27.3.03 3.4.03	24.3.03 27.3.03 & 3.4.03
New		46	54	80	44	2	4	3	70	100	32	34
Internal Deployment		15	20	28	12	0	0	0	0	0	0	0
ICU Inventory		17	9	16	17	6	5	1	20	0	7	0

Remarks:

(1) Apart from the above equipment, HAHO has offered to distribute additional equipment to PMH ICU (i.e. 10 Puritan760 ventilators and 20 Space Lab monitors). These were eventually deployed to other hospitals upon arrival.

(2) # Subsequent orders made

19-FEB-2004 15:19

+ 852 2990 3477

98%

P.21

19-FEB-2004

15:19

PMH ICU

98%

P.21

Appendix four

Dr Lily Chiu
Cluster Chief Executive
Princess Margaret Hospital

12/4/03

Dear Dr Chiu,

Further to our telephone conversation this morning I propose that the following structure of the medical manpower for ICU be implemented:

Overall co-ordination and administration: TA Buckley and KO Cheung

Ward	ICU Specialist	Medical Officers	Criteria
One	One	Five	* minimum THREE months ICU experience * capable of working semi-independently

On a FOUR ICU (A2, B2, C2, D2) ward basis this would entail there being 4 ICU specialists and 20 ICU Medical Officers. To enable an ICU specialist to have a day off there would preferably be a fifth specialist available.

Of the 20 ICU Medical Officers 16 would have to fulfill the criteria listed above. This would enable a minimally acceptable arrangement to provide cover at nights. The other four medical officers need not have ICU experience but would be assigned daytime ICU duties until sufficiently experienced.

The above system assumes

1. No recognition of Saturday and Sunday as days off
2. No recognition of Public Holidays
3. No recognition of annual leave
4. No recognition of sick leave

It is a straight 1:4 or 1:5 roster which rolls over and would enable me to provide a minimally acceptable standard of care for these critically ill patients.

Thank you for your attention.

Dr Tom Buckley
Intensive Care Unit
Princess Margaret Hospital

Medical Staff Deployment to ICU

Appendix five

Name	Original Position	1-31 Mar	1-3 Apr	3 Apr	6-8 Apr	8 Apr	7-9 Apr	10 Apr	11 Apr	12 Apr	11 Apr	14-15 Apr	15 Apr	17-19 Apr	21-26 Apr	1-11 May	12-18 May	19-20 May
ICU Core Team																		
[REDACTED]	CCO(ICU)PMH	1	1	1	1	1	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS
[REDACTED]	SMO(ICU)PMH	1	1	1	1	1	1	1	1	1	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS
[REDACTED]	MO(ICU)PMH	1	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS
[REDACTED]	MO(ICU)PMH	1	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS
Staff Deployment (Intra Hospital): 16																		
[REDACTED]	MO Med(PMH)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	Consultant Ana(PMH)			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	MD Ana(PMH)		1	0 not met	0 not met	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS
[REDACTED]	MD Ana(PMH)				1	1	1	1	1	1	1	1	1	1	1	1	0	0
[REDACTED]	MD Med(PMH)							1	1	1	1	1	1	1	1	1	0	0
[REDACTED]	MD Med(PMH)							1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	MD Med(PMH)							1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	MD Med(PMH)							1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	MD Ana(PMH)							1	1	1	1	1	1	1	1	0	0	0
[REDACTED]	MD Ana(PMH)							1	1	1	1	1	1	1	1	0	0	0
[REDACTED]	MD Ana(PMH)							1	1	1	1	1	1	1	0	0	0	0
[REDACTED]	Resident O&T(PMH)									1	1	1	1	1	1	0	0	0
[REDACTED]	MD H&O(PMH)																	
Staff Deployment (Inter Hospital): 21																		
[REDACTED]	SMO Ana(AHMI)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	HCE KWI									1	1	1	1	1	1	1	1	1
[REDACTED]	CCO ICU(YCHI)			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	CCO ICU(CMC)				1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	Consultant ICU(PWH)				1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	Consultant ICU(QEH)							1	1	1	1	1	1	1	1	1	0	0
[REDACTED]	Clinical Director ICU(QH3)										1	0	0	0	0	0	0	0
[REDACTED]	SMO A&E(YCHI)								1	1	1	1	1	1	1	1	0	0
[REDACTED]	MO A&E(RH)								1	1	1	1	1	1	1	1	1	1
[REDACTED]	MO A&E(YCHI)								1	1	1	1	1	1	1	1	0	0
[REDACTED]	MO O&QKWI									1	1	1	1	1	1	0	0	0
[REDACTED]	MD Ana(YCHI)											1	1	1	1	1	1	0
[REDACTED]	MD ICU(PYNEH)												1	1	1	1	1	1
[REDACTED]	MD Ana(YCHI)												1	1	1	1	1	0
[REDACTED]	MD Ana(KWI)													1	1	1	1	0
[REDACTED]	MD Ana(CMC)																	
[REDACTED]	MD H&O(CMC)					1	1	1	1	1	1	1	1	0	0	0	0	0
[REDACTED]	MD Ana(QEH)		1	0 not met	0 not met	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS	0 SARS
[REDACTED]	Resident Ana(YCHI)		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
[REDACTED]	Resident O&T(CMC)									1	1	1	1	1	1	0	0	0
[REDACTED]	Resident O&T(CMC)										1	1	1	1	1	0	0	0
Total Staff:		6	7	7	10	10	9	10	11	12	12	16	16	17	18	19	17	17

TOTAL P.02
P.02

99%

+ 852 2990 3477

-FEB-2004 17:27