SARS at TTSH (Part 4)

By Prof Chee Yam Cheng, Editorial Board Member

Editorial note:
The following article was submitted on 17 May 2003. Contents are current as at the time of submission. Parts 1 to 3 were published in the earlier issues of the SMA News.

THE STORY BEGINS

Around the third week of February 2003, three young ladies from Singapore were in Hong Kong for a short holiday. They stayed at the Metropole Hotel and were unlucky to have rooms on the same floor as a retired Chinese doctor from Guangdong who was ill with fever and cough. Maybe they travelled in the same lift or were together in the lobby. Whatever it was, the sneeze and cough of the elderly doctor spread infection to all three of them. They returned to Singapore and on 25 February, one of them took ill. She was hospitalised at Tan Tock Seng Hospital (TTSH) on 1 March and became the first index imported case of SARS as the disease was later so named in mid March by the World Health Organisation (WHO). Later, her two friends were also warded, one at TTSH and the other at Singapore General Hospital. All three recovered and survived the illness. The first case has been reported in the Singapore Medical Journal, April 2003 pages 201-4. From this one case, many more were to suffer the disease.

While at TTSH, many who came into contact with the first index case took ill – patients around her bed, nurses, attendants and doctors. And when the patients became febrile and went into heart failure (in the elderly) they were moved to other wards under the care of other specialists. The patient herself did not improve on the usual antibacterial treatment regimens. Her chest X-rays worsened and were the worst on day 13 of her stay. She was not intubated and became afebrile on day 16 (16 March 2003). So the damage was done. The unknown disease had spread unknowingly to those about her.

Our staff were in contact with her without knowing her illness and just how contagious it was. Our doctor who attended to her from 3 to 9 March, was well when he left for New York to attend a medical conference. His illness began when he was there, and on 13 March, he flew home but during the stopover in Frankfurt (of course he was flying on Singapore Airlines), he, his wife and his mother-in-law were transferred to an isolation facility with the diagnosis query "atypical pneumonia". The German doctors who looked after our colleagues lost no time in reporting their experience in the New England Journal of Medicine on 10 April.

On 12 March, WHO issued a global alert about an outbreak of a severe form of pneumonia in Vietnam, Hong Kong and Guangdong in China. On 16 March, this disease was renamed SARS, a diagnosis dependant on a combination of clinical features, CXR findings, and a history of contact with patients suffering the disease.

22 MARCH 2003

On this eventful day, TTSH was declared a designated SARS hospital. We are used to such things. Previous names included TB Hospital, Chest Hospital and AIDS Hospital. And during the Japanese Occupation, Love Hospital. So our new badge above the left breast shirt pocket is the SARS Hospital.

The day had begun at TTSH at 8 am with a gathering of staff in our Lecture Theatrette for an update on the SARS situation by the Head, Department of Infectious Diseases TTSH. SARS is an atypical pneumonia thought to be due to a paramyxovirus. (This was subsequently proven wrong. It is now due to a coronavirus.) Transmission is by droplet and close contact, and all staff must take full universal precautions to prevent contracting the disease. Patients with atypical pneumonia were housed in special wards. All other wards and areas within TTSH were safe and continued operation as normal.

The case definition of SARS was presented. A suspect case was a person with a high fever of more than 38ºC, respiratory symptoms, and had close contact with a person diagnosed with SARS or travel history to Hong Kong, Hanoi or Guangdong. Close contact meant having cared for, having lived with, or having had direct contact with the respiratory secretions and body fluids of a person with SARS. A probable case was a suspect case with chest X-ray finding of pneumonia or respiratory distress syndrome. A probable case was also a person with an unexplained respiratory illness resulting in death, with an autopsy examination demonstrating the pathology of respiratory distress syndrome without an identifiable cause.

There was no diagnostic test. Diagnosis was purely on clinical grounds. And there were two main pointers – history of contact and relevant travel, as well as symptomatology. Precautions at this stage were N95 respirator masks, gloves and proper handwashing after contact with every patient.

Our CEO mentioned that the Ministry of Health (MOH) strongly supported TTSH as the Communicable Disease Centre (CDC) was the focal point for admission and screening of SARS cases. All patients had to be referred to Ward 72 CDC while paediatric cases were seen at Kandang Kerbau Women's and Children's Hospital (KKWCH). If a patient were seriously ill, he could be admitted to the nearest hospital. SARS was now a notifiable disease under the Infectious Diseases (ID) Act. The CEO said we were therefore one of several hospitals dealing with SARS patients.

All this changed at the 11 am MOH meeting. A circular from MOH stated that: "Following review by the SARS Task Force on Friday 21 March and Saturday 22 March, the following decisions have been made in relation to the management of SARS cases."

Page 24 ►

About the author:
Prof Chee Yam Cheng, MBBS(S) (1973), PPA, FRCP(Lond), (Edin), (Glasg), FRACP, FACP(Hon), FCFPS, is a Senior Consultant Physician and Chairman of the Medical Board, Tan Tock Seng Hospital.

◄ *Page 20 – SARS at TTSH (Part 4)*

The first was concentrating all SARS cases in the TTSH complex i.e. TTSH, National Neuroscience Institute and CDC. So now, even children were to be admitted to TTSH. All suspected and probable cases in any other hospital should be transferred over, and no patient could refuse transfer. Compulsion was provided for in the ID Act. Patients seen at Emergency Departments of hospitals were to be transferred to CDC by hospital ambulance with patient and staff properly protected.

The second decision was that TTSH would no longer attend to non-SARS patients. All SCDF (Singapore Civil Defence Force) ambulances were to be diverted away from TTSH to other hospitals. The media published that the Emergency Department (ED) of TTSH was closed to the general public. TTSH specialist outpatient clinic (SOC) was to be managed for existing patients with a dedicated SOC team of doctors and nurses who had no contact with SARS patients nor their contacts. New cases were not to be seen at TTSH. Instead these patients would be redirected to other hospital SOCs for the next three weeks. (In retrospect, this was unfulfilled optimism, as three weeks downstream, the SARS problem had not abated but had worsened.) And TTSH inpatients when fit for discharge could do so, but were placed on the contact list for the next two weeks with officers calling them daily to enquire about fever and their health status. If febrile, they were to return to CDC immediately (no mention of transport being provided at this time).

Of course, the other hospitals were impacted and so their elective operations and admissions for the next two to three weeks were cut. This would allow them to absorb our ED daily load (we are the busiest ED in Singapore) and SOC workload. KKWCH would set up paediatric services at TTSH by Monday 24 March and it happened. We got back our paediatrics, which we lost when KKWCH opened in 1997 at its new location. More than that, we had a dedicated team of paediatric doctors and nurses posted to us full-time for as long as we needed them. They would not go back to KKWCH to work during this period.

As at 22 March 2003, there were 44 probable SARS cases and 31 suspect cases. By 27 March 2003, all our SOCs were closed. Existing inpatients were managed as usual until they went home. Entry of staff and relatives was closely controlled and monitored. All staff in the team caring for SARS inpatients had no other inpatient or outpatient duties. They were to wear N95 masks, gloves and gowns (so gowns were now explicitly stated for protection), and gloves and gowns had to be changed and hands washed and disinfected between patients. So the m2g rule was in place. For hospital staff in other wards not treating SARS patients they were to wear N95 masks when in contact with patients, with hands disinfected between patients.

Further, staff who were unwell with fever were to report to the staff clinic for assessment and treatment. Only medical certificates from this clinic were recognised for leave of absence from TTSH. It was an important principle to help us track who amongst our workforce took ill after contact with SARS patients. It helped us to identify if any wards (non-SARS, so designated) were brewing cases of SARS when two or three staff in one ward took ill with fever. It could be the nurse, doctor, and attendant – anybody in the ward. Clusters of febrile cases were being sought. Medical leave was for 3 days only, followed by medical review.

A GIFT OF THERMOMETERS

On 25 March 2003, the temperature-monitoring rule was implemented. All staff working in inpatient areas were given a personal thermometer each (made in China) and instructed to take their oral temperatures thrice during their duty cycle – start, mid point and end of duty. If the temperature reading was 38°C or above, the staff was to wear a surgical mask and proceed to the staff clinic. The purpose of this was to quickly detect any new SARS cases among staff and prevent spread to colleagues and family. Temperatures were to be charted and records kept for each staff, including the hospital cleaners.

For doctors, all department heads were instructed to comply strictly with these rules. Charts were submitted to Medical Affairs daily and any temperature readings above normal highlighted. However, on the day before, if temperature was between 37°C and 38°C, it was rechecked after one hour, the doctor staying in isolation and in no contact with any patient or staff. If above 38°C, he proceeded to the staff clinic. This cut off was lowered to 37.5°C subsequently.

A month downstream, thermometers have become routine personal equipment for Singaporeans. Schools, canteens, ministries, all hospitals, and so on, have instituted the temperature rule. Thermometers are suddenly in great demand. Aural and oral thermometers, digital and mercury thermometers, are now in widespread use. So if you have a fever, go see a doctor. This advice is healthcare news in The Straits Times almost daily.

VISITOR RESTRICTIONS

Also, from 25 March 2003, following WHO guidelines, SARS patients are not permitted any visitors. Paediatric SARS patients are allowed two registered visitors and their visitors should not be above 40 years old nor with medical problems. Further, no children or pregnant women are allowed into a SARS ward. Visitors must be registered (so that they can be quickly contact traced if required), must wear N95 mask, gown and gloves (m2g) at all times when visiting patients. They must discard gloves and gowns and wash their hands thoroughly before leaving the patient's room. Each visit is supervised by staff and lasts no more than 10 minutes per patient. Further, for young paediatric patients, one adult visitor may be allowed to stay

Page 25 ►

◄ *Page 24 – SARS at TTSH (Part 4)*

with the child throughout the stay but that visitor needs m2g protection.

As for visitors to non-SARS wards, they still needed to be registered. Three could be registered but only one visitor allowed in at any one time. Again, visitors should preferably be below 40 years old and with no medical problems. No children or pregnant women are allowed. All visitors are advised against moving around to other patients and sitting on a patient's bed.

Why all these restrictions? It is in the hospital setting that infection has spread between healthcare workers, patients and visitors (three groups). It is prudent to minimise contact between these groups, and if contact were necessary, that visitors and healthcare workers be appropriately protected. The assumption at this time was that spread is by droplet and close contact. It was later learnt that the coronavirus (identified end March) could survive for up to three hours on fomites, which if touched by hands that then touch the face or eyes or nose, may be a possible route of transmission. For young children, isolation is difficult to enforce and so usually one parent or relative is allowed throughout to help manage and pacify the child. Again, more than one month downstream, the "no visitor" rule was passed to apply to all wards in all public hospitals regardless of their SARS status. The reason is slightly different. It is to decrease the stress on the healthcare hospital system because all visitors needed their temperatures checked at the registration counter and only if they were afebrile were they allowed to visit inpatients.

DEATHS

On Tuesday night 25 March, we lost our first patient and another one on 26 March 2003. Both were men; the father of the first index case and the pastor. They had been in the ICU when the Minister for Health visited TTSH on Wednesday 19 March 2003. Yes, the two men were very ill, on the ventilator and not easily roused. Their chest X-rays showed very opaque, white lung fields. They were stable in that their vital signs and other monitoring parameters were normal while on high concentrations of inspired oxygen.

It was difficult to accept their deaths. It was a big blow to the morale of our staff especially those caring for them in the ICU. It brought home to all the reality that this illness kills. Two men previously healthy had succumbed. Their contact with the index case? The father at home and at the patient's bedside in hospital; the pastor in a prayer session with the patient in hospital.

On 28 March, Dr Ong (who had worked at TTSH previously) wrote a heart-rending letter to the Forum page of The Straits Times, titled "Be thankful for heroes among us". I quote excerpts: *"As my family battles SARS – my brother and mother have been admitted to TTSH – we would like to convey our deeply felt thanks to all the dedicated staff who have been caring for them. My brother who is a healthcare professional at TTSH caught SARS from a patient. He has since moved from intensive care to the general ward. We feel proud of the doctors, nurses and healthcare workers there especially knowing that there were doctors who volunteered to go near the areas where the patients are most critically ill. The world is short of heroes and heroines and their contributions should not go unnoticed..."* Most unfortunately, tragedy of tragedies, both her brother and mother succumbed. They battled SARS to the last.

Fast-forward to 11 May 2003 (Mother's Day) and TTSH lost a long-serving Nursing Officer whose battle lasted 56 days since her hospitalisation on 12 March. She was a tower of strength, a loving nurturer, a dedicated protector, a caring comforter and a steadfast beacon to all around her, at work and at home. We lost a faithful and dedicated mother and nurse.

GHOST TOWN?

The retail outlets at our Atrium saw diminishing returns since 22 March. They cut down their operating hours and then they closed. On 28 March, Polar Café, Standard Photo and Starbucks closed. Soon the others followed suit – Astoria Florist, Fa Salon, Norgen Vaz, Pearl's Optical, and finally on April Fool's Day, Assisted Living and Food Junction shut their doors. As of 1 May 2003, all have remained closed. The new 1.99 shop had not even opened and press reports mentioned that the company had gone into liquidation (not due to TTSH nor to SARS). The only shops open throughout were 7-Eleven and Nes Cafe. All staff of TTSH are grateful for the convenience they provide – always close and never closed?

Fast-forward to 28 April and 2 May, when Norgen Vaz and Fa Salon have re-opened for business respectively. Great faith they have in TTSH getting back on her feet.

THE OPERATIONS ROOM

On 12 March 2003, WHO issued the global health threat alert on SARS. MOH alerted all registered medical practitioners on this in its circular of 13 March.

Friday 14 March 2003 was a bright, clear, and cold day for me in London. That night, I was to board SQ 322 for Singapore. Friday 14 March 2003 at TTSH was different. The number of cases of SARS was creeping upwards. Patients had landed in the ICU and were being ventilated. By late afternoon, the decision was made to activate our Emergency Operations Centre. Staff worked till late into the night to get it operationally ready. All the charts were put up, essential personnel listed with contact numbers and rosters made to man the place continuously over day and night. This was day one of the OPs Room (rather it was night when finally set up).

Saturday 15 March 2003 was the first official meeting at 9 am in the OPs Room. Army style briefing was conducted. First, there was a "sit rep" or situational report i.e. the number of patients, which wards, status of patients, were

Page 26 ►

◄ *Page 25 – SARS at TTSH (Part 4)*

they probable, suspect or for observation, how many in ICU, how many on ventilators, beds occupied, and so on. Each new admission was reviewed – was there a contact, who was the contact, and on a big white board, each case was linked to another – a new kind of web was being recorded. Were the contacts being traced and surveyed? At that time, there was no quarantine order and it was the first day of the week-long school holiday period. Families were going off to Hong Kong and China. Then each representative of an area of responsibility presented the happening of yesterday and sought advice for any problems encountered – be it supplies of masks, policies of MOH or TTSH queries from public, manpower needs of nurses, doctors, contact tracers, and so on. Also how SOC was functioning, how ED was being overwhelmed (as usual), and later (from 24 March), reports from the paediatric doctor, and later still, from the SGH doctor (7 April).

After each meeting, lasting about an hour, subgroups would meet to work out further details. Clinical Heads would meet at 11 am, and when SOC started to see patients again in mid April, the meeting time was shifted to 12.30 pm.

And so things were made as transparent as possible to all. We were facing a common, unknown, contagious, dangerous and deadly enemy. Fears and concerns had to be addressed and managed. When sufficient experience and information became available from these meetings, the hospital senior management held open seminars with all staff. These were held on Saturday 22 March, and again on Monday 1 April.

MINISTER OF STATE VISITS TTSH

The Minister for Health visited on 19 March 2003. There was little, if any publicity about the visit. The Minister of State who is a medical doctor visited us on 3 April. All staff were invited to the Lecture Theatrette to meet with him. Being a staff member of TTSH himself some years back, he was warmly welcomed and he himself felt at home amongst us. What surfaced prominently during the dialogue were the discriminations and ostracisms faced by staff. They were being shunned, booted out of homes, avoided by lay public on trains, buses, food courts and lifts. They were told to stay indoors and not mix with others. Buses would not stop for them to alight or board at the bus stops around TTSH. Their families too were under pressure. School-going children were specially treated by their teachers and classmates. With this feedback, public education was put into top gear to manage the fear that was pervading and gripping the community at large. What followed in the days thereafter were well wishes, cards, gifts, letters to the press, and by no means least, the Courage Fund (11 April 2003).

I quote excerpts from 2 tributes. The first is from Yahoo.com (14 April 2003).

"Dear Sir,

Please convey this message to all the working staff of TTSH; we, the people of Singapore are very proud of each and every one of you. Your sacrifices and perseverance in this "fight" against "SARS" have put many of us to shame (especially me!). You have shown through your deeds the meaning of the words "service to mankind." From the deepest of my inner being, we salute you! From the bottom of our hearts we pray that all of you stay in the pink of health and may God bless and keep you and your families in good health. May all patients currently undergoing treatments recover in quick time. May good thoughts and prayers of all Singaporeans be with all of you. Remember, "you never walk alone"; we are with you all the way till victory come! Take care and may the Great God bless you again."

The second is from the Straits Times titled "Medical Heroism" by a doctor.

"Like any other people, Singaporeans need heroes and role models. We often turn to people featured in the media, that is, celebrities, sports personalities, politicians, successful entrepreneurs and so on. Media attention may be the last thing on the minds of the staff of TTSH but perhaps this is precisely what they need: positive media attention. I can think of no better role models for young Singaporeans than these people. They are waging war against an unseen enemy and may be struck down at any time. They continue to give their heart and soul to the battle, even when their colleagues fall victim to the deadly virus. They show tremendous resolve in even setting foot outside the security of their home every day... Let us rally together in support of our heroes instead of treating them like the enemy. Give all of them, from doctors to hospital attendants, the recognition they so rightly deserve....."

EXCISION BIOPSIES

With TTSH declared the SARS dedicated hospital, any patient with fever and a contact history was transferred over to us. On 4 April, TTSH had 94 inpatients, 11 of whom were in the ICU. The sixth death from SARS occurred. She was the lady from Beijing returning home as the fourth imported case. She had gone from the Singapore airport by taxi to Singapore General Hospital (SGH) and then was transferred here. Yes, SGH did the correct thing – it transferred her to TTSH immediately.

Next day, 5 April, a cluster of febrile patients was found in SGH Wards 57 and 58 – a general surgical ward. Post-operative fever? Infection? Complication from surgery? Fever altogether on the same day? And 10 staff also febrile the same day? Answer – SARS had popped up at SGH.

Prior to this, there was a SARS-related death also at National University Hospital (NUH). We discovered that those with medical/surgical illness plus SARS (through having been in TTSH before 15 March as inpatients) were more difficult to diagnose as SARS, in part because the doctors thought their medical/surgical diagnoses were sufficient causes for their fever, or they were too ill to mount fevers

Page 27 ►

◄ *Page 26 – SARS at TTSH (Part 4)*

of 38ºC to meet the case definitions of SARS. But clustering of febrile patients was the red flag.

So over the weekend, Saturday and Sunday 5 and 6 April, SGH "excised" Wards 57 and 58 and sent them, patients and staff including the doctors caring for patients in those wards, to TTSH. This draconian move was completed on Monday. At TTSH, the SGH team of doctors and nurses managed these patients. Over succeeding days, the "biopsy" results confirmed SARS in more and more patients, some of whom took seriously ill, landed in the ICU, and even died.

At TTSH under the SARS microscope, with heightened awareness and sensitivity to all that relates to SARS, the "biopsy" was more confidently diagnosed and proper management instituted. With no definitive diagnostic test, SARS remains a clinical diagnosis and as experience accumulates and resides within TTSH, this remains the best and also the safest hospital to deal with problems related to this disease.

Fast-forward one month to 7 May 2003, and a cluster was forming at the Institute of Mental Health (IMH). Some 30 patients (and staff) were warded in TTSH by 13 May. Patients of Wards 64 and 65 were affected. However this "excision biopsy" was somewhat different to that in SGH. When patients at IMH developed fever, they were sent to Alexandra Hospital (AH) for medical management since only psychiatrists are based at IMH. So AH doctors began collecting these patients and when there were four or six with pneumonia, alarm bells sounded. So further transfers to AH were stopped as the diagnosis in a few of these patients was not nosocomial pneumonia but atypical pneumonia, probably viral. As far as we know, there were no contacts with SARS patients but the clinical picture could well go with viral pneumonia. Therefore, IMH patients and staff with fever were instead directed to ED, TTSH for assessment, and warded at TTSH if needed. It could not have been possible to excise many IMH wards and transfer their patients to TTSH. We do not have such capacity as one ward of IMH could house up to 100 patients. Some three days later, a few tested positive for influenza virus B.

CONCLUSION

From 25 February 2003 when our first patient took ill, or from 1 March when she was hospitalised at TTSH, or from 14 March when TTSH was geared up to handle SARS with an operational Ops Room, or from 22 March when TTSH became the declared, dedicated and designated hospital for SARS in Singapore, whichever date you feel is appropriate, there are many lessons to learn about this new disease.

Tuberculosis was the scourge some 50 years ago. It is still not conquered. Singapore was one of the countries that helped in research on short course chemotherapy for tuberculous pneumonia. Today, we are still battling TB with DOT (Directly Observed Therapy) and STEP (Singapore TB Elimination Program). Some 20 years ago, TTSH became the HIV/AIDS centre for Singapore. Again, many drug trials have involved our patients, and combination therapy is the norm today but still not curative.

And today, we are challenged by SARS. With worldwide co-operation among clinicians, scientists and researchers battling SARS, and with WHO and CDC Atlanta support and backing, TTSH staff are very much involved in these activities (together with SGH pathologists, microbiologists, and others from the Genome Institute of Singapore). There is hope yet for a better tomorrow in dealing with the Urbani SARS – associated coronavirus and the disease it causes. ■

Editorial note:

The following poem was recently written by an SGH medical officer, contemplating his impending night call. Interestingly however, that particular call, turned out to be one of his better calls.

NIGHT CALLS

After midnight
When all the world, has gone home
and stillness sweeps the wards.
The metal beds creak
An asthmatic coughs
And the whole hospital
is like an old man –
groaning.

Along the sterile corridor
A syringe wrapper tumbles along
driven by air currents,
unseen
As the negative pressure fans whirl.

A quick patter of feet
only the vanishing back
of the houseman on call, is caught...
the darkness is enveloping.
The A&E has fifty patients waiting,
all for isolation ward beds
After the dam bursts – comes,
the Deluge
I have grown accustomed to treading water
some others around me, drown.

On call, even non-believers pray
For when courage
and stamina give way,
Science bends its head to superstition...
The HOs don't eat PAO
My partner changes yet another set of lucky underwear,
I, personally, try not to curse.

The daytime is governed by the Rules.
They stand, in black, in bold, so proud
But at night –
The Fury
Chaos bellows its head in defiance
It is giddy, soaking in, the multitude
the sick, the dying
Adrenaline is its drug
It makes the doctors superhuman.

After each nightcall
I feel as if I have died
With the morning sun –
I rise again
With each call, I struggle,
with the most primitive of instincts
Hunger, and fear
When night comes, I realise
I am not a doctor
I am my mortal elements –
I am a man, alone.