SARS and W.H.O. (Part 7)

By Prof Chee Yam Cheng, Editorial Board Member

Editorial note:
The following article was submitted on 25 August 2003. Contents are current at the time of submission.

The United Nations (UN) is based in New York whereas the World Health Organisation (WHO) is based in Geneva, Switzerland. As a UN agency, it relied on goodwill and sovereign resources whenever crises struck. As WHO, it was a convener of international expertise most times. It published many reports, long after the Committees that deliberated on the contents, had completed their task. As a medical student and young doctor, I was always browsing through its Technical Report Series, which covered communicable and non-communicable diseases. It dealt with toxins, poisons, environmental and also occupational health issues. The address of the WHO Representative is given as 144 Moulmein Road, right here beside Tan Tock Seng Hospital (TTSH) and next door to the Tuberculosis Control Unit. An alternate address is Newton P.O. Box 31.

The WHO has two main divisions – one dealing with non-communicable diseases, whose present worldwide studies have to do with deep vein thrombosis in passengers on long haul travel, be it by air, road or rail; and the other with communicable diseases, aptly named Communicable Disease Surveillance and Response (CDSR). Its address is given as WHO, 1211 Geneva, 27 Switzerland, and its e-mail as cdsdocs@who.int. In this article when I refer to the WHO, in the context of SARS, it has to be to this division of the WHO. SARS has shown WHO at its best being not good enough. It has need of a change in strategy. With the change in WHO leadership on 21 July 2003, it is hoped that the new Director-General Dr Lee Jong Wook, will take the WHO beyond the critical stage of convenor of international conferences into one in a better position to collaborate closely with its member countries in disease monitoring and reporting. For now, let us go back to the beginning.

EARLY DAYS

The first cases of SARS emerged in mid-November 2002, when the first case of atypical pneumonia occurred in Foshan city, Guangdong Province, China on 16 November. The first official report of the outbreak in the province, said to have affected 305 persons and caused five deaths, was received by WHO on 11 February 2003, from the Chinese Ministry of Health. About 30% of cases were reported to occur in healthcare workers. (The confirmation of cases that was consistent with the definition of SARS was made after China allowed the WHO team to visit the province on 2 April.)

On 12 February, WHO was told the outbreak in Guangdong affected six municipalities and laboratory tests proved negative for influenza. On 14 February, WHO was informed that the outbreak was clinically consistent with atypical pneumonia. Further investigations ruled out anthrax, pulmonary plague, leptosprosis and hemorrhagic fever.

On 20 February, Hong Kong officials informed WHO of an outbreak of two cases (one fatal) of avian influenza following the detection of influenza A (H5N1) in members of a family who had recently travelled to Fujian Province, China. The next day, a 65-year-old medical doctor from Guangdong checked into the ninth floor of the Metropole Hotel in Hong Kong. He stayed in Room 911. He had treated patients with atypical pneumonia prior to departure from Guangdong and was symptomatic upon his arrival in Hong Kong. Days later, guests and visitors to the hotel's ninth floor (at least 12 of them) had seeded outbreaks of cases into the hospital systems of Hong Kong, Vietnam and Singapore. As guests flew home to Toronto and elsewhere, the disease was spread internationally. The initial hot spots of SARS were characterised by rapid increases in the number of cases, especially in healthcare workers and their close contacts. In these areas, SARS first took root in hospital settings, where staff, unaware that a new disease had surfaced, and fighting to save the lives of patients, exposed themselves to the infectious agent without barrier protection. From these initial outbreaks, chains of secondary transmission outside the healthcare environment began.

On 26 February, a 48-year-old Chinese American businessman was admitted to the French Hospital in Hanoi with a three-day history of respiratory symptoms. He came from Hong Kong where he had visited a friend staying on the ninth floor of the Metropole Hotel. Two days later, Dr Carlo Urbani, a WHO official based in Vietnam, was alarmed by several cases of atypical pneumonia in the French Hospital, where he had been asked to assist. Dr Urbani notified the WHO Regional Office for the Western Pacific (ROWP), which is based in Manila and also oversees Singapore. The WHO headquarters in Geneva moved into a heightened state of alert.

On 1 March, a 26-year-old former flight attendant was admitted to TTSH with respiratory symptoms. She had been a guest on the ninth floor of the Metropole Hotel. On 4 March, another 26-year-old and resident of Hong Kong, who had visited a friend at the Metropole Hotel, was admitted to the Prince of Wales Hospital with respiratory symptoms. For whatever medical indications, he was treated with a jet nebuliser four times daily over the next seven days.

On 5 March, the Chinese American businessman, in a stable but critical condition, was air-evacuated to the Princess Margaret Hospital in Hong Kong. Seven HCWs (healthcare workers) in Hanoi who had cared for him took ill. Dr Urbani

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continued to treat cases at the French Hospital in Hanoi. Over in Toronto, an elderly woman who had stayed on the ninth floor of Metropole Hotel died at the Scarborough General Hospital. Five members of the family were infected and admitted to hospital. On 7 March, HCWs at Hong Kong's Prince of Wales Hospital started to have respiratory symptoms progressing to pneumonia. On 8 March, 14 staff at the French Hospital fell ill with acute respiratory syndrome (this is where the name SARS originated) and a WHO team arrived in Hanoi to support Dr Urbani. By 10 March, at least 22 staff in the French Hospital became ill with respiratory symptoms. At this time, the Chinese Ministry of Health asked WHO to provide technical and laboratory support to clarify the cause of the Guangdong outbreak. (This is over 100 days since the first case surfaced on 16 November 2002.)

On 11 March, Dr Urbani left Hanoi for Bangkok where he was to give an update and presentation on tropical diseases. Instead, he took ill upon arrival and was immediately hospitalised. He fought SARS valiantly but succumbed on 29 March.

On 12 March, WHO issued a global alert about cases of severe atypical pneumonia following mounting reports of cases among HCWs in the Hanoi and Hong Kong hospitals. This followed an assessment of the Asian situation by WHO teams in Hanoi, Hong Kong and Beijing. At least 20 HCWs in Hanoi's French Hospital and 23 at a hospital in Hong Kong, were ill with similar acute respiratory syndrome.

GLOBAL RESPONSE: INFRASTRUCTURE

In April 2000, WHO launched the GOARN (Global Outbreak Alert and Response Network) as a mechanism to link together in real time, 112 existing networks which together possess much of the data, expertise and skills needed to keep the international community alert to outbreaks and ready to respond. By electronically linking together existing networks, WHO is able to maintain close vigilance over the evolving infectious disease situation and to mobilise outbreak verifications and response activities as and when required.

For gathering epidemic intelligence, a customised search engine that continuously scans World Internet Communications for rumours and reports of suspicious disease events is available. It is the GPHIN (Global Public Health Intelligence Network), a computer application developed by Health Canada and used by WHO since 1997. GPHIN operates as a sensitive real-time early warning system by systematically searching for key words in over 950 news feeds and electronic discussion groups around the world. Human review and computerised text mining are used to filter, organise and classify the over 18,000 items it picks up everyday, of which over 200 merit further analysis by WHO. GPHIN provided some of the earliest alerts to the November 2002 outbreak in China.

In outbreak alert and response, every hour counts, as the window of opportunity for preventing deaths and further spread closes quickly. GPHIN has brought great gains in timeliness over traditional systems where reports need to progressively filter upwards before finally being notified to WHO. GPHIN currently picks up in real time the first hints of about 40% of the roughly 200 to 250 outbreaks subsequently investigated by and verified by WHO each year. While early alerts are important, GPHIN also allows WHO to step in quickly to refute unsubstantiated rumours before they have any chance to cause social and economic disruption.

During an outbreak response, WHO uses a custom made geographical mapping technology to assist in the location of cases and rapid analysis of the epidemic's dynamics. This epidemiological mapping technology is also used to predict environmental and climatic conditions conducive for outbreaks. An event management system, introduced in 2001, is now used to gather and communicate data throughout the course of outbreak investigation and response. The system generates a dynamic picture of operations, aids organisation of logistics, and provides a systematic way to prepare better, respond faster and manage resources more effectively.

GLOBAL RESPONSE AGAINST SARS

From 12 to 15 March 2003, an initial emergency plan of WHO called for an attack on the ground and in the "air". WHO sent teams of experts and specialised protective equipment for infection control in hard-hit hospitals to countries requesting such assistance. In the "air", WHO used the model of its electronically interconnected global influenza network to quickly establish a similar "virtual" network of eleven leading laboratories, connected by a shared secure website and daily teleconferences, to work around the clock on identification of the SARS causative agent and the development of a robust and reliable diagnostic test. This network in turn served as a model for similarly electronically linked groups set up to pool clinical knowledge and to compare epidemiological data.

WHO also issued daily updates on its website to keep the general and travelling public informed, and where possible, to counter rumours with reliable information.

PRESS RELEASES FROM WHO

12 March 2003. This release told of WHO's efforts since February to confirm what the outbreak of severe pneumonia was about and of how the outbreak in Vietnam evolved. It gave a clinical picture of the disease as one with a flu-like illness (rapid onset followed by muscle aches, headache and sore throat). Laboratory findings may include low platelet and low white cell count. In some cases, this is followed by bilateral pneumonia, in some cases progressing to acute respiratory distress requiring assisted breathing on a respirator. And on this day, the Department of Health, Hong Kong, SAR (Special Administrative Region) reported on an outbreak of respiratory illness in one of its public hospitals. As of midnight on 11 March, 50 HCWs had been screened and 23 were found to have febrile illness. They were admitted to the hospital and

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eight were found to have developed early chest X-ray signs of pneumonia. Three other HCWs self-presented to hospitals with fever and two of them had chest X-ray signs of pneumonia. It also mentioned that in mid-February, the Government of China reported 305 cases of atypical pneumonia in Guangdong, and in cases that died, it was due to chlamydia infection. WHO also stated that there was no link so far between these outbreaks in Hanoi and Hong Kong. WHO made two recommendations: patients with pneumonia who may be related to these outbreaks be isolated with barrier nursing, and any suspect cases be reported to the national health authorities.

15 March 2003. This release included the case definition of a suspect case (but used the cut-off date as illness dating back to 1 February 2003) and probable case. In addition, other symptomatology, besides fever and respiratory symptoms, included headache, muscle stiffness, loss of appetite, malaise, confusion, rash and diarrhoea. (The last two were to assume more prominence later when Dr Alex Chao died and an outbreak occurred at the Amoy Gardens in Hong Kong.) As of 15 March, reports of suspected cases of SARS had been received from Canada, China, Hong Kong, Indonesia, Philippines, Singapore, Thailand and Vietnam. It was also reported that an "ill passenger and companions who travelled from New York, United States on to Frankfurt, Germany were removed from their flight and taken to hospital isolation." Then came this important statement by the Director-General of WHO, Dr Gro Harlem Brundtland, "This syndrome, SARS, is now a worldwide health threat. The world needs to work together to find its cause, cure the sick and stop its spread." The press release went on to say that "there is presently no recommendation for people to restrict travel to any destination. However in response to enquiries from governments, airlines, physicians and travellers, WHO is now issuing guidelines for travellers, airline crews and airlines."

16 March 2003. Country reports, including Singapore, were given in this release. As of 15 March, reports of over 150 cases of SARS have been received by the WHO, and four deaths had been reported. SARS was first recognised on 26 February in Hanoi, Vietnam. For Singapore, the Ministry of Health (MOH) reported on 13 March of three cases of SARS in patients recently returned to Singapore after travelling to Hong Kong. As of 15 March, 13 additional cases had been reported and all 13 of them had contact with one or more of these three initial cases. All 16 cases were reported to be in stable condition and were cared for in isolation. The other mention was under the heading "New York, USA – Frankfurt, Germany". It said that on 15 March, a HCW from Singapore who was visiting New York boarded a flight from New York to Frankfurt. The HCW was known to be unwell and to have had close contact with a reported case of SARS in Singapore. German health authorities had this HCW transferred to an isolation unit in Frankfurt as soon as the flight landed.

Under international response, the press release stated that the following organisations were contributing personnel and materials to Vietnam: (1) Centres for Disease Control and Prevention, Atlanta, United States; (2) Centre for International Health, Australia; (3) Epicentre; (4) Institut National de Veille Sanitaire, France; (5) Institut Pasteur, France and Vietnam; (6) Medecins Sans Frontieres; (7) National Health Service, Department of Health, United Kingdom; (8) Robert Koch Institute, Germany; and (9) Central Field Epidemiology Group Smittskyddsintitutet (SMI), Sweden.

Further, bilateral assistance had been mobilised from France and Japan, and WHO was providing epidemiological support to the health authorities in Hong Kong.

WHO had no recommendations to restrict travel to any destination. 16 March was a Sunday and the start of the one-week school holidays in Singapore. WHO gave the commitment that it would update its website daily and has done so to date.

IN SINGAPORE

All 16 cases in Singapore were being kept in the isolation rooms at the Communicable Disease Centre, TTSH. Doctors and nurses attending to them were observing "enhanced infection control procedures." Dr Leo YS, Senior Consultant, said, "If we suspect a case of atypical pneumonia, we will immediately isolate the patient." Doctors and nurses wore respiratory masks, gowns and surgical latex gloves. Only immediate family members were allowed to visit the patients and they too followed the same safety protocol. MOH advised Singaporeans against travelling to Hanoi, Hong Kong and Guangdong unless absolutely necessary. Further, Singaporeans who had travelled to these places were advised to seek immediate medical attention if they had fever, muscle aches, cough, sore throat or any breathing difficulty, or if they had been in close contact with someone diagnosed with atypical pneumonia. *(The New Paper, 16 March 2003, pg 15.)*

On 15 March 2003 at 2 am Geneva time, the Singapore government notified WHO by urgent telecommunication, of a 32-year-old physician who had treated cases with SARS in Singapore all subsequently linked to the Hong Kong hotel. This doctor had travelled to the US for a medical conference and at the end of the conference boarded a flight to Singapore in New York. Before departure, he had indicated to a colleague in Singapore by telephone that he had symptoms similar to the patients he had treated in Singapore. The colleague notified the health authorities. WHO identified the airline and flight (Singapore Airlines), and the physician and his two accompanying family members were removed from the flight at a stopover in Frankfurt, Germany. As a result of this prompt action, Germany experienced no further spread linked to its first imported cases.

Later in the morning of 15 March, with this background and chronology of events mentioned earlier, a decision was made by WHO to increase the level of the global alert issued on 12 March.

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A RARE EMERGENCY ADVISORY

The decision was based on five different but related factors. First, the causative agent and therefore the potential for continual spread, of this new disease were yet unknown. Second, the outbreaks appeared to pose a great risk to HCWs who managed patients, and to family members and close contacts of patients. Third, many different antibiotics and antivirals had been tried empirically and did not seem to have an effect. Fourth, though the numbers were initially small, a significant percentage of patients (25 out of 26 HCWs in Hanoi, and 24 out of 39 HCWs in Hong Kong) had rapidly progressed to respiratory failure, requiring intensive care, and causing some deaths in healthy persons. Finally, the disease had moved out of its initial focus in Asia and appeared to have spread to North America and Europe.

SARS was poorly understood. The hope was that this new disease like many others of the recent past, would fail to maintain efficient person to person transmission, or that it might attenuate with passage and eventually self contain. Not knowing much about the disease, its cause and future evolution, the need was great to introduce a series of emergency measures to contain SARS outbreaks in affected areas and prevent further international spread. WHO thus decided on 15 March to issue a rare emergency travel advisory as a global alert to international travellers, healthcare professionals and authorities.

22 MARCH 2003

This was the day TTSH was declared SARS central. The WHO press release was titled "Update 7 – SARS virus isolated, new diagnostic test produces reliable results." From the Guangdong Professor and one of his contacts (both died), the virus was isolated in a special cell line and a basic test was devised by the Hong Kong scientists. Results would be shared among the 11 leading laboratories in a network set up on 17 March. What would have normally taken three months had been achieved in a matter of days. "This spectacular achievement is an example of what the world can do when the intellectuals of nations around the world are focused on a single problem," said Klaus Stohr, a WHO virologist coordinating the global laboratory network. As of this day, Hong Kong was the most seriously affected area with 222 cases.

CHINA

In late March, Chinese authorities updated data on cases and deaths for the previously reported outbreak in Guangdong since November 2002, raising the cumulative totals from 305 to 792 cases and from five to 31 deaths. Chinese scientists, epidemiologists and clinicians also became full partners in the three working groups studying SARS. On 2 April 2003, a WHO five-person team was given permission to travel to Guangdong to confer with officials there about the SARS outbreak. The Chinese government had given highest priority to the SARS response. The first joint MOH-WHO team visited Hebei Province in mid-May. A system of alert and response for emerging and epidemic-prone diseases was being developed for all of mainland China. Electronic reporting of new cases and deaths by province was now a daily occurrence. Equally important, health officials were holding televised press conferences, thus taking the important step of increasing the awareness of the population and hospital staff of the characteristic symptoms, the need to seek prompt medical attention, and the need to manage patients according to the principles of isolation and strict infection control. The report of the first WHO expert team to investigate the SARS situation in Guangdong province reached the following conclusion:

"If SARS is not brought under control in China, there will be no chance of controlling the global threat of SARS. Control of a new and rapidly disseminated disease like SARS is challenging, especially in a country as large and as diverse as China. Effective disease surveillance and reporting are key strategies in any attempt to control the spread of a serious new communicable disease such as SARS."

AIRPORTS

Near the end of March, WHO recommended screening measures at airports for passengers departing from areas with recent local transmission, and issued advice to airlines on steps to take should a suspect case be detected in flight. Twice in April and once in early May, to prevent further international spread, WHO issued the toughest travel advisories in its 55-year history when it recommended postponement of all but essential travel to designated high risk areas.

22 APRIL 2003

This was the day the WHO press release gave "Update 36 – Situation in Singapore and China." For Singapore, it mentioned that a large wholesale fruit and vegetable market was closed following a small cluster of three cases linked to the market. To date, eight probable and 14 suspect SARS cases had been linked to the market. This first case in the cluster was a 64-year-old worker at the market who died on 12 April. In an effort to contain the outbreak, health authorities had issued some 1,200 home quarantine orders. As of this day, Singapore had reported 186 cases of probable SARS with 16 deaths. As for China, the reported number of cumulative cases was 2,001 with 92 deaths. SARS had spread to some of China's poorest provinces including Western Guangxi, Northern Gansu, and Inner Mongolia.

WORLD HEALTH ASSEMBLY 19-28 MAY 2003

This 26th annual summit was held in Geneva. Minister of State for Health, Dr B Sadasivan, attended as did other participants from the 192 member states of WHO. On 21 May, Dr Jong-Wook Lee, a medical doctor and national of the Republic of Korea who has worked nearly 20 years in WHO, was elected Director-General, replacing Dr Gro Harlem

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Brundtland. He said he would immediately expand and strengthen GOARN. The recent experience of fighting SARS featured prominently in discussion. Two resolutions were passed. The first was on the revision of the International Health Regulations, the international law which governs public health; and the second specifically on SARS. The resolution confirms and underlines the WHO's authority to verify disease outbreaks from all available official and unofficial sources, and when necessary, to determine the severity of an outbreak through on-the-spot investigations to ensure it is appropriately controlled.

The resolution on SARS recognises the disease as "the first severe infectious disease to emerge in the twenty first century", and called for the full support of all countries to control SARS and other emerging and re-emerging infectious diseases.

During the Assembly, WHO announced the creation of a new US$100 million public-private initiative to fight SARS and build capacity for disease surveillance and outbreak response in China and the surrounding region. "SARS exposes fundamental weakness in the global health infrastructure," said Dr JW Lee, WHO Director-General Elect. "This new fund and other innovation initiatives like it will help prepare the world to respond to future emerging diseases."

The Assembly also paid tribute to Dr Carlo Urbani, the medical doctor based in the WHO office in Vietnam who was the first to recognise the new disease that was to be named SARS, and died as a result of contracting the disease in the line of duty on 29 March 2003. ■

Note: *Part 7 will be continued in the next issue of SMA News.*