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Prevention and Control of Severe Acute Respiratory Syndrome(SARS)

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1. INTRODUCTION

As of 5 July 2003, all known chains of person-to-person transmission of the SARS virus were interrupted. The last probable case was reported in Taiwan on 15 June 2003. The time needed to contain this epidemic from the first global alert issued by WHO was around 4 months. The total number of reported cases were 8437 with 812 deaths. The success achieved in containing SARS was commendable, considering the many unclear facets related to the epidemiology, laboratory and clinical management of the disease. The success was largely due to the effective international responses led by WHO and the cooperation of all affected countries. However, on the basis of current knowledge, the re-emergence of SARS can not be ruled out.

The SARS epidemic also serves as a wake up call to enhance disease surveillance and infection control at various health care institutions which, in most Member Countries, need considerable improvement.

Since SARS is a new disease, Member Countries as well as WHO need to be better prepared to tackle both emerging infectious diseases and the re-emergence of existing ones.

It is worth noting that all Member Countries in the Region have taken preventive measures far beyond those recommended by WHO. This is justifiable since importation of a single case may fuel a large outbreak. Strong political commitment by all SEAR countries coupled with effective regional collaboration among APEC, ASEAN and SAARC countries significantly contributed to the containment of SARS.

Till the end of the current epidemic, only three Member Countries reported SARS cases - India, Indonesia and Thailand - with no further transmission occurring after its importation.

2. EPIDEMIOLOGY

SARS is the first severe and readily transmissible new disease to emerge in the 21st century. When the outbreak was first detected in Hong Kong it was thought to be *Avian Flu* similar to the one which affected Hong Kong in 1997 when hundreds of thousands of chickens were slaughtered. The causative agent of SARS is a new corona-virus/CoV (*named SARS CoV*), which is notorious for its *frequent mutations*. Currently known corona-viruses cause the common cold that is usually mild in nature. In animals such as chickens, pigs and ducks, it causes diseases with various manifestations.

SARS CoV cannot survive for long outside the human body. On an average, (depending on the ambient temperature - the higher the temperature the shorter the lifespan) it can survive only up to 4 hours. Recent studies have, however, revealed that it can survive for 4 days in the stool of a SARS case (having diarrhoea).

The symptoms of SARS are : high fever - more than 38 degree centigrade/104 Fahrenheit - cough or difficulty in breathing and diarrhoea (in 20 per cent of cases). WHO's most recent analysis estimates the case fatality ratio in the range of 14-15 per cent. In persons over 65 years, the case fatality ratio can exceed 50%.

SARS is not easily spread as many people think. It spreads through *close person-to-person contact* via droplets expelled by coughing or sneezing by an infected person. It is not an airborne infection. The incubation period is between 2 to 7 days, although a longer

period has been documented. *For control purposes, 10 days is accepted as the incubation period.* There is no evidence so far that during the incubation period or during the convalescing state, one can spread the disease although CoV has been detected during these periods. Even though other means of transmission such as environmental factors through sewage leakage and possibly infected objects have been clearly documented in Hong Kong, in the vast majority of cases, transmission occurs through close person-to-person contact. *It is this mode of transmission that enables contact tracing which* is an important component in the control of SARS. There is no evidence that commodities such as cloth, meat products or fruit play any role in the transmission of the disease. Traveling with a SARS case in a crowded environment such as in a plane has been proved to pose very minimal risk. Those contracting the disease are usually those sitting next to the case or one to two rows from the case, or the air crew attending the case.

There are two hypotheses regarding the emergence of SARS. One relates to mutation of already existing CoV. The other contention is that SARS CoV is a totally new entity. As to how this SARS CoV infects human beings, the recent discovery of SARS CoV in some wild animals consumed as delicacies in China strongly suggests that SARS CoV was transmitted from animals to human beings. WHO, in collaboration with FAO, is currently undertaking a study on the role of some animals in Southern China. If the study proves that these animals are the reservoirs of SARS, in other words, SARS is a zoonotic disease, it will not be possible to eradicate it. Constant vigilance will be indispensable, just as in the case of plague.

3. CASE DEFINITION AND LABORATORY TEST

Since there is no dependable confirmatory laboratory test (as in the case of TB and HIV/AIDS) diagnosis of SARS is based on exclusion, relying heavily on *clinical and epidemiological factors*.

A history of contact with a SARS case or having visited areas with recent local transmission (previously termed affected areas) is the most important component of the case definition. Since the world is now free of SARS, the case definition needs to be changed.

Earlier, WHO was very confident that a laboratory test consisting of PCR (Polymerase Chain Reaction), ELISA and IFA to detect antibody would be developed by the network of laboratories participating in this endeavour within a short period. Unfortunately, this was not the case. To date, the available PCR test (a molecular test) has not been fully validated. It has high specificity (low false positive) but low sensitivity (high false negative). Thus, a positive PCR is highly indicative of SARS infection whereas a negative finding does not exclude the infection.

The serological test (ELISA and IFA), become positive only after 2-3 weeks.

The laboratory test has to be undertaken in a facility fulfilling Bio-Safety Level 3. Only a few Member Countries have this facility.

4. CLINICAL MANAGEMENT

As with other viral diseases there is no cure for SARS. Treatment is merely symptomatic such as provision of oxygen or use of ventilator in very severe respiratory distress, administration of antibiotics to prevent secondary infection and use of antipyretics. Although some success was recorded in Hong Kong using *ribavirin* and *corticosteroids*, more valid evidence is required for WHO to recommend the use of these medications.

5. PREVENTIVE MEASURES

To date a vaccine to prevent SARS is not available. Vaccine development by the private sector may take at least 2-3 years. Since SARS CoV is frequently mutating (just like Influenza virus) it is very difficult to decide whether or not to develop a vaccine. It is possible that once a vaccine based on a certain antigenic property is developed, the SARS CoV would mutate, rendering the vaccine useless. Now, with the world free of SARS, the private sector may not be interested in developing the vaccine.

For *personal preventive measures*, frequent hand washing, using soap or alcohol-based disinfectants is highly recommended. For those with a high risk of contracting the disease, such as health care workers, use of personal protective equipment (N 95 mask, goggle, apron etc) is mandatory. Whenever possible household contacts should also wear a mask.

6. CONTROL/CONTAINMENT MEASURES

Since there is no cure or vaccine for SARS, containment measures are based on:

(a) *prompt detection* of cases through good surveillance network including early warning system.

(b) *isolation of suspected or probable cases* with good infection control using barrier nursing technique in health care institutions. Here, all Member Countries need to pay special attention since in general, before the SARS outbreak, no country was practicing good infection control.

(c) *backward tracing* to identify the source of infection and *forward tracing* to detect contacts that may develop the disease. *Domestic and or international cross-notification* resulting from these tracings is of immense importance to prevent further transmission.

(d) *voluntary or mandatory quarantine* of suspected contacts for 10 days.

(e) exit screening for outgoing passengers from areas with recent local transmission by asking questions and temperature measurement.

(f) disinfection of aircraft and cruise vessels having SARS cases on board using WHO guidelines.

Although WHO *does not recommend* screening of passengers screening even from areas with recent local transmission, all Member Countries of SEAR have instituted this kind of screening.