# SARS – infectious disease of 21st century

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## Abstrak

Severe acute respiratory syndrome (SARS) *adalah penyakit infeksi virus yang baru muncul di awal tahun 2003. Menurut WHO, kasus "suspek" SARS adalah mereka yang suspect bila menderita panas > 38 C ditambah adanya gejala respiratorik, baik berupa batuk, atau sesak napas, atau kesulitan bernapas, dengan riwayat kunjungan/tinggal ke affected area, atau ada kontak erat dengan penderita SARS. Selain itu, mereka yang meninggal karena penyakit infeksi respiratorik setelah 1 November 2002 tanpa sebab yang jelas dan padanya tidak dilakukan otopsi dengan riwayat kunjungan / tinggal di affected area, atau ada kontak erat dengan penderita SARS. Sementara kasus "probable" SARS adalah kasus suspect yang pada gambaran radiologik menunjukkan adanya infiltrat yang konsisten dengan gambaran pneumonia* atau respiratory disstress syndrome (RDS), *atau kasus suspect yang pemeriksaan virologiknya menemukan virus SARS, atau kasus suspect yang meninggal tanpa sebab yang jelas yang gambaran otopsinya konsisten dengan gambaran patologi SARS. Pada tulisan ini juga disampaikan beberapa data epidemiologik SARS di Indonesia, di mana antara periode 1 Maret sampai 9 Juli 2003 tercatat 2 kasus probable dan 7 kasus suspek SARS, dan tidak ada lagi kasus SARS setelah saat itu. Bagaimana perkembangan SARS di masa datang masih akan jadi kajian para ahli, dan kita harus bersiap untuk menghadapi berbagai kemungkinan di masa datang.* ***(Med J Indones 2004; 14: 59-63)***

## Abstract

*Severe acute respiratory syndrome (SARS) is an emerging viral infectious disease. According to the World Health Organization, a suspected case of SARS is defined as documented fever (temperature >38°C), lower respiratory tract symptoms, and contact with a person believed to have had SARS or history of travel to an area of documented transmission. A probable case is a suspected case with chest radiographic findings of pneumonia, acute respiratory distress syndrome (ARDS), or an unexplained respiratory illness resulting in death, with autopsy findings of ARDS without identifiable cause. In this article some SARS epidemiological data in Indonesia will also presented. There are 7 SARS suspected cases and 2 probable cases were registered in Indonesia on the period of 1 March to 9 July 2003, and no more cases were reported after that time. How will be SARS progression in the future will be a subject of discussion among scientist, and we will have to wait and be prepared for any development might occur.* ***(Med J Indones 2004; 14: 59-63)***


***Keywords*** *: SARS, Case Definition, Etiology, Indonesia*

In early 2003, public health authorities, physicians and scientists around the world are struggling to cope with a severe and rapidly spreading new disease in humans, severe acute respiratory syndrome, or SARS. This appears to be the first severe and easily transmissible new disease to emerge in the 21st century. Severe Acute Respiratory Syndrome (SARS) was first identified in Viet Nam on February 28, 2003, when Dr Carlo Urbani, an epidemiologist from the Hanoi WHO office examined a patient with a severe form of pneumonia for which no etiology could be found. On March 10, 2003, 22 hospital workers in Hanoi French Hospital were ill with a similar acute respiratory syndrome, and by March, 11 similar outbreaks had been reported among hospital workers in Hong Kong.[1,2]

Despite some positive signs that imported cases are not spreading further, outbreaks in China, Canada, Hong Kong, Hanoi, and Singapore have taken root in hospitals and beyond, and give rise to considerable concern. One of the most alarming features of SARS in these areas is its rapid spread in hospitals, where it has affected a large number of previously healthy health care workers. Many require intensive care, placing a huge strain on hospital facilities and staff. In countries, such as Canada, where cases occurred before WHO issued its global alert, SARS is

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continuing to spread despite the introduction of strict patient isolation and excellent infection control. In this article some SARS epidemiological data in Indonesia will also presented.

## CASE DEFINITION[3]

### Suspect Case

1. A person presenting after 1 November 2002[1] with history of:
   - high fever (>38 °C)

   AND
   - cough or breathing difficulty

   AND one or more of the following exposures during the 10 days prior to onset of symptoms:
   - **close contact**[2] with a person who is a suspect or probable case of SARS;
   - history of travel, to an area with recent local transmission of SARS
   - residing in an area with recent local transmission of SARS
2. A person with an unexplained acute respiratory illness resulting in death after 1 November 2002,[1] but on whom no autopsy has been performed AND one or more of the following exposures during 10 days prior to onset of symptoms:
   - **close contact,**[2] with a person who is a suspect or probable case of SARS;
   - history of travel to an area with recent local transmission of SARS
   - residing in an area with recent local transmission of SARS

### Probable Case

1. A suspect case with radiographic evidence of infiltrates consistent with pneumonia or respiratory distress syndrome (RDS) on chest X-ray (CXR).
2. A suspect case of SARS that is positive for SARS coronavirus by one or more assays
3. A suspect case with autopsy findings consistent with the pathology of RDS without an identifiable cause.

### Exclusion Criteria

A case should be excluded if an alternative diagnosis can fully explain their illness.

### Reclassification of Cases

As SARS is currently a diagnosis of exclusion, the status of a reported case may change over time. A patient should always be managed as clinically appropriate, regardless of their case status.

- A case initially classified as suspect or probable, for whom an alternative diagnosis can fully explain the illness, should be discarded after carefully considering the possibility of co-infection.
- A suspect case who, after investigation, fulfils the probable case definition should be reclassified as "probable".
- A suspect case with a normal CXR should be treated, as deemed appropriate, and monitored for 7 days. Those cases in whom recovery is inadequate should be re-evaluated by CXR.
- Those suspect cases in whom recovery is adequate but whose illness cannot be fully explained by an alternative diagnosis should remain as "suspect".
- A suspect case who dies, on whom no autopsy is conducted, should remain classified as "suspect". However, if this case is identified as being part of a chain transmission of SARS, the case should be reclassified as "probable".
- If an autopsy is conducted and no pathological evidence of RDS is found, the case should be "discarded".

[1] The surveillance period begins on November 1, 2002 to capture cases of atypical pneumonia in China now recognized as SARS. International transmission of SARS was first reported in March 2003 for cases with onset in February 2003.

[2] **Close contact:** having cared for, lived with, or had direct contact with respiratory secretions or body fluids of a suspect or probable case of SARS.

## ETIOLOGY

Based on conclusive proof, from animal trials, a new coronavirus, discovered by WHO collaborative group is the agent that causes SARS.

With the cause of SARS is proven, network scientists are giving top priority to the development of better diagnostic tests. The development of a diagnostic test

has proved more problematic than hoped. Three tests are now available and are helping to improve understanding of how the virus causes disease in humans. However, all three tests have limitations as tools for bringing the SARS outbreak quickly under control. Status of available diagnostic tests are as follows :[4]

1. **Antibody Tests**
   - ELISA (IGM/IGA) detects antibodies in the serum of SARS patients reliably as from about day 20 after onset of clinical signs. Antibodies are already detectable in some patients between 14-21 days.
   - Immunoflorescence Assays (detecting Immunoglobulin M) in SARS virus infected VERO cells detects antibodies in serum after about day 10 of onset of disease. This is a reliable but demanding test requiring amongst others, use of live virus in cell culture and an immunofluorescence microscope.
2. **Molecular Tests**
   - PCR can detect genetic material of coronavirus in various specimens (blood, stool or respiratory secretions). For this test, several primers have been developed by Centers for Disease Control and Prevention, United States of America, Federal Laboratories for Health Canada, Hong Kong University, and the Governmental Viral Unit of Hong Kong, Canada and they have been shared on the WHO web site. Some laboratories in the WHO multi-centre collaborative network on SARS are currently comparing these tests and first results are will be forthcoming shortly.
3. **Cell Culture**
   - Virus in specimens (respiratory secretions, blood) from SARS patients can also be detected by infecting cell cultures such as VERO cells.
     - **Positive test results** indicate that SARS patients are, or recently were, infected with the coronavirus. A negative coronavirus test does not mean that the patient does not have SARS.
     - **Negative test results:** SARS is diagnosed not on the basis of laboratory tests but on clinical evaluation and possible past exposures. Reasons for negative test results in a patient with SARS may be:
       - Tests are incorrect ("false-negative"). Current tests need to be further developed to improve sensitivity.
       - Patient is not infected with the new coronavirus. The cause of infection could be another pathogen (virus, bacteria, etc.) causing respiratory symptoms, and pneumonia.
       - Specimens were not collected at a time when virus or its genetic material was excreted. Excretions may be for a brief period only, depending on the type of specimen tested

The new studies, conducted at network labs in Hong Kong, Japan, and Germany confirm, as anticipated, that the SARS virus can survive after drying on plastic surfaces for up to 48 hours. Scientists have also tested virus survival times in faeces. Research conducted at one Hong Kong lab determined that the virus can survive in faeces for at least 2 days, and in urine for at least 24 hours. Studies conducted at a second Hong Kong lab found that virus in faeces taken from patients suffering from diarrhoea, which has a lower acidity than normal stools, could survive for 4 days. This raises the possibility that surfaces contaminated with faeces from patients suffering from diarrhoea might survive for as long as 4 days. However, the dose of virus needed to cause infection remains unknown. Further studies are needed before firm conclusions about the role of faecal-oral transmission can be made.[5]

Results of the new studies underscore the need for frequent handwashing, proper cleaning, and good disinfection control in hospitals managing SARS cases. Spread by infected droplets remains the most important mode of transmission. Good personal hygiene, including frequent handwashing, is important for everyone in areas with SARS cases, but most especially so for persons who have been in close contact with a probable case.

Shedding of the SARS virus in faeces, respiratory secretions, and urine is now well-established. In Hong Kong in late March, a large and sudden cluster of more than 320 simultaneous cases occurred among residents of the Amoy Gardens housing estate. The outbreak raised the possibility of an environmental source of infection. Subsequent investigations suggested that contamination with sewage might have played a role. Around 66% of Amoy Gardens SARS patients presented with diarrhoea as a symptom, compared

with 2% to 7% of cases in other outbreaks. With the exception of the Amoy Gardens cluster and a previous event where cases were linked to visits to a single floor of a hotel, SARS is thought to spread in the majority of cases through close person-to-person exposure to infected droplets expelled during coughing or sneezing.[5]

## CASE FATALITY RATIO

WHO estimates that the case fatality ratio of SARS ranges from 0% to 50% depending on the age group affected, with an overall estimate of case fatality of 14% to 15%.The likelihood of dying from SARS in a given area has been shown to depend on the profile of the cases, including the age group most affected and the presence of underlying disease. Based on data, the case fatality ratio is estimated to be less than 1% in persons aged 24 years or younger, 6% in persons aged 25 to 44 years, 15% in persons aged 45 to 64 years, and greater than 50% in persons aged 65 years and older .The estimates of the case fatality ratio range from 11% to 17% in Hong Kong, from 13% to 15% in Singapore, from 15% to 19% in Canada, and from 5% to 13% in China.[6]

A more accurate and unbiased estimation of case fatality for SARS can be obtained with a survival analysis method. This method relies on detailed individual data on the time from illness onset to death or full recovery, or time since illness onset for current cases. Using this method, WHO estimates that the case fatality ratio is 14% in Singapore and 15% in Hong Kong. In Viet Nam, where SARS has been contained and measurement is more straightforward, case fatality was comparatively low, at 8%. One explanation for this is the large number of total cases that occurred in younger, previously healthy health care workers.[6]

## INDONESIAN DATA

Indonesia also have a few SARS cases during the period of March 1, 2003 until July 9, 2003. Data below were collected by Indonesian SARS verification team, which during the outbreak period had daily meeting to verify all cases from all over Indonesia, from various hospitals and port health offices in Indonesia. The author of this article is also the head of national SARS verification team. All of the activities were under the umbrella of Indonesian Ministry of Health SARS Team.

From the data, as listed on table 1, during that period of time –based on the data registered by Indonesian SARS Verification Team- there were 112 patients are seeking for help because afraid to having SARS, which only 9 of them are fulfill criteria as SARS suspected or probable cases. The remaining 103 patients (91.9%) then classified as an excluded SARS cases, or not having SARS. Examination performed were include anamnesis, physical examination, chest X ray as well as laboratory finding, that is normal laboratory procedure test to examine pneumonia. Only the suspected and probable cases were undergo laboratory examination for SARS, but all come up with negative result. Data from table 1also showed that there are almost equal male female ratio on suspect cases. On the other hand, all probable cases in Indonesia are male. Table 2 showed age group of the patients, with average age for suspect cases is 40 years old and for probable cases is 54 years old.

Table 1. Patients seek help due to symptoms related to SARS 1 March – 9 July 2003

| Status | Sex | | Total |
|---|---|---|---|
| | Male | Female | |
| Suspect | 3 (42.8%) | 4 (57.2%) | 7 |
| Probable | 2 (100%) | 0 | 2 |
| Exclude | 46 (44.7%) | 57 (55.3%) | 103 |
| Total | 51 (45.5%) | 61 (54.5%) | 112 |

Table 2. Age Group Status

| Classification | Age Group | | | | |
|---|---|---|---|---|---|
| | <15 | 16-30 | 31-55 | >56 | Average |
| Suspect | 0 | 3 | 2 | 2 | 40 |
| Probable | 0 | 0 | 1 | 1 | 54 |
| Exclude | 9 | 48 | 38 | 8 | 32 |
| Total | 9 | 51 | 41 | 11 | 112 |

Table 3 showed the travel history of patients, which showed that all probable cases has a travel history from Singapore, while 71.5% suspect cases were also traveled from Singapore and the remaining 28.5% cases were traveled to China before get symptoms related to SARS.

Table 4 showed location where the patients stayed / treated. All of these 103 patients were diagnoses or treated at 26 hospitals throughout Indonesia. Table 5 showed the symptom from the patients. Data showed that all suspect and probable cases experienced fever, and all probable cases also have cough and shortness of breath. On the other hand, only 57.14% suspect cases had a cough complain and 28,57% suspect cases complain of shortness of breath.

No more SARS cases were reported in Indonesia after July 9. How will be SARS progress in the future will is a subject of discussion among scientist, and we will have to wait and be prepared for any development may occur.

Table 3. Travel History

| Country | Suspect | Probable | Exclude | Total |
|---|---|---|---|---|
| Singapore | 5 (71.5%) | 2 (100%) | 36 | 43 |
| Taiwan | 0 | 0 | 7 | 7 |
| Hongkong | 0 | 0 | 14 | 14 |
| China | 2 (28.5%) | 0 | 0 | 2 |
| Vietnam | 0 | 0 | 1 | 1 |
| Canada | 0 | 0 | 1 | 1 |
| Batam | 0 | 0 | 1 | 1 |
| Malaysia | 0 | 0 | 15 | 15 |
| Japan | 0 | 0 | 1 | 1 |
| Not known | 0 | 0 | 25 | 25 |

Table 4. Location of Patients

| Province/City | Male | Female | Total |
|---|---|---|---|
| DKI Jakarta | 11 | 9 | 20 |
| Batam | 8 | 8 | 16 |
| Central Java | 2 | 9 | 11 |
| West Java | 4 | 13 | 17 |
| Tangerang | 4 | 2 | 6 |
| Batam | 8 | 8 | 16 |
| Medan | 2 | 1 | 3 |
| Manado | 1 | 0 | 1 |
| Bali | 1 | 1 | 2 |
| East Java | 4 | 1 | 5 |
| Pare-Pare | 0 | 1 | 1 |
| Liwa | 0 | 1 | 1 |
| Lampung | 0 | 2 | 2 |
| Balikpapan | 0 | 1 | 1 |

Table 5. Symptoms

| No Classification | Symptom | | |
|---|---|---|---|
| | Fever | Cough | Shortness of Breath |
| Suspect | 7 (100%) | 4 (57.14%) | 2 (28.57%) |
| Probable | 2 (100%) | 2 (100%) | 2 (100%) |
| Exclude | 61 (59.2%) | 43 (41.6%) | 19 (18.4%) |
| Total | 70 | 49 | 23 |

## REFERENCES


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