

Will the SARS epidemic recur?

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Introduction

The SARS has caught the world off-guard. The outbreak first started in November 2002 in Guangdong province of China and reached Hong Kong in February 2003. It then spread quickly through jet travel to various countries. After several months of menace to health care workers and the community, SARS died down as suddenly as it appeared, sparking a question whether it will return this winter or later. To help us make an “educated” guess, I shall consider the following factors:-

Seasonality

Many viral respiratory diseases demonstrate a distinct seasonal pattern. However, the underlying reasons for this seasonality have not been fully understood. Influenza peaks in the winter months in temperate countries, which has generated hypotheses ranging from closer indoor personal contact in winter to the more intriguing relationship with latitude and solar radiation.¹ A similar pattern has been observed with respiratory syncytial virus infections, with an inverse relation with temperature and sunshine. Whether these seasonal changes affect the activity of the virus or host behaviour is still unclear. It is reasonable to assume that the SARS coronavirus would demonstrate a similar seasonal pattern. In winter months, there might be an increased probability of transmission between personal contacts and a change in dietary habits* among the Cantonese (people of Guangdong province origin and include the majority of the Hong Kong population).

Source of infection

The source of the SARS coronavirus has not yet been determined, but preliminary viral isolation studies in Shenzhen (right across the border of Hong Kong) have suggested wildlife like the masked palmed civet cat and the raccoon dog might have been the natural host.² This was further supported by the presence of antibodies to SARS virus among wild animal handlers. It is not clear if seropositive animal handlers are infectious and might constitute a potential source of infection. Another important source for a future epidemic would be the patient with sub-clinical infection. However, it is not certain whether this entity exists. Serosurveys among over 800 asymptomatic health care workers in the Prince of Wales Hospital (where the first outbreak of SARS occurred) in Hong Kong failed to demonstrate SARS antibodies (titre ≤ 1 in 40) by the indirect immunofluorescence assay. As the SARS coronavirus is a new virus, it is unlikely to have

* Dietary preferences like eating exotic wildlife originate from a traditional Chinese folk belief that one needs extra nutrition – rich in wildlife meat, in cold seasons.

adapted itself to produce a sub-clinical infection, or for the human host to develop sufficient immunity to avert a full clinical illness. Hence, if SARS returns, the source of infection should be similar to that which caused this epidemic, probably some form of wildlife that came into contact with its human handler, thereby transmitting the SARS virus to the latter.

Public health response

The last factor that influences the spread of a future SARS epidemic is the effectiveness of the global disease surveillance system and the efficiency of the public health response. Early case detection and isolation appear to be the most effective control measures. Home quarantine, personal protection measures and voluntary restriction of social activities adopted by the community are of unsure value, but should theoretically interrupt disease transmission. International travel restrictions and surveillance of febrile travelers might limit global spread. There are good reasons for optimism, as the worst affected countries and regions in this epidemic have learnt the lesson quickly and should be able to put these measures in place before the epidemic gathers force. How to prevent the amplification of SARS by the hospital, through better hospital design, more adequate isolation facilities, and better training and protection of health care workers remains a problem in less developed countries.

Will SARS come back?

Without identifying (and hence eliminating) its source and reservoir, it is possible that SARS will make a comeback, even in the absence of a sub-clinical human carrier. However, the transmission of the virus from a (presumed) wild animal host to a susceptible human host is a stochastic event and the probability of a large-scale epidemic is low.

Keypoints:

- Seasonality is a common phenomenon of viral respiratory infections.
- The yet unidentified source of infection makes it possible for SARS to recur, even in the absence of a sub-clinical carrier of the virus.
- Effective public health measures should limit the scale and the spread of any future epidemic.

Policy implications

- Vigilant disease surveillance and rapid and effective public health response are vital in the control of SARS, if and when it returns.

References

¹ Hope-Simpson RE. The role of season in the epidemiology of influenza. *Journal of Hygiene* 1981;86:35-47.

² Cyranoski D, Abbott A. Virus detectives seek source of SARS inb China's wild animals. *Nature* 2003;423:467. www.nature.com/nature