

Tracking the new disease SARS in combat mode

The small window of opportunity to track down Severe Acute Respiratory Syndrome or SARS is on a war footing, as it is a question of 'control now' or 'the world would be dealing with the disease in the future as endemic and part of populations'. Several countries have kept 'protection of global health' high on the agenda over self-interests. SARS is rapidly reaching 'explosive epidemic' proportions which has an epidemiological linkage. The World Health Organization (WHO), Geneva is a key player in bringing countries to work together to fight the SARS disease. WHO disseminates valuable information on SARS through its network for the common good. The first SARS case was reported in November 2002 from Guandong Province, China. The disease then came to be known when a patient admitted in Hanoi on 26 February 2003, later died on 13 March 2003. Seven health workers associated with the patient's care took ill on 5 March 2003. SARS has now rapidly spread to several countries causing death in some cases. Air travel between SARS-affected countries has made it a global disease. The number of SARS cases are on the increase with each new day adding to the figures. WHO has issued travel advisories to SARS-affected countries that keeps getting updated as the disease spreads or is contained. Vietnam may now be the first country to contain SARS.

Viruses have always plagued people and animals. New emerging infectious diseases have appeared, adapted themselves to the host while science has continually fought the scourge. The most recent, on the ever-changing list, are HIV, Ebola, Nipah, Hepatitis F and now SARS. The agent that is most probably responsible for the new infection is the SARS coronavirus or SARS CoV. So far 90% of patients recover, about 10% have severe complications and about 3–4% of SARS cases die. The WHO definition for a suspect case of SARS is sudden onset of high fever ($> 100.4^{\circ}\text{F}$) and one or more respiratory symptoms such as cough, shortness of breath and difficulty in breathing. The WHO definition includes a history of visits to SARS-affected countries within ten days of onset of symptoms and a history of having cared for, lived with or come into face-

to-face contact with respiratory secretions and body fluids of a person diagnosed with SARS.

What could a person do if one suspects SARS? Contact a doctor and inform about any recent visits to SARS-affected countries. Suspect SARS cases and their caregivers should adhere to avoiding work places, schools and crowded spots. Precautions include using special masks such as a triple layer surgical mask, latex gloves that are disposed off after handling body fluids and maintaining scrupulous 'hand hygiene' with soap and water. Isolation of utensils, bedding and frequent cleaning of toilets, sinks, etc. are also recommended. Based on the clinical diagnosis, the doctor would, if SARS is suspected, contact the identified hospital whose list is available with the State Health Authorities. The National Institute of Communicable Diseases (NICD), Delhi is the nodal agency to investigate SARS cases. Two institutes namely, NICD, Delhi and the National Institute of Virology, Pune analyse clinical samples for SARS by confirmatory tests. These institutes also take the help of regional laboratories such as the Tuberculosis Research Center, Chennai, the Enterovirus Research Center of the Haffkine Institute, Mumbai, the National Institute of Cholera and Enteric Disease, Kolkata and the National AIDS Research Institute, Pune. As a precaution in epidemic areas, it would be well-advised to use masks that completely cover the mouth and nose when in crowded places or using public transport. In the present understanding of how SARS spreads, it appears to be by close person-to-person contact, through droplets from cough or sneeze of a person who has SARS, or touching some object that an infected person has handled or even through sewage or contaminated air. Healthcare workers have not been spared. At the time of writing, positive cases of SARS in India have arisen from direct contact with an infected person, i.e. history of travel to a SARS-infected country or contact with SARS-infected person. The source of infection for the Indian index cases has been mostly travel-related.

Thus far, there is neither a medicine nor a vaccine to cure or prevent SARS. Only some relief could be obtained by

taking medicines that lower the fever. Home quarantine for the SARS patient is absolutely necessary till at least ten days after the disappearance of the symptoms. For any respiratory problems, hospitalization is advised. Health workers have to take many precautions and there are specific WHO guidelines. National guidelines especially for doctors would be made available by the end of April. Virus-testing laboratories have also to conform to WHO Biosafety guidelines, along with rules for the safe transportation of samples and use of biosafety equipment. There are also guidelines for cleaning commercial airplanes that had a suspected SARS commuter on board. Doctors have to take precautions with Personal Protective Equipment (PPE) regarding hand hygiene, airborne contact (use of WHO N-95 respirator that needs to be disposed off every eight hours), gowns and gloves.

Telemedicine has been noteworthy to transmit and study the data of SARS patients at a very rapid pace between countries. In fact, on 17 March 2003, the WHO has integrated a 'collaborative multicentre research project on SARS diagnosis comprising eleven laboratories in nine countries'. This information sharing is done through a secure WHO website, according to WHO. This has resulted in Polymerase Chain Reaction (PCR) primer tests that are able to detect SARS and the details are posted on the WHO network. Several countries, including India, use these primers. Presently according to WHO, these tests are specific but do not possess sensitivity, i.e. negative results are not a proof of not being affected by the SARS infection and the recommendation is therefore to place suspect cases in quarantine and follow protocols for infection control.

Presently a doctor's dilemma constitutes nonspecific symptoms with which to make a diagnosis, the greatest challenge being the early suspicion of SARS as opposed to other diseases with similar first symptoms. Researchers from the USA and Canada have sequenced the SARS genome but it would take a while before accurate diagnostic tests are made available. According to Sanjiv Malik, Indian Medical Association, the education of doctors and patients is posing the

biggest challenge with the Union Health Minister being made aware of this. SARS guidelines are soon to be released. The Directorate General of Health Services (DGHS), the Ministry of Health and Family Welfare has been keeping the media updated on SARS with daily press-briefings.

On 28 April 2003 the Director General of the Indian Council of Medical Research (ICMR), Nirmal Kumar Ganguly who had just returned from a visit to NIV, Pune spoke to *Current Science*. He said that although at present SARS is 'not notifiable', no case is being missed. There is a recent directive to open Ports for testing of SARS cases in their testing laboratories. This would aid the NIV, Pune and NICD, Delhi, two of the main centres for testing of SARS. Standardized protocols have now also been put in place in testing laboratories. India had obtained its PCR primers for SARS testing initially from a commercial source, which had been developed by the Bernhard Nocht Institute for Tropical Medi-

cine, Hamburg, Germany and then also from the Center for Disease Control and Prevention, USA. Now, India has begun to make its own primers for testing SARS cases. The process from sample to microbial detection and sequence analysis takes just under twelve hours.

ICMR is also preparing to use an animal model such as monkey, infected with the SARS virus, develop the symptoms and then isolate the virus from the animal model for further studies to understand the nature of the virus. The method of infecting cell cultures for growing and detecting live virus in specimens from SARS patients would also be taken up by ICMR, said Ganguly. Since there is high rate of transmission, i.e. one patient can infect a large number of people, the key was to isolate index SARS cases. His advice for a person with SARS, if he is not suffering from any major infection, is to quarantine himself from any outside contact and if fever rises, to visit the Infectious Diseases Hospital.

When posed with the question as to how India was coping with SARS, Ganguly said 'at the moment we have been able to cope with SARS, we have done marvelously. Till date cases have come from contact with SARS-infected persons through travel to SARS-infected countries and we have been able to isolate these cases'. He added 'we are also looking at the long-term research strategy for accurate diagnostic tests and antiviral drugs'. When asked about the IR heat sensors that produce heat sensitive images, being used in countries such as Singapore, for detecting SARS cases at the airports, he replied that 'we are aware of these heat sensors and something is being done about this in India'. The World Health Organization would be holding an international conference in Geneva between 17 and 18 June 2003 to 'review epidemiological, clinical management and laboratory findings on SARS and to discuss global control strategies'.

Nirupa Sen

New forecast models for Indian south-west monsoon season rainfall

The 2002 forecast for the Indian south-west monsoon by the India Meteorological Department (IMD), New Delhi went awry. This prompted severe criticism over the validity of the existing 16-Parameter Power Regression Statistical Model for Long Range Forecast (LRF). As a backlash, the IMD seems to have attempted to save its face by developing a new set of LRF models, unveiled to the media by R. R. Kelkar, Director General, IMD on 16 April 2003. Kelkar has, however, denied that criticism had anything to do with making new models. He said the character of the monsoon season of July 2002 had been 'unique' and the nature of the anomaly by either hindsight or retrofitting could not yet be pinpointed. Figure 1 shows the performance of operational forecasts between 1988 and 2002.

The long-range forecast for the 2003 south-west monsoon (June–September) rainfall is that the rainfall for the country as a whole is likely to be 96% of the Long Period Average (LPA) with a model

error of $\pm 5\%$. A newly adopted 8-parameter power regression model was used for this forecast.

The probability of monsoon season rainfall for the country as a whole in five broad rainfall categories is as follows:

- 21% probability of drought (rainfall less than 90% of LPA),
- 39% probability of below normal rainfall (90–97% of LPA),
- 14% probability of near normal rainfall (98–102% of LPA),

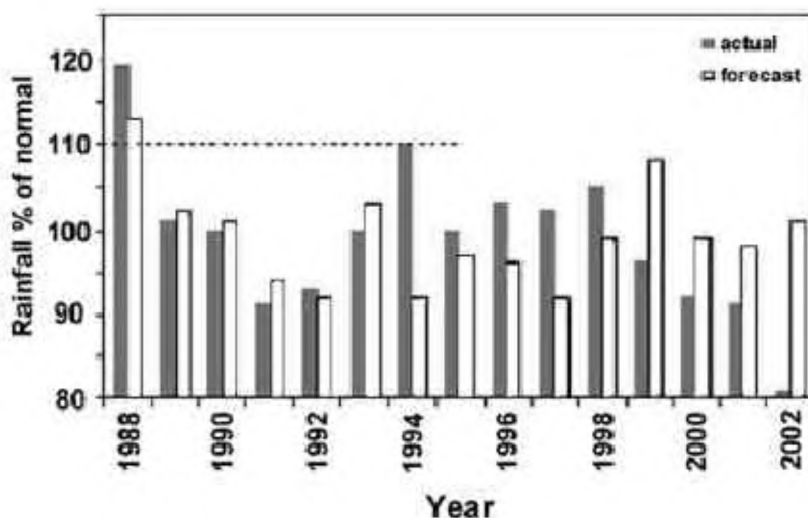


Figure 1. IMD's forecast performance between 1988 and 2002. (Source: IMD, New Delhi).