

SARS outbreak over, but concerns for lab safety remain

The recent outbreak of Severe Acute Respiratory Syndrome (SARS) in China which infected nine people and killed one of them is now over said WHO on 19 May. The outbreak, which began in April at a laboratory in Beijing, has raised questions about storing and handling the killer virus in laboratories.

The recent outbreak was the third of four SARS outbreaks associated with a laboratory since 5 July 2003 — when the virus was declared to be under control following a major epidemic which left nearly 800 people dead.

The outbreak in April began after two graduate students working at a laboratory at the National Institute of Virology in Beijing, where experiments using the live SARS coronavirus were conducted in February and March, became infected with the virus. WHO experts are helping the Chinese authorities investigate the source or sources of infection.

Dr Angela Merianos, the SARS focal person at WHO's Global Alert and Response unit, noted that the virus can be transmitted by droplets, through contact with contaminated objects as well as by touching the eyes, mouth or nose with contaminated hands but said it

was still unclear how the lethal virus had escaped at the Chinese institute. WHO is working closely with China's Ministry of Health and provincial health authorities to ensure biosafety procedures at the Institute of Virology are correct. Chinese health authorities are reviewing biosafety standards in other facilities undertaking research on the SARS virus.

"The investigation conducted to date has yet to identify a single source of infection or single procedural error at the institute. Consequently the route or routes of transmission are not known at this time," said Merianos, who visited China in May. It also remained unclear how two researchers at the institute became infected since they were not even working with the SARS virus. All those who became infected in the latest outbreak were people working at the institute and people who came into contact with them.

One of the nine SARS patients, a 53-year-old physician in China's Anhui province died on 19 April after being infected by her daughter, a 26-year-old postgraduate medical student who had been doing research at the Beijing institute. Her daughter and the seven other patients were treated in isolation at Ditan Hospital in Beijing. At the time of writing, seven patients have recovered whilst one remains in critical condition.

"The big question is: is it safe to handle SARS?" said Dr Cathy Roth from the Dangerous and New Pathogens team at WHO's Global Alert and Response unit, adding: "Countries need to identify all the laboratories holding the virus and to ensure that all correct biosecurity measures in those labs are in place." Roth said it was impossible to know how many laboratories across the world were storing SARS virus stocks.

She noted that WHO had issued recommendations in April, October and December last year on handling and storing SARS specimens and cultures in laboratories. Since the latest outbreak WHO has called on the Chinese Government to ensure that all research work on the live SARS virus should be conducted at least to standards that correspond to WHO biosafety level 3 guidelines to achieve maximum containment. Dr Merianos, who recently visited the Institute for Virology in Beijing, could not say whether laboratories here or in other Chinese research facilities adhered to biosafety level 3. "There is evidence that work practices in the lower level labs have room for improvement," Dr Merianos said, referring to the Beijing institute.

The third highest of four risk groups which are set out in the second edition of the WHO Laboratory biosafety manual related to handling infectious agents that pose a high risk to individuals, but a low risk to the population in general.

The Beijing institute was closed on 23 April to allow most of its staff to be quarantined for medical observation, while a handful of staff stayed on to continue essential experiments and care for laboratory animals. ■

Fiona Fleck, *Geneva*



Reuters/China Photos

Supplies arrive for staff under quarantine at the National Institute of Virology in Beijing, China, 30 April 2004. A laboratory at the institute is thought to be the source of the recent SARS outbreak.

Cardiovascular disease — a global health time bomb

Cardiovascular diseases such as heart disease, stroke and diabetes — usually associated with wealthy, developed countries — have become far more prevalent in poorer, less developed countries than previously thought, according to a new report published by Columbia University's Earth Institute in New York on 26 April.

The report, *A Race against Time: The Challenge of Cardiovascular Disease in Developing Economies*, concluded that cardiovascular diseases could become a public health time bomb in developing countries if too little is done to reverse the trend.

Dr Shanthi Mendis, Coordinator of WHO's Cardiovascular Diseases unit described the report as "a compelling and cogent argument to convince policy-makers and politicians of the need for commitment, development and implementation of policies for prevention and control of the cardiovascular diseases epidemic."

The researchers, led by Australian epidemiologist Stephen Leeder, analysed mortality and disease data from four middle-income countries: Brazil, China, South Africa and the Russian Republic of Tatarstan, and one low-income country, India.

They found that even if nothing changes in the next 30 years, population growth alone will lead to major increases in cardiovascular disease in developing countries which could severely curb workforce productivity and economic progress. According to the report, the problem is often neglected by developed countries, whose chief health-care priority is infectious diseases such as AIDS, malaria and tuberculosis.

Cardiovascular mortality rates among people of working age in India, South Africa and Brazil were one-and-a-half to two times higher than those in the US, said the report. In South Africa, despite the predominance of AIDS, 12% of men aged between 35 and 44 died from cardiovascular disease while the figure for women was 17.2%. In India, 28% of the five million people who die of cardiovascular diseases every year are under 65. The authors said this was even higher than the equivalent figure for the US 50 years ago, before treatment for cardiovascular diseases became a public health priority.

Recommendations included a reduction in tobacco production and consumption, campaigns aimed at improving nutrition, including school programmes on healthy diet and physical exercise. These recommendations are also part of a global plan to prevent chronic disease through healthy diet and physical exercise to be adopted by WHO's 192 Member States during the Fifty-seventh World Health Assembly in Geneva, 17–22 May.

Professor Shah Ebrahim, a cardiovascular diseases expert at Bristol University in England, said the projections were reasonable and should be enough to make policy makers take notice. He also said that cardiovascular diseases were also often neglected because of a lack of data and training.

The report is available at: http://www.earth.columbia.edu/news/2004/images/raceagainsttime_FINAL_051104.pdf ■

Fiona Fleck, *Geneva*

Brazilian genomics breakthrough offers hope for leptospirosis control

A team of Brazilian researchers has sequenced the genome of a bacterium which causes leptospirosis, a disease which infects over 100 000 people and causes 1000 deaths worldwide every year. The breakthrough has been hailed as a first step towards creating a vaccine against one of the world's most widespread zoonoses (diseases affecting both humans and animals).

"The research is important since ... it will open new opportunities for developing quicker and more precise diagnostic tests and vaccines for preventing leptospirosis," said Dr Carlos Morel from the Oswaldo Cruz Foundation, a biomedical research centre linked to Brazil's Ministry of Health.

The researchers, whose findings were published in the *Brazilian Journal of Medical and Biological Research* (2004;37:459-77), analysed the 4.6-million-base-pair genome of the strain of bacteria mainly responsible for the disease in Brazil, *Leptospira interrogans* serovar *Copenhageni*. The results of their research have pointed to the identification of candidate proteins for this purpose. Although leptospirosis can be treated with antibiotics, when left untreated it can lead to kidney damage, liver failure and, in extreme cases, death.

"We have already isolated 23 proteins ... that we consider potentially important for the development of a vaccine against leptospirosis," said Ana Lucia Tabet Oller do Nascimento, a researcher from Butantan Institute in São Paulo and lead author of the study. The 23 proteins were selected because of their ability to induce the production of antibodies in humans, explained Nascimento. "However, we

need now to test if such antibodies are in fact protective against the disease," she added. The researchers are now analysing another 200 proteins.

Despite the success of their research, Nascimento estimated it would take around ten years to develop a vaccine or any other product offering protection against the disease.

"Nothing is done in the short term when we are talking about developing a vaccine, which includes several steps between the sequencing and the final product. To believe that genomics can shorten such a period of time is to believe in magic or miracles," said Morel who views genomics research as a potentially powerful tool for controlling developing country diseases.

Leptospirosis occurs worldwide in urban and rural areas and in both tropical and temperate regions, mostly in developing countries. It is contracted by humans through direct contact with the urine of infected animals or by contact with a urine-contaminated environment. The disease has been found in both wild and domestic animals including rodents, insectivores, dogs, cattle, pigs and horses. It is therefore an occupational hazard for those who work outdoors or with animals and a recreational hazard for those who swim or wade in contaminated waters.

The number of human cases worldwide is not well-documented. According to WHO, it probably ranges from 0.1 to 1 per 100 000 per year in temperate climates to 10 or more per 100 000 per year in the humid tropics. During outbreaks and in high-risk groups, 100 or more per 100 000 may be infected. In Brazil 4128 cases were recorded in 2000, according to the National Foundation of Health.

The science of genomics — the branch of genetics that studies organisms in terms of their full DNA sequences (or genomes) — has been accelerating in recent years with very positive implications for combating diseases afflicting developing countries, says the report *Genomics and world health*, published by WHO in 2002. However, according to the report, 80% of DNA patents in genomics between 1980 and 1993 are held in the US. Of the 1233 new drugs marketed between 1975 and 1999, only 13 were approved specifically for tropical diseases.

"In this regard, steps need to be taken to avoid the creation of a 'genomics divide,' to ensure that the benefits of the