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Report of an Interregional Meeting on Prevention and Control of Plague

New Delhi, India
13-16 March 1995

WORLD HEALTH ORGANIZATION
BACTERIAL, VIRAL DISEASES AND IMMUNOLOGY

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1. EXECUTIVE SUMMARY

The outbreak of plague in India in 1994 was of global concern. WHO convened an Interregional Meeting in the WHO Regional Office for South-East Asia, New Delhi, from 13 to 16 March 1995 to review the lessons learned from the outbreak and to make recommendations for the prevention and control of plague and other infectious diseases with epidemic potential.

With improved hygiene and living standards, the availability of effective drugs for treatment and prophylaxis and the large-scale application of insecticides, the world-wide incidence of plague decreased steadily during the 20th century with a remarkable decline in the mid-1950s, although no real decrease was apparent world-wide during the last two decades. During the period from 1954 to 1993, 36 countries notified 67 344 cases and 6 095 deaths to WHO under the International Health Regulations, with case fatality rates ranging from 14.4% in Africa to 5.4% in the Americas.

The 1994 outbreak of plague in India started in Mamla village in the Beed district of Maharashtra State. In this village, rat-fall was reported on 5 August 1994 followed by reports of flea nuisance. On 26 August 1994, 33 patients with lymphadenitis were reported. From September until October 1994, suspected bubonic cases were reported from other villages of Beed district and other districts of Maharashtra State. A total of 596 presumptive cases (i.e. with positive serology) of bubonic plague were reported. The last case of bubonic plague occurred in Beed District on 2 October 1994.

An outbreak of acute respiratory illness characterized by fever, cough, hemoptysis and pneumonic infiltration seen in radiographs occurred in Surat, Gujarat State, in September-October 1994. The infection occurred with greatest frequency in young adults. It did not respond to treatment with penicillin, but responded well to tetracycline. The case fatality was high during the early stage of the outbreak. Based on the clinical picture and the occurrence of plague in the bordering state of Maharashtra, the diagnosis of suspected pneumonic plague was made. A total of 146 presumptive (seropositive) cases and 54 deaths considered as due to plague occurred place during the period 19 September to 22 October 1994. The independent international team established by WHO concluded that clinical, epidemiological and serological findings pointed to *Y. pestis* as the likely causative agent of the Surat outbreak. Subsequently, the National Technical Advisory Committee on Plague established that *Y. pestis* was the causative agent in three Surat patients with pneumonia by isolation and characterization of the organism.

Experience gained during this outbreak demonstrated that epidemic preparedness has to be a concern of health authorities at all levels of the health system, beginning with the community and extending to the global level. It should include laboratory support to ensure rapid and accurate confirmation, or at least preliminary confirmation, of clinical diagnoses. While epidemic preparedness can often appropriately be focused at local (district) level, it will need to be encompassed within a broader framework of integrated disease prevention and control strategies at regional (state) and national levels.

Recognition of a suspected epidemic posing an acute public health threat should be followed by the immediate formation of a multi-disciplinary Action Group to review the findings and decide on further actions to be taken, including clinical, epidemiological

and microbiological investigations.

For a number of diseases, insect vectors and animal reservoirs play a critical role. In epidemic-prone areas, surveillance services are required to monitor vector frequency, susceptibility to insecticides and rates of infection. They should also determine the distribution and infection rates of reservoir hosts and their susceptibility to control measures.

Building partnerships with the media and others involved in public relations is an integral part of the responsibility of health authorities. These partnerships must be fostered on a routine and continuing basis and appropriate channels of communication used to provide timely and accurate information in simple language.

Rapid action to contain diseases with serious epidemic potential, and to publicize such action, will often be critical in countering rumours and maintaining public confidence. This is also important to ensure that other countries do not impose inappropriate restrictions with respect to international travel and commerce.

Surveillance for new, emerging and re-emerging diseases must be a component of general disease surveillance within the health infrastructure. Reporting systems need to be improved and streamlined and surveillance data rapidly analysed to provide the essential information needed for decision-making. Guidelines for surveillance and control activities should be prepared in simple language for peripheral staff who have a key role in early detection and containment of diseases of concern.

The capacity to make a presumptive diagnosis must exist on all levels of health services, from national down to the district level. Confirmatory diagnosis should be the primary responsibility of the national reference laboratory.

Involvement of NGOs and other voluntary organizations, with their roles clearly defined, may contribute substantially to the containment of an outbreak.

The International Health Regulations (IHR) define a sound framework for national and international action and provide a model for all communicable diseases with rapid epidemic potential. Guidelines on application of the IHR at country level should be circulated by WHO.

2. INTRODUCTION

Plague is a disease of great antiquity, recorded in the ancient writings of India as well as in the Bible. Three great pandemics have swept across the world claiming many millions of lives and causing untold misery. The last pandemic, which began in the late 19th century, claimed about 13 million deaths in India alone. A remarkable decline in the number of cases and deaths due to plague was observed in the 20th century including in India, where no cases had been reported since 1967.

However, in 1994, plague suddenly re-emerged in India. Bubonic cases in Beed district of Maharashtra State and Surat City preceded an outbreak of pneumonic cases in Surat City in Gujarat State. The outbreak in Surat created local panic and international concern, leading to the imposition of travel and trade restrictions by a number of other countries. Effective measures taken by India brought the Surat outbreak rapidly under control and the disease did not spread to other countries.

An Interregional Meeting was convened in the WHO Regional Office for South-East Asia, New Delhi, from 13 to 16 March 1995 to review the lessons learned from this outbreak of plague and to make recommendations for the prevention and control of plague and other infectious diseases with epidemic potential.

The meeting was opened by Dr Hiroshi Nakajima, Director-General of WHO and was attended by staff from WHO Headquarters, WHO Regional Offices of the African, South-East Asian and Western Pacific Regions and scientists from India, Russian Federation, Thailand, Tanzania, United Kingdom and United States of America. The objectives, agenda, and list of participants are annexed. Professor V. Ramalingaswami accepted to Chair the meeting.

3. OPENING SESSION

Dr Nakajima, in his inaugural address, recalled that the control of plague had been one of WHO's earliest priorities. WHO expert committees met in 1949, 1952, 1958, 1969 and consultations were also held in Geneva (1979) and New Delhi (1989) where the need for effective plague surveillance was repeatedly emphasized. Emergency preparedness and response, including response to epidemics, require a well-coordinated plan of action and pooling of resources and efforts. Priorities must be clearly understood by all; relevance and timeliness are first among these priorities. The Director-General highlighted the need for increased coordination both at national and international levels. WHO should help countries prepare for and take effective action.

Dr Uton Muchtar Rafei, Regional Director, WHO/SEARO, noted that the lessons learned from the last epidemic of plague in India will enable countries to be better prepared to control future outbreaks of plague and other infectious diseases. The importance of epidemiological surveillance for the early recognition of outbreaks and carrying out of effective control measures, particularly for those diseases with epidemic potential, both at national and international levels, was stressed.

Dr Ralph H. Henderson, Assistant Director-General, WHO, reviewed the background and the objectives of the meeting. The outbreak of plague in India resulted not only in the loss of life and social disruption for thousands of people but also in substantial economic losses from trade and tourism. While there were many technical lessons to be learned from the outbreak of plague, he suggested that the meeting as a whole should also focus on more generic issues which would apply to any disease with epidemic potential.

Dr Mukherjee, Director General of Health Services, India, presented the steps taken by the Government of India to bring this outbreak under control.

4. REVIEW OF PLAGUE WORLD-WIDE

With improved hygiene and living standards, the availability of effective drugs for treatment and prophylaxis and the large-scale application of insecticides, the incidence of plague decreased steadily during the 20th century. Vector control measures brought plague under control in India in the 1950s. The 1994 outbreaks of bubonic plague in Beed district, Maharashtra and of pneumonic plague in Surat, Gujarat, were the first human cases reported in India since 1967.

During the period from 1954 to 1993, 36 countries notified 67 344 cases and 6 095 deaths to WHO under the International Health Regulations. The highest number of cases, 6 004, was reported in 1967 and the lowest, 200 cases, in 1981. The largest proportion of reported cases (66.8%) was notified by countries in Asia, followed by Africa and the Americas. The case fatality rates were relatively high in Africa (14.4%) and low in the Americas (5.4%). Despite the remarkable decline in the incidence of plague in the world in the mid-1950s, there appears to have been no real decrease world-wide in the last two decades.

The distribution of human plague throughout the world corresponds to the geographical distribution of its natural foci in wild rodents, which persist at present in North and South America, Africa and Asia, and to some extent in south-eastern Europe. Sporadic cases of human plague may occur in natural foci. Epidemics may develop if the ecology and environment are disturbed by earthquake or floods when wild rodents leave their normal habitats and come in contact with domestic rodents and hence result in human infections. Large outbreaks of plague have occurred during the past decade in Peru, Madagascar, Tanzania, Viet Nam and most recently in Zimbabwe and India. Recrudescence of enzootic plague has almost always been related to epizootics of the disease among rodents.

The meeting identified the following important issues:

1. Given that occurrence of plague epidemics is closely associated with the presence of natural foci, there is a need to investigate the presence of hitherto unknown natural foci particularly in Africa, Asia and South America.

2. Experience from a number of countries suggests that areas affected by plague are expanding over time. Therefore, surveillance for plague must