

support. Such support will include sufficiently accurate information to allow informed, competent decisions and financial recompense for the time and energy required by this new area of work. In addition, representatives of fundholders and non-fundholders will need to cooperate and have access to specialist advice.

The Nottingham group may be succeeding because most of these criteria have been fulfilled, but even when these conditions are achieved some groups will find themselves in difficulty. Clear agreement on the exact status of each group, its scope for action, and the limitations of its power are essential. In contrast with fundholding practices and the newly emerging "multifunds," non-fundholding groups are only advisory to purchasing agencies. Clarity about the nature of this relation should help sustain advisory groups and prevent breakdown in the more difficult debates about resources. Doctors will need to experience early positive results from their work; suspicion that consultation is purely cosmetic will produce early disillusionment. Anecdote and some reports suggest that such disillusionment is not unusual.<sup>7</sup>

Such groups face other problems. The Nottingham group rightly recognises the difference between purchasing and planning, and ways must be found of restoring to every health authority and health board a coherent planning function, involving not only non-fundholding groups but also fundholding practices and multifunds where they exist.

Groups will be motivated by aspirations to guarantee equity of access, but defining and proving inequity has proved difficult. To ensure equity requires rigorous contracting and, better, more accessible information than often seems available to non-fundholders at present. Furthermore, although the debate about inequity has focused on the impact of fundholders' purchasing decisions, unpublished reports suggest that some non-fund-

holder groups have achieved quicker access to secondary care than fundholders. The profession will surely not tolerate this variety of twotierism.

The climate of continuing change is not conducive to the establishment of satisfactory working practices and good relations, and commissioning groups need a period of stability. The function of a group may be undermined if the agency is simultaneously exploring alternative arrangements to secure advice for general practitioners.

Finally, the leaders of general practitioner advisory groups will need to maintain the validity of their mandate, and therefore of their advice, by frequently rechecking that the arrangements they are negotiating are indeed in line with colleagues' views.

The internal market seems with us for the foreseeable future,<sup>9</sup> and some have argued that general practitioners need to get involved or risk isolation.<sup>10</sup> A period of rigorous evaluation of all systems of purchasing remains essential, but the Nottingham non-fundholders have described a model that may merit wider application.

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## Plague in India

### *Lessons for public health everywhere*

After decades with no confirmed human plague in India, health authorities there are simultaneously responding to outbreaks of bubonic and pneumonic plague in rural and urban populations of the south central and southwestern states of Maharashtra and Gujarat. A major concern is the spread of disease by travellers from these epidemic foci.<sup>1</sup> Worldwide, public health authorities have been trying to prevent the introduction of pneumonic plague within their borders, requiring national disease surveillance and quarantine offices to operate on emergency schedules dealing with a situation with which almost none has any first hand experience.<sup>2</sup>

Public fascination, confusion, and incredulity have been fuelled by press reports. A mass exodus including hospital patients and even staff themselves has occurred from the epicentre of the outbreak of pneumonic plague despite regular pronouncements by the medical community that plague is readily treated with antibiotics. Assurances of the effectiveness of public health measures have seemed incongruous given the explosive spread of disease, which authorities have been slow to confirm and explain. Doctors and public health workers have quickly tried to educate

themselves about a disease they had long considered in the past tense. And everyone asks, "How could this happen?"

Plague is caused by infection with *Yersinia pestis*, a bacterium carried by rodents and transmitted by fleas in parts of Asia, Africa, and the Americas.<sup>2</sup> India was one of the countries most affected by the pandemic of plague that began in the latter half of the 19th century, experiencing an estimated 12.5 million deaths during 1889-1950.<sup>4</sup> In recent decades plague in India and elsewhere has retreated to rural, natural foci of infection involving mostly wild rodents and their fleas, with occasional spill over to commensal hosts and humans in villages and towns. Although a number of countries regularly experience endemic plague, its pattern of occurrence is mostly sporadic but with occasional limited outbreaks. In the 1990s outbreaks of both bubonic and pneumonic plague have occurred in Myanmar, Vietnam, Tanzania, Zaire, Peru, and Madagascar.<sup>5</sup> In 1992, 1758 cases with 198 deaths were reported to the World Health Organisation.<sup>5</sup> None of these outbreaks has aroused much attention outside the country of occurrence. What is so different about the current situation in India?

Most human plague is the bubonic form, which results

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from the bites of infected fleas; plague can also be transmitted direct to humans if they handle infected animals or inhale infectious respiratory droplets from people with pneumonic plague or aerosols from laboratory accidents. The incubation period for plague ranges from one to seven days, and manifestations of the illness include rapid onset of fever, chills, headache, malaise, myalgias, and prostration, often with nausea and abdominal discomfort. In particular, bubonic plague is characterised by painful swelling of lymph nodes (buboes) in the inguinal, axillary, or cervical regions; pneumonic plague is characterised by cough, dyspnoea, and tenacious blood tinged sputum; and septicæmic plague may result in fulminant Gram negative shock in the absence of localised signs of infection.<sup>6</sup>

New cases of bubonic plague were recognised six weeks ago by Indian health authorities in Beed district, Maharashtra state, about 300 km east of Bombay. In a chronology provided by WHO's regional office for South East Asia these cases followed reports of a flea nuisance and large numbers of dead rats (rat falls) in affected villages; the diagnosis was supported by positive results of serum testing in the cases. By 26 September 80 suspected cases had been reported by 15 villages. Routine control measures were instituted. On 22 September reports of cases of suspected pneumonic plague were received from Surat, a port city with a population of more than a million people, many of them migrant workers, in Gujrat state, about 200 km north of Bombay. Significantly, no rat falls and no cases of bubonic plague were reported.

This suggests a spillover from an epizootic cycle of plague in wild rodents to commensal rodents in Maharashtra state, resulting in primary cases of bubonic plague and secondary cases of pneumonic plague and the subsequent importation by travellers of pneumonic plague from the primary focus into Surat. The course of the epidemic in India over the next weeks is unclear; aggressive application of proved methods of actively detecting and of containing cases, contact tracing, and treatment as well as improved hygiene and environmental sanitation are necessary to bring about its early control.

### Quarantine

Plague is one of the three remaining diseases for which people can be put in quarantine internationally.<sup>7</sup> The response of countries has ranged from complete termination of air transport to and from India and the requirement of proof of recent vaccination against plague for admittance of anyone travelling from India to the institution of various systems of heightened surveillance based on international regulations.<sup>7</sup>

In Britain recommendations were issued to all doctors, describing the level of risk to travellers and measures to be taken by those who travel to Gujrat state.<sup>8</sup> Britain, Canada, and the United States instituted heightened disease surveillance by flight crews, notification of quarantine officers by pilots of any suspect case before a plane lands, medical examination of the suspect case before the disembarkation of passengers and crew, surveillance of those passengers potentially exposed to the suspect contagious person, providing information to all passengers arriving on direct flights from India advising that their risk of infection is likely to be low, and notifying them to report to a doctor immediately should they develop an illness with fever during the ensuing week. People suspected of having plague have been identified in aircraft landing in North America and Europe, although no cases of plague have been confirmed in travellers at the time of writing.

Travellers to India and other countries in which plague is endemic are considered to be at low risk of infection with

*Y pestis*. To reduce risk, travellers should avoid areas with recently reported cases in humans. People who must travel to these areas should avoid rat infested areas, especially areas where dead rats have been observed; apply insect repellants to ankles and legs and apply repellants and insecticides to clothing and outer bedding as directed by the manufacturer; avoid handling dead or sick animals; and, if the risk of exposure is high, take prophylactic antibiotics. For adults the preferred antibiotic for prophylaxis is tetracycline or doxycycline; for children aged 8 or less it is a sulphonamide. Because desired antibody responses to plague vaccine may require the administration of multiple doses over several months these vaccines are not recommended for immediate protection during outbreaks.

Doctors should be alert for evidence of plague in people who have travelled to areas where plague is endemic and who develop a febrile illness within seven days of leaving the area. All patients suspected of having plague should be placed in hospital in isolation, specimens should be obtained from patients for laboratory diagnosis, chest roentgenography should be performed, and antibiotic treatment should be started promptly. Streptomycin is the preferred drug for treating plague, but gentamicin, tetracyclines, and chloramphenicol are also effective.<sup>9,10</sup> Prompt treatment can reduce overall mortality from plague from 60%-100% to less than 15%. Prophylactic antibiotic treatment should be given to all people who have been close enough to a patient with pneumonic plague to allow the transmission of infective respiratory droplets.

The unexpected and dramatic events that are playing themselves out in India, and the public health responses around the world to these events, highlight the continuing threat of emerging and re-emerging infectious diseases and the ill preparedness of the health community to meet these threats.<sup>11-14</sup> The Centers for Disease Control and Prevention in the United States is currently evaluating what strategies will be most useful to meet these challenges; one possibility is for doctors to participate in a sentinel network for the surveillance of emerging infections.<sup>14</sup>

Outbreaks of plague in India remind us once again of the need to maintain a core of skill in infectious diseases and the public health infrastructure to detect, monitor, and combat a wide range of disease agents, some new, some revisiting. Plague may have retreated over the past decades, but it has not gone away.

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