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Foot and mouth disease: the human consequences

The health consequences are slight, the economic ones huge

The current major outbreak of foot and mouth disease (FMD) is the latest in a series of disasters that are putting British agriculture under stress.[1] The disease affects all cloven-hoofed animals and is the most contagious of animal diseases. It is caused by a virus of the family Picornaviridae, genus Aphthovirus, of which there are seven serotypes (O, A, C, SAT1, SAT2, SAT3, and Asia1). The current outbreak in the United Kingdom is due to the highly virulent pan-Asiatic serotype O.[1] In animals the disease presents with acute fever, followed by the development of blisters chiefly in the mouth and on the feet. Infected animals secrete numerous virus particles before clinical signs appear.[2]

Foot and mouth disease is a zoonosis, a disease transmissible to humans, but it crosses the species barrier with difficulty and with little effect. Given the high incidence of the disease in animals, both in the past and in more recent outbreaks worldwide, its occurrence in man is rare[3] so experience of the human infection is limited. The last human case reported in Britain occurred in 1966, during the last epidemic of foot and mouth disease.[4] The circumstances in which it does occur in humans are not well defined, though all reported cases have had close contact with infected animals. There is one report from 1834 of three veterinarians acquiring the disease from deliberately drinking raw milk from infected cows.[5] There is no report of infection from pasteurised milk, and the Food Standards Agency considers that foot and mouth disease has no implications for the human food chain.

The type of virus most often isolated in humans is type O followed by type C and rarely A. The incubation period in humans is 2-6 days. Symptoms have mostly been mild and self limiting, mainly uncomfortable tingling blisters on the hands but also fever, sore throat, and blisters on the feet and in the mouth, including the tongue.[3] Patients have usually recovered a week after the last blister formation. In the unlikely event of human cases in the current outbreak in Britain they should be reported to the Communicable Disease Surveillance Centre (0208 200 6868) duty doctor, who can direct professional inquiries towards expert advice on management and diagnosis.[2] Suspected and confirmed human cases must have no contact with susceptible livestock to avoid transmitting the disease. Person to person spread has not been reported.

Foot and mouth disease should not be confused with the human disease hand, foot, and mouth disease. This is an unrelated and usually mild viral infection, principally of children, caused by different viruses, principally coxsackie A virus.[6]

Foot and mouth disease is endemic in many countries, including much of Africa, Asia, and South America, where its importance relates to the reduced productivity of livestock, the cost of vaccination, and the restrictions placed on international trade in live animals and animal products.[7] To be listed among the "FMD free countries where vaccination is not practised" the Office International des Epizooties, the international regulatory body concerned with animal infections,[8] requires a country to have a record of regular and prompt animal disease reporting and to supply documented evidence of an effective system of surveillance. Such a country should also not import animals vaccinated against foot and mouth disease[9] since serological testing cannot differentiate between infected and vaccinated animals. A "foot and mouth free zone" may be established in a country in which parts are infected, separated from the rest by a buffer zone.

As international trade barriers become increasingly subject to scrutiny, foot and mouth disease remains one of the few remaining constraints to international trade in live animals and animal products. The occurrence of even a single case of foot and mouth disease in a previously disease free country results in an immediate ban on an economically valuable export trade. The European Commission in 1990-1, after undertaking a cost benefit analysis, implemented a policy of non-vaccination to increase export opportunities and to ensure high animal health standards.[10] This outbreak containment policy requires an export ban on all livestock and animal products from any affected country, along with movement restrictions and the slaughter and burning of all cloven-hoofed animals that are either infected, on infected premises, or in contact with infected animals. Until now the European Union has remained free of foot and mouth disease since an outbreak in Greece in 1996.

The highest risk to European Union countries is through legal and illegal imports of infected live animals and contaminated meat or dairy products from infected countries then being eaten by animals. International travellers bringing back food from endemic countries could spread the disease. The foot and mouth disease virus can survive for long periods in a range of fresh, partially cooked, cured, and smoked meats and in inadequately pasteurised dairy products. Currently animals and animal products need to be checked only when they enter the European Union.

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Once inside, and with correct documentation, they can be moved around without restriction. For these reasons other countries have banned the import of animal products from the UK.

Spread of the virus is facilitated by the development of long distance animal trading. Dense livestock populations may also enhance local spread in the vicinity of an outbreak. Awareness of the disease among livestock owners is crucial, as are the UK's excellent diagnostic facilities. Spread can take place on the wind and mechanically by the movement of animals, people, and vehicles that have been contaminated with the virus. Thus the whole British population has a role in combating the disease. Restriction of non-essential movement both into and out of affected farms and more widely in the countryside is important. This is requiring close collaboration between veterinary, health, and local authorities. If these measures are not successful, however, the major review of safeguards announced by the agriculture minister may lead to major changes in animal husbandry in the UK.[11]

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HIV and infertility: time to treat

There's no justification for denying treatment to parents who are HIV positive

No established guidelines exist for defining access to fertility care for individuals infected with HIV. Although many in vitro fertilisation units in the United Kingdom screen patients for HIV, only a handful are prepared to treat couples if one or other partner tests positive. A premise of offering assisted conception treatment is a consideration for the welfare of any child born or affected as a result of treatment. In the case of HIV the primary concern is over the life expectancy of the infected parent and the risk of viral transmission to either the uninfected partner or offspring.[1 2] The ethical dilemmas these issues raise have, until now, provided sufficient grounds for most units offering assisted conception to close their doors to patients infected with HIV who ask for help or who test positive in their preliminary investigation.[3]

Combination antiretroviral therapy has produced radical improvements in life expectancy and quality of life for both children and adults infected with HIV in developed countries. Current estimates suggest that a disease previously associated with certain death is compatible with a life expectancy of at least 20 years from time of diagnosis. Is it therefore justifiable to deny HIV positive adults fertility treatment on the grounds that children born as a result are unlikely to see childhood through before one or both parents die? There are many similarities between HIV and other once fatal diseases afflicting women in their reproductive years, such as diabetes, cystic fibrosis, congenital heart disease, and breast cancer. Cardiac disease and cystic fibrosis, in particular, may worsen considerably during pregnancy, with effects on both maternal and fetal health. Yet fertility treatment is rarely refused in these cases, despite the risks of pregnancy to mother and fetus.

As regards viral transmission to the offspring, without intervention a mother infected with HIV has a 13%-30% risk of infecting her baby.[4] Judicious use of combination antiretroviral therapy during pregnancy and labour, delivery by caesarean section, and avoidance of breast feeding are proved measures which have reduced the risk of vertical transmission to less than 2%.[5 6] Compare this with an HIV negative mother, who has a 2.5% risk of giving birth to a baby with a significant congenital malformation, a risk increasing fourfold if she has insulin dependent diabetes and tenfold if she has congenital heart disease. In vitro fertilisation clinics treat many such women and many women over 40, whose age related risk of giving birth to a child with Down's syndrome is 1% and increases steeply with age. Potential teratogenic effects of antiretroviral drugs taken during pregnancy remain an issue. Serious adverse effects appear rare, although mitochondrial cytopathy leading to neonatal death has been documented.[7]

Reproductive assistance to HIV discordant couples can make a significant impact in preventing viral transmission. The female partner of an HIV positive man runs a 0.1%-0.2% risk of acquiring HIV in an act of unprotected intercourse,[8] and attempting to conceive naturally carries a serious risk to the uninfected woman and her child.[9] In men infected with HIV, virus is present in semen as free virus in the seminal plasma and as cell associated virus in the non-sperm cells. Although the issue is controversial, there is little evidence to support

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