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Measles

Introduction

Measles is a highly contagious infection caused by a virus of the paramyxovirus family. Measles remains a leading cause of death amongst young children despite the availability of an effective vaccine. In 2006, an estimated 242,000 people died from measles worldwide, the majority of them children [1].

Epidemiology

Global epidemiology

Measles occurs worldwide but is now less common in high income countries. As an example, measles is no longer endemically transmitted in the United Sates. In countries where vaccine coverage is low measles is a leading cause of death and morbidity. Data from the World Health Organization (WHO) indicates that the highest burden of disease was in the WHO South East Asia region where 178,000 people died in 2006 [1]. The primary reason for high childhood measles morbidity and mortality is the difficulty that affected countries have in delivering at least one dose of measles vaccine to each child. Although the figures remain high, due to improvements in vaccine coverage, measles mortality decreased by 68% between 2000 and 2006, and in Africa measles cases and deaths fell by 91% [1].

Several European countries have seen a recent increase in the number of measles cases. In February 2006, an outbreak of 150 cases was reported in northern Greece [2]; and in June 2006, an outbreak affecting 1,278 people was reported in Germany, the largest outbreak in the country since measles reporting began in 2002 [3]. This outbreak lead to the recommendation by the Pan American Health Organization for all travellers to the FIFA World Cup in Germany to be vaccinated [4]. In January 2007, an outbreak of measles was reported in Barcelona, Spain in which 122 people were affected and a large scale vaccination programme initiated [5].

In England and Wales, statutory notification of measles began in 1940. Before the introduction of measles vaccination in 1968, notifications of the illness varied from 160,000 to 800,000 cases annually [6]. Although measles vaccine was introduced in 1968, vaccine coverage remained low until the late 1980s and measles remained a major cause of morbidity and mortality in England and Wales.

In 1988 measles, mumps, and rubella (MMR) vaccine was introduced in England and Wales and vaccine coverage exceeded 90%. As a consequence, measles notifications fell, and since 1997 measles notifications have fluctuated between 2,000 and 4,000 per year. Despite this fall, cases continued to occur in older, unimmunised children who had not been exposed to measles at an early age and therefore, a catch-up vaccination campaign was implemented in 1994 and a two-dose MMR schedule in 1996.

In 2006 there was a sharp increase in measles cases, with 739 confirmed cases in England and Wales, compared to 77 cases in 2005 [7].

Measles in England and Wales associated with overseas travel

During 2004 and 2005, 28 cases of measles in England, Wales, and Northern Ireland were known to have acquired their infection overseas, and a further 12 acquired their infection through contact with cases that had travelled [8]. Twenty of the travel-related cases acquired their infection in Asia; other countries of travel reported were Jamaica (one), Turkey (one), France (three), Spain (two), and the United States (one).

Risk for overseas travellers

All previously unvaccinated and non-immune travellers are at risk from measles when visiting countries where measles continues to occur. Travellers should be offered vaccination as part of their pre-travel health consultation. See Vaccine Information section for indications for the use of vaccine.

Transmission

Measles is one of the most contagious infectious diseases; it is transmitted via respiratory droplets. Individuals are infectious from when the first symptoms appear until four days after the appearance of rash.

Signs and symptoms

Following an incubation period ranging from eight to 12 days, measles begins with a two to four day prodrome characterised by fever, malaise, coryza (runny nose), conjunctivitis and cough. Koplik's spots, small papular white lesions, usually appear one day before the onset of rash on the buccal mucosa in line with the molars.

The hallmark of measles is a rash. A red maculopapular rash first appears on the face and spreads down to the trunk and extremities. The rash begins to fade after three to four days. In uncomplicated cases clinical recovery begins soon after the appearance of the rash.

The rate of complications of measles varies by age, and is increased by malnutrition, vitamin A deficiency, and immune deficiency [9]. The risk of mortality as a result of measles complications is highest among infants aged less than 12 months, and in adulthood [10]. The most common complications are otitis media (7-9%), diarrhoea (8%), pneumonia (1-6%), and convulsions (one in 200) [6].

Recovery from measles results in life-long immunity. However, those who have recovered from measles should still receive MMR vaccine if protection against mumps or rubella is required. There are no known safety concerns about giving MMR vaccine to immune persons [9].

Treatment

Uncomplicated measles in immune competent persons is usually a self limiting illness. Secondary infections may require treatment with antibiotics.

Prevention

Vaccination should be offered to all previously unvaccinated individuals who are travelling abroad provided there are no contraindications to the vaccine. Persons born before 1970 are likely to have acquired natural immunity, but there is no upper age limit to vaccination and MMR vaccine can be offered if they are not immune and at risk of exposure.

Measles is a notifiable disease in the United Kingdom (UK) and cases should be reported to the local Health Protection Unit. Appropriate public health action including contact tracing and vaccination can then be implemented.

Vaccine information

Indications for use of vaccine

Measles vaccine is available as a combined product with mumps and rubella, and forms part of the UK vaccination schedule. The aim of the programme is to ensure that all susceptible persons receive two doses of measles, mumps, and rubella (MMR) vaccine. The second dose of vaccine aims to prevent an accumulation of susceptible individuals that could be sufficient to re-establish measles transmission.

- Children under ten years of age

MMR vaccine should be offered to infants shortly after their first birthday, usually at 13 months of age. A second dose is then given before school entry.

- Children ten years and older, and adults

MMR vaccine can be given at any age, and a travel health consultation is an opportunity to ensure that individuals have received two doses of the MMR vaccine given at least one month apart.

Adults born in the UK before 1970 are likely to have developed immunity following natural infection. Vaccination would not normally be given, unless they are considered to be non-immune and at risk of infection.

- Overseas travellers

All travellers should ensure that they are fully immunised according to the UK schedule. MMR vaccine can be considered for infants from six months age if they are visiting a measles endemic area. However, as a sub-optimum response may occur in infants under 12 months of age, two further doses, one at 13 months of age and another before school entry, should be given.

Availability

There are two MMR vaccines available in the UK. Details of these can be found in the table below.

The Summary of Product Characteristics (SmPC) should be consulted prior to the administration of any vaccine [11,12].

Vaccine schedules

Vaccine	Manufacturer/distributor	Schedule	Length of Protection	Age range
M-M-R II™	Sanofi Pasteur MSD	Children under 10 years: 2 doses, given at least 3 months apart. Children 10 years or over and adults: 2 doses at least 1 month apart	Lifelong protection following 2 doses	From 12 months of age From 6 months if travelling to a risk area. Two further doses, one at 13 months of age and a 2nd before school entry, are still required.
Priorix™	GlaxoSmithKline	Children under 10 years: 2 doses, given at least 3 months apart. Children 10	Lifelong protection following 2 doses	From 12 months of age From 6 months if travelling to a risk area. Two

		years or over and adults: 2 doses at least 1 month apart		further doses, one at 13 months of age and a 2nd before school entry, are still required.

Interrupted courses

There is no evidence that an interrupted course of MMR vaccine needs to be restarted regardless of the interval between the two doses

Contraindications

MMR vaccine should not be given to:

- Immune suppressed individuals. HIV-positive individuals can be given MMR vaccine depending on CD4 count. See the Department of Health's *Immunisation against infectious disease* ('The Green Book') for further guidance.
- Individuals who have experienced an anaphylactic reaction to a previous dose of a measles, mumps, or rubella containing vaccine.
- Individuals who have experienced an anaphylactic reaction to neomycin or gelatine.
- Pregnant women.

Precautions

MMR vaccine should be used with caution in the following individuals and specialist advice sought as appropriate prior to vaccinating. Further guidance can be found in the Department of Health's *Immunisation against infectious disease* ('The Green Book').

- Individuals with a history of Idiopathic thromocytopaenic purpura (ITP) following previous MMR vaccine.
- Individuals with egg allergy (both vaccines are cultured on chick embryo tissue) cultures).
- Breastfeeding women.
- HIV positive individuals.

Adverse events

Adverse events (except allergic reactions) following MMR vaccine are due to replication of the vaccine viruses. They are seen in individuals who are not immune to one or more of the viruses in the vaccine. Events due to the measles component occur six to 11 days after vaccination, and to the mumps or rubella components two to three weeks following vaccination, but can occur up to six weeks later.

Undesirable adverse events include:

- Common: malaise, fever, and/or rash.
- Rare: febrile seizures, Idiopathic thrombocytopaenic purpura, arthralgias, or arthritis.

References

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Links

Health Protection Agency

World Health Organization