

**Updated July 2010**

## **Poliomyelitis**

### **Introduction**

Poliomyelitis (polio) is an acute, potentially paralysing, vaccine-preventable disease. It is caused by poliovirus, a small RNA virus of the genus *Enterovirus* with the picornavirus family [1, 2]. There are three serotypes of human poliovirus: 1, 2 and 3 [1, 2]. Significant progress has been made towards the global eradication of polio, and serotype 2 has been eradicated. However, four countries remain endemic for polio: Afghanistan, India, Nigeria and Pakistan, and other countries in Africa and Asia have reported imported cases [2, 3].

On 23 April 2010, the World Health Organization (WHO) confirmed wild poliovirus (type 1) in diagnostic cases of acute flaccid paralysis (AFP) in southwest Tajikistan [3]. This was the first reported importation of poliovirus in the WHO European region since it was certified polio free in 2002 [4].

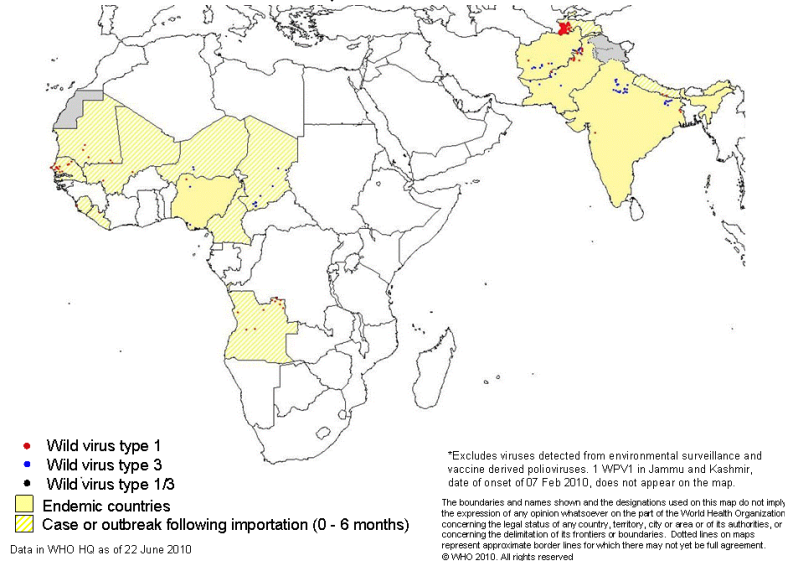
### **Epidemiology**

#### Global Epidemiology

In 1988, more than 125 countries on five continents were endemic for polio, with more than 1,000 children paralysed every day. In that year, the World Health Assembly voted to launch a global initiative, with the aim of eradicating polio by 2000.

The Global Polio Eradication Initiative (GPEI) was set up by national governments, WHO, Rotary International, the US Centers for Disease Control and Prevention (CDC) and the United Nations Children's Fund (UNICEF). It is a leading global health initiative. The GPEI involves collaborative efforts to improve global polio surveillance and to organise immunisation campaigns. These activities have interrupted transmission of polio in more than 100 countries.

#### **Wild Poliovirus\*, 23 Dec 2009 – 22 Jun 2010**





Map reproduced from the Global Polio Eradication Initiative: [www.polioeradication.org](http://www.polioeradication.org)

The number of reported cases worldwide has declined from 350,000 in 1988 to 1,606 in 2009 [4]. As of 22 June 2010 there are four countries where wild poliovirus circulation has never been interrupted and that are endemic for polio: Afghanistan, India, Nigeria and Pakistan [4]. Exportation of polio from these endemic countries remains a problem. The following countries have reported cases of polio related to importation since January 2007: Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Ghana, Guinea, Kenya, Liberia, Mali, Mauritania, Myanmar, Nepal, Niger, Senegal, Sierra Leone, Somalia, Sudan, Tajikistan, Togo and Uganda [4].

[The outbreak of wild type polio virus in Tajikistan](#) in April 2010 is the first in the WHO European Region since it was certified polio-free in 2002 [4].

Other countries outside of the regions that have eradicated polio (WHO regions of the Americas and Western Pacific) may also be a risk for travellers.

#### Polio in Travellers from England and Wales

Control of polio in the UK is excellent and there have been no confirmed cases of indigenous wild type polio since 1984 [1]. The last imported case was in 1993, when a UK traveller acquired polio in India [5].

#### **Risk for travellers**

Two WHO global regions (the Americas and the Western Pacific regions), have eradicated wild type poliovirus [6]. Therefore travel to these regions is a negligible risk for polio.

The risk of acquiring polio visiting countries outside these regions is low [6] and depends upon several factors. These include: standard of living, length of stay, and food and water hygiene. The risk is highest for those intending to visit areas of poor sanitation.

Infected travellers carry polio virus and can potentially introduce the virus to polio free countries. Until worldwide polio eradication is achieved, the risk to travellers of acquiring the virus, and the risk of polio being re-introduced to disease free regions remains [7].

#### **Transmission**

Polio is transmitted via the faecal-oral route, either by exposure to faecally contaminated food or water, or by person to person contact. Pharyngeal secretions may contain virus and can play a role in transmission [1, 2].

#### **Signs and symptoms**

The incubation period for polio ranges from 3 to 21 days [6]. Clinical illness can be categorised according to the severity of symptoms:

##### Asymptomatic

Accounts for up to 95% of all polio infections. Estimates of the ratio of asymptomatic to paralytic illness vary from 50:1 to 1000:1 (usually 200:1).



#### Minor, non-specific

Accounts for 4% to 8% of infections. Three syndromes are seen and can be indistinguishable from other viral illnesses:

- upper respiratory tract infection (sore throat and fever)
- gastrointestinal disturbances (nausea, vomiting, abdominal pain, constipation, and diarrhoea)
- influenza-like illness

There is no central nervous system invasion and recovery occurs in less than a week.

#### Aseptic meningitis

Occurs in 1% to 2% of infections and is characterised by a non-specific prodrome followed by stiffness of the neck, back, and/or legs. This lasts from two to ten days, with complete recovery.

#### Flaccid paralysis

Occurs in less than 1% of all polio infections. Prodromal symptoms last for one to ten days followed by paralytic symptoms which progress over two to three days and stabilise as the temperature returns to normal.

Paralysis can affect single or multiple limbs and the respiratory muscles. 1 in 200 infections result in irreversible paralysis, usually of the legs. Fatality rates are about 2% to 5% of cases in children and up to 15% to 30% in adults, increasing to 25% to 75% when there is bulbar involvement. There is a 5 to 10 fatality rate when respiratory muscles are involved [6].

About 50% of people with paralytic polio recover without paralysis. Another 25% have mild permanent disability and 25% have permanent severe paralysis. Rarely persons, who have made a complete recovery from polio, will develop a return or worsening of muscle weakness 15 or more years after this attack of polio. This is called Post Polio Syndrome.

### **Treatment**

No antiviral drugs are available and treatment is supportive [2, 8]. This includes respiratory support, including intubation and mechanical ventilation if respiratory muscle paralysis occurs [2]. Occupational therapy, physiotherapy and occasionally surgery have important roles in patient rehabilitation [9].

Polio is a notifiable disease in the UK [1].

### **Prevention**

Effective vaccination is available. Travellers should also be advised:

- Polio is transmitted via the faecal oral route. In addition to vaccination, strict food and water hygiene is an important preventative strategy. See [food & water hygiene](#) advice for further information.
- Practise a high level of personal hygiene, i.e. hand washing, especially after using the toilet and before eating.
- Swim in chlorinated water and avoid contact with water contaminated with sewage.



Infection with one of the three virus types of polio does not confer immunity to the other two types [6]. Therefore, persons with a history of poliomyelitis only have type-specific immunity and will not be fully protected against other polio serotypes.

A previous history of poliomyelitis disease is not a contraindication to vaccination with poliomyelitis vaccine [10].

## Vaccine Information

All previously unvaccinated individuals, including those with a history of poliomyelitis, should receive a primary course of three poliomyelitis containing vaccines (appropriate to their age group) with an interval of at least one month between each dose. Booster doses should be given at the appropriate interval according to UK guidelines.

## Indications for use of vaccine

Polio vaccine is recommended for:

- All infants, from two months of age ([British Routine Immunisation Schedule](#)).
- Travellers to areas or countries where poliomyelitis is epidemic or endemic and their last dose of polio vaccine has been 10 or more years ago [1].
- Individuals at risk of exposure to polio through their work, e.g. healthcare workers and microbiology laboratory staff.
- Individuals not previously immunised.

## Availability of vaccine

In September 2004, inactivated polio vaccines (IPV) replaced oral polio vaccine (OPV) in UK vaccine schedules. This change simplified vaccine schedules, eliminated the small risk of OPV-associated paralytic poliomyelitis, and recognised the low risk of polio importation to the UK following global efforts at polio eradication [1, 11].

There are five vaccines containing IPV that are licensed for use in the UK. Revaxis™ (dT/IPV) is the only vaccine licensed for use in adults. See the table below for details.

Further information on the UK childhood vaccine program can be found on the [Department of Health website](#).

## Vaccine schedules

Vaccine	Manufacturer/ distributor	Schedule	Length of protection	Age range
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<b>Pediacel®</b> [12]. Diphtheria, tetanus, 5 component acellular pertussis, inactivated poliomyelitis vaccine and Haemophilus influenzae type b vaccine (DTaP/IPV/Hib).	Sanofi Pasteur MSD	Primary immunisation: 2, 3 and 4 months	3 years for DTaP/IPV.  Lifelong for Hib.	2 months to 10 years.
<b>Infanrix IPV + Hib®</b> [13]. Diphtheria, tetanus, 3 antigen acellular component pertussis, inactivated poliomyelitis and Haemophilus type b conjugate vaccine (adsorbed).	GlaxoSmithKline.	Primary immunisation: 2, 3 and 4 months.		2 months to 36 months
<b>Infanrix IPV®</b> [14]. Diphtheria, tetanus, 3 component acellular pertussis, inactivated polio vaccine (DTaP/IPV).	GlaxoSmithKline	Pre-school booster: single dose	7 years for the dT/IPV. No data on aP.	Booster: from 16 months to 13 years.
<b>Repevax®</b> [15]. Low dose diphtheria, tetanus 5 component acellular pertussis and inactivated polio vaccine (dTAP/IPV).	Sanofi Pasteur MSD.	Pre-school booster: single dose	7 years for the dT/IPV. No data on aP.	3 years, 4 months to 5 years.
<b>Revaxis®</b> [16]. Low dose diphtheria, tetanus and inactivated polio vaccine (Td/IPV).	Sanofi Pasteur MSD.	Single dose booster. 3 dose schedule for previously unvaccinated adults.	10 years.	10 years and over.

### Contraindications

- History of hypersensitivity to the vaccine or any of its components.
- Acute febrile illness.

### Adverse events

Adverse events following polio vaccination tend to be mild and transient. They include soreness, erythema and induration at the injection site. The Summary of Product Characteristics for each vaccine product lists vaccine specific adverse events [12 - 16].

### References

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## Reading list

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Field VF, Ford L, Hill DR, eds. Health Information for Overseas Travel. National Travel Health Network and Centre, London, UK, 2010.

Plotkin S, Orenstein W, Offitt P, eds. Vaccines 5<sup>th</sup> ed. Philadelphia: Saunders Elsevier; 2008.

## Links

Centers for Disease Control:

<http://www.cdc.gov/vaccines/vpd-vac/polio/default.htm>

NaTHNaC Clinical Update: Changes to the NaTHNaC Country Information Pages: Polio:

[http://www.nathnac.org/pro/clinical\\_updates/cip\\_changes\\_polio\\_240510.htm](http://www.nathnac.org/pro/clinical_updates/cip_changes_polio_240510.htm)

NaTHNaC Clinical Update: Wild type polio outbreak in south-west Tajikistan:

[http://www.nathnac.org/pro/clinical\\_updates/polio\\_tajik\\_270410.htm](http://www.nathnac.org/pro/clinical_updates/polio_tajik_270410.htm)

World Health Organization: Global Polio Eradication Initiative:

<http://www.polioeradication.org/>

World Health Organization: Weekly Epidemiological Record. Polio vaccines and polio immunization in the pre-eradication era: WHO Position Paper:

<http://www.who.int/wer/2010/wer8523.pdf>