

# Polio and the road to eradication

## The Global Polio Eradication Initiative

**Kimberley Anneveldt**

*While in the Netherlands the last polio outbreak happened more than 20 years ago, several not western countries are still facing outbreaks. In 2014, 356 cases of Polio were reported globally, most of them (303) in Pakistan. The most recent case dates from January 3rd 2015, in Pakistan.*

### **Poliomyelitis**

Poliomyelitis is a highly infectious disease caused by the human enterovirus C group, one of the four human enteroviruses with a single-stranded RNA genome. The three poliovirus serotypes are conveniently named types 1, 2 and 3 and all of them produce motor neuron disease. The transmission takes place by fecal-oral contamination but can also happen by pharyngeal spread. 95% of the poliovirus infections are asymptomatic. One in 200 infections leads to irreversible paralysis (usually in the legs). Among those paralysed, 5% to 10% die when their breathing muscles get affected. After infection a major viremia occurs which causes the usual viral infection symptoms, but in some cases involvement of the central nervous system occurs, giving signs of meningitis or even more severe symptoms like the development of motor weakness. After invading the central nervous system the virus uncoats, viral replication occurs and the motor neuron dies leading to paralysis of muscle fibers supplied by this motor neuron. The gold standard for confirming the diagnosis is PCR amplification of poliovirus RNA from cerebrospinal fluid.

There is no cure for poliomyelitis at this moment. Treatment includes pain relief, physical therapy and if necessary mechanical ventilation. The only antiviral therapy available

has shown mixed results. Because of this, prevention is the key to eradication for which an effective vaccine is available since 1956.

### **The Global Polio Eradication Initiative**

Rotary International took the initiative to eradicate polio worldwide in 1985. The World Health Assembly adopted a resolution in 1988 to support this initiative and both World Health Organisation and Rotary International have worked together with UNICEF and the US-based CDC in the Global Polio Eradication Initiative since. The basis of the GPEI has been immunization and surveillance of poliomyelitis.

At the start of this initiative in 1988 polio was endemic in more than 125 countries and paralyzed at least 350 000 children each year. But since the start of the programme a fall of cases by 99% has been achieved. At this moment, at the end of 2014, only three endemic countries are left: Afghanistan, Nigeria and Pakistan. Reported cases in other countries are imported cases. Wildtype 2 has officially not been reported since 1999 and type 3 not since November 2012 and they could for this reason already be considered eradicated.

Achieving eradication comes with high costs, especially in

low-income countries. But the prevention of poliomyelitis through the GPEI has been shown to be highly cost-effective. Between the start in 1988 and 2035 net benefits of the GPEI have been estimated to up to 40-50 billion US dollars.

### Recent outbreaks

The progress is tracked through surveillance of acute flaccid paralysis cases and testing of linked stool specimens for polioviruses in selected areas. All thought the numbers of 2014 looked hopeful, only in 2013 different cases of outbreaks were reported in different areas of the world and most of them could be linked to conflicts which are still continuing. Because of the threat of increasing outbreaks, the WHO declared in May 2014 that the spread of polio had become a global public health emergency, posing a major threat to the global eradication effort. The reason of these (sometimes new) outbreaks had to do with international travel, but especially with limited resources of health systems and low poliovirus vaccination coverage because of military, politically and social conflict.

### Future

The strategy of the polio vaccine only works when high levels of vaccine coverage are maintained. However, failure in implementing the planned strategy leads to ongoing transmission of the virus. Because of this the new Polio Eradication Endgame Strategic Plan 2013-2018 has been developed by the GPEI together with polio-affected countries, WHO-partners and national and international advisory bodies and was presented at a Global Vaccine Summit in April 2013. Once polio is eradicated the world can celebrate a new step made towards health equality and thousands of people won't have to suffer from the horrible effects of the polio virus.

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### About the author

Kimberly Anneveldt is a fourth year medical student at the University of Groningen. In the past she has been president of IFMSA-Groningen and Vice President of IFMSA-NL.

### References

- [www.polioeradication.org](http://www.polioeradication.org)
- [www.endpolio.org](http://www.endpolio.org)

