

Polio free: surveillance for acute flaccid paralysis

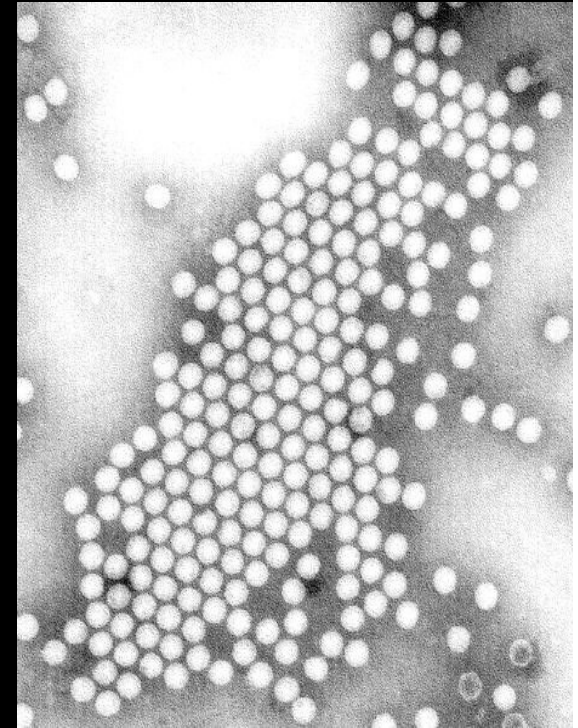
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Spinal polio (poliomyelitis)

- *Antecedent febrile illness*
 - URTI, gastroenteritis
- *Acute onset painful limb weakness and areflexia*
 - Often asymmetric, patchy
 - Rarely involves respiratory muscles
 - Progress rapid but brief (days)
- *Variable meningism*
- *No sphincter dysfunction*
- *No UMN involvement*
 - Cognition and sensorium unaffected

Poliovirus

- Spread mainly faecal-oral
- Most infections asymptomatic / self-limiting
- Peak infection <5yrs
- Three types of wild poliovirus:
 - Type 1: Responsible for most infections worldwide 2003-2006
 - Residual paralysis in 1/200
 - Type 2 : last recorded 1999
 - Type 3: Residual paralysis in 1/1000



Poliomyelitis: differential diagnosis

Other myelopathies

- Transverse myelitis
- Cord compression, cord infarction
- Other anterior horn myelopathies
 - Hopkins' syndrome
 - Non-polio enteroviruses
 - Coxsackie, echovirus, EV 70 and 71
 - Central European, Japanese, Kunjin encephalitis
 - Other neurotropic viruses
 - Rabies, varicella zoster, flaviviruses, EBV, West Nile

Acute neuropathies

- Guillain-Barré syndrome
- Toxic neuropathies
- Acute intermittent porphyria, Tangier disease

Neuromuscular junction

- Myasthenia gravis, botulism





Jonas Salk
Inactivated trivalent polio
vaccine 1954



Thomas Sabin
Live attenuated trivalent vaccine 1957

1954: polio prophylaxis



Salk field vaccine trial : 1.8 million children - largest field trial ever



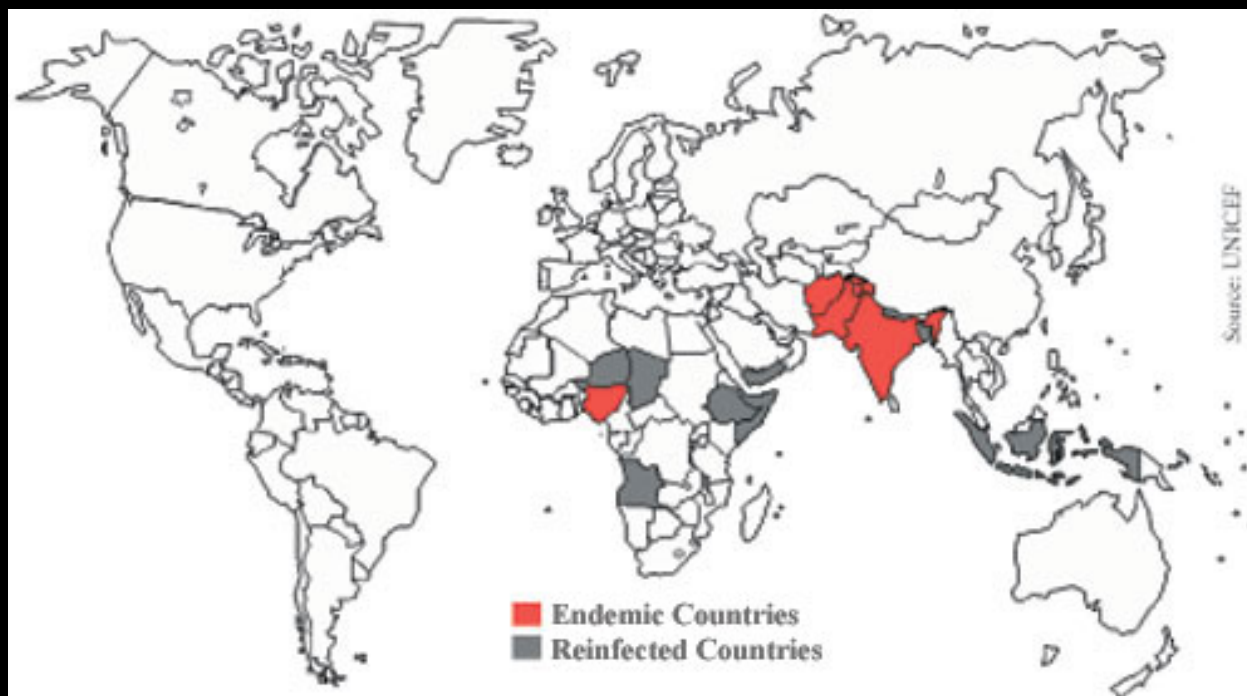


The Global Polio Eradication Initiative

- Begun 1988, has reduced global incidence by >99%
 - Goal of eradication of polio by 2000
 - Wild polio now endemic in only 4 countries:
 - Afghanistan, Pakistan, Nigeria, India
 - Flares since 2002 in India, Nigeria → 20 countries re-infected
 - Other difficulties:
 - Circulating virus derived from oral vaccine
 - Persistent excretion by immunodeficient individuals
- ? Abandonment of eradication in favour of control
- Cost estimates favour ongoing attempts at eradication

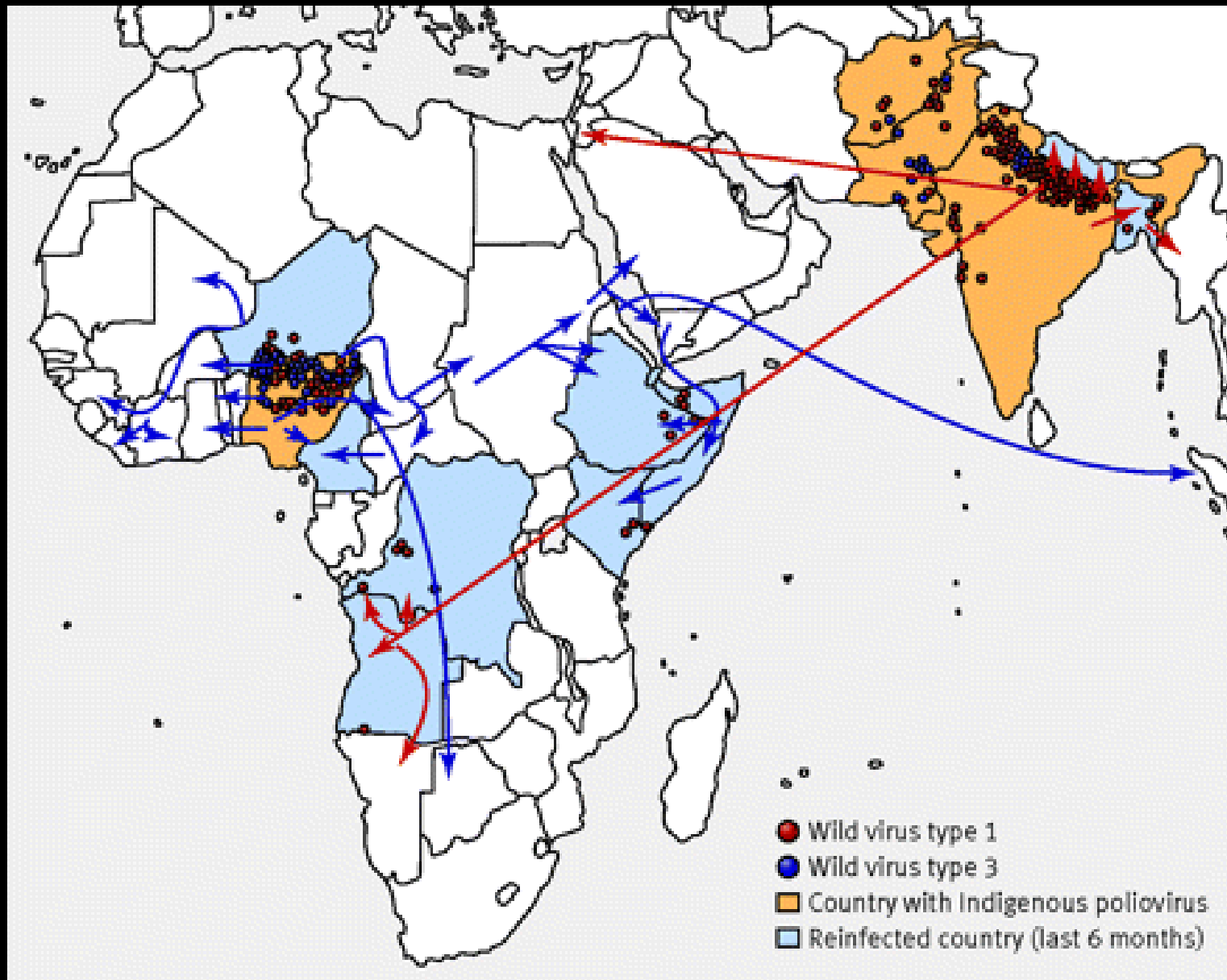


World polio 1988



World polio 2007

Source: Unicef



International spread of wild polioviruses 2003-2007

Source: GPEI

The GPEI

- GPEI has now abandoned tOPV
 - Use of monovalent OPVs against types 1 and 3
- Current strategy focuses on type 1 mOPV
 - Only oral vaccine is proven to stop transmission of polio
 - Risk of spread to unimmunised/ immunodeficient
 - Strategies to increase public engagement
 - Polio outbreak responses
 - National Immunization Days
 - Vitamin A supplementation
 - Malaria nets
- Move to IPV in polio-free countries
- OPV for outbreaks in countries where IPV use is standard

Poliomyelitis in Australia

- Last case indigenous wild poliovirus
 - 1967 laboratory confirmed, Vic
 - 1974 clinically compatible, Qld
- Vaccine-associated paralytic polio (VAPP)
 - Last documented case 1994
- Imported case 2007
- Western Pacific Region declared polio-free in 2000
 - Exclusive use of IPV from 1.11.2005
- Potential means of polio infection:
 - Importation of wild polio from an endemic country
 - Importation of a vaccine strain from a country using OPV
 - Laboratory-acquired infection

Monitoring Australia's polio status

- Vaccination coverage
 - IPV combination paediatric vaccine: 2, 4, 6m and 4y
 - » Fully immunised (ACIR, age at 31.3.2007)

12 - <15 months	91.8%
24 - <27 months	95.1%
72 - <75 months	88.8%
 - IPV adult booster
- Clinical surveillance + laboratory investigation
 - Acute flaccid paralysis (AFP) study March 1995
 - National Polio Reference Laboratory: VIDRL 2000
 - Cases referred to Australian Polio Expert Committee

Surveillance for acute flaccid paralysis (AFP) within Australia

Paediatricians notify cases of AFP via a monthly report card to the Australian Paediatric Surveillance Unit and submit a clinical questionnaire to the National Poliovirus Reference Laboratory (NPRL). Stool specimens from AFP cases are tested at the NPRL for isolation of poliovirus. The Australian Polio Expert Committee reviews the clinical and laboratory data to determine whether the case is compatible with poliomyelitis. The Committee reports to the Australian Government Department of Health and Ageing and the World Health Organization.

Protocol for investigation of suspected polio cases

Clinicians should phone the NPRL to notify the case and arrange for two stool specimens to be collected 24 hours apart (due to intermittent virus shedding) and within 14 days of onset of symptoms, for testing at the NPRL. Polio antibody testing requires acute and convalescent serum, and is only performed when there is a clinical suspicion of poliomyelitis.

Contacts

National Poliovirus Reference Laboratory, Victorian Infectious Diseases Reference Laboratory

Phone: (03) 9342 2607; fax: (03) 9342 2665; email: polio@mh.org.au;

website: http://www.vidrl.org.au/labsandunits/polio/polio_activity.htm

Australian Paediatric Surveillance Unit, Children's Hospital at Westmead

Phone: (02) 9845 3005/ 9845 2200; fax: (02) 9845 3082; email: apsu@chw.edu.au;

website: <http://www.apsu.org.au>



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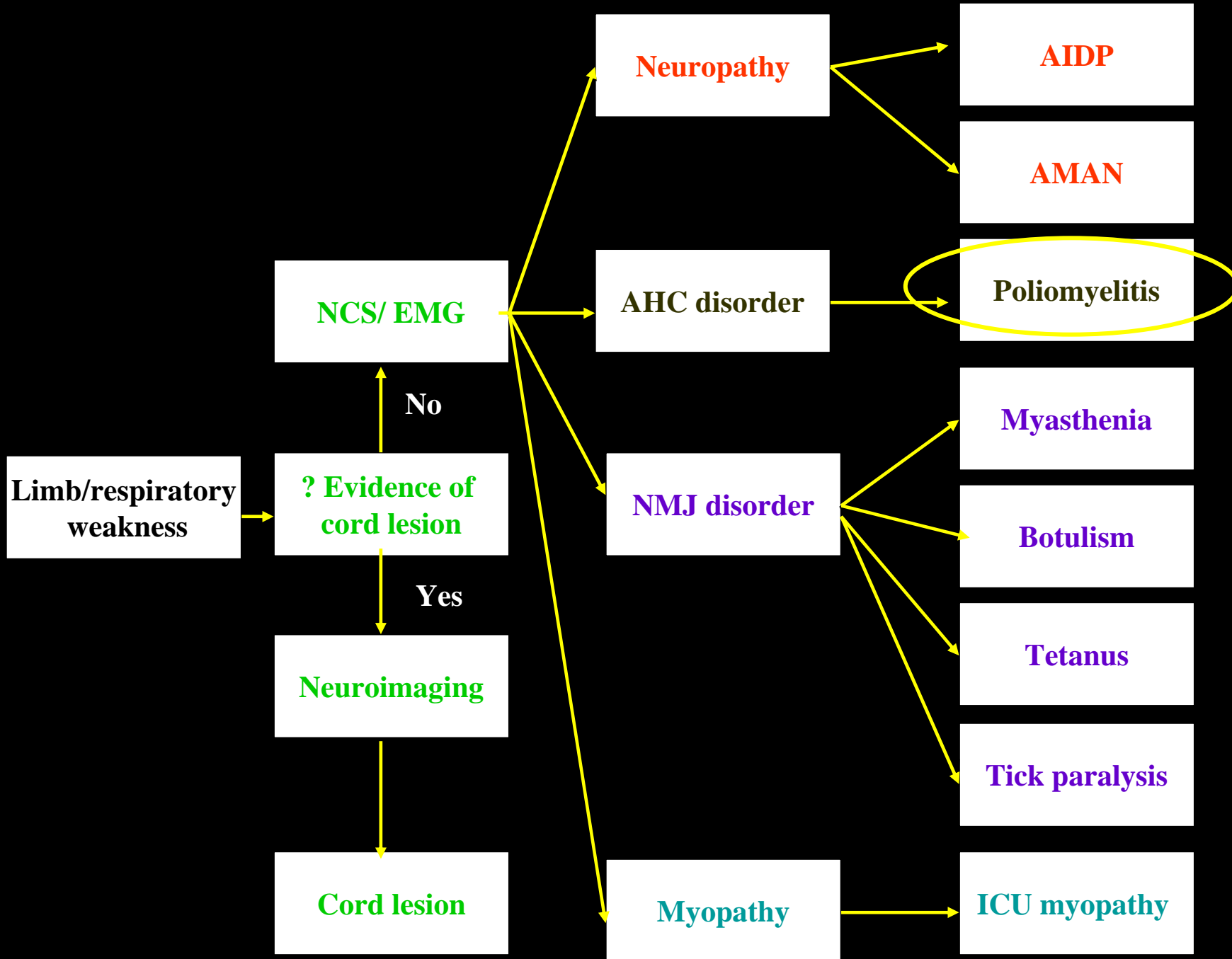
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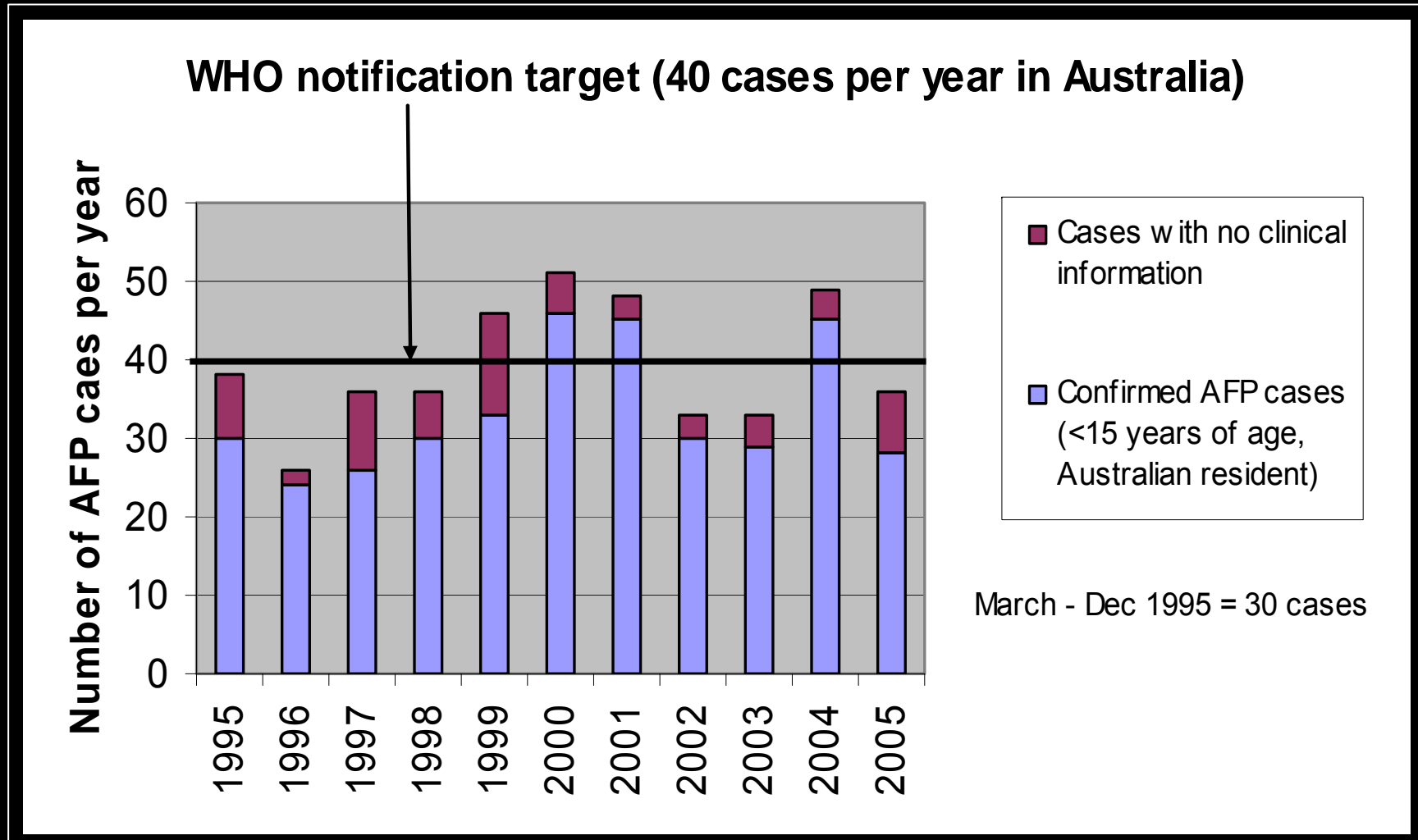
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Surveillance for AFP in Australia

A VIDRL / APSU collaboration



APSU notifications 2007

State/ Territory	Estimated Population aged <15 years ¹	Expected number of AFP cases per year ²	2007: Number notifications	2007: Number of cases classified by the PEC	Notification rate per 100,000 population for eligible cases
NSW	1,332,708	13	8	5	0.6
VIC	979,747	10	8	7	0.8
QLD	844,860	8	3	2	0.4
WA	416,737	4	2	1	0.5
SA	287,572	3	2	1	0.7
TAS	96,558	1	1	0	1.0
NT	51,770	1	0	0	0.0
ACT	63,127	1	0	0	0.0
Australia	4,073,624	41	24	16	0.6

Enterovirus isolations from AFP cases, Australia 1996-2005

- Stool specimens received from 162 AFP cases
- Adequate stool collection 21- 40% cases
 - WHO target 80%
- Enterovirus isolations from 26 cases
 - Poliovirus 1, 2, 3 (OPV)
 - Echovirus 9, 11, 18
 - Coxsackievirus A24, B5
 - Enterovirus 71, 75

The risk of polio importation

- VAPP
 - Unimmunised adult, USA 2005
- cVDPV
 - Unimmunised community, USA 2005
- Poliovirus importation:
 - Wild poliovirus
 - Indonesia: polio-free from 1995
 - 2005 300 cases; strains originated in Nigeria
 - Netherlands 1978 & 1992

Wild poliovirus importation Australia 2007

- 22 year old male student: at least 3 doses OPV as child, no booster
- Returned to Pakistan and visited NWFP June 2007
- 22 June: symptom onset - fever, nausea, pain in lower back and legs
- 24 June: asymmetric lower limb weakness
- 2 July: symptoms resolved except for pain, arrived in Melbourne
- 3 July: pain worsened, lower limb weakness returned
- 6 July: admitted Box Hill Hospital, MRI compatible with poliomyelitis
- 8 July: symptoms resolved
- Public health aspects managed by DHS, CDN, AHPC, NPRL, PEC

Source: Dr Andrew Stewardson, Dr John Daffy (Eastern Health)

Aiming for polio eradication

'Finishing the job of polio eradication is our best buy. We must do it. We are leaving a perpetual gift to generations of children to come.'

WHO Director-General Dr. Margaret Chan

- Monitoring:
 - Individuals with known immunodeficiency
 - Improved surveillance for poliovirus detection
 - APSU, PAEDS networks
 - Enterovirus laboratory network
 - Environmental sampling
 - Aim for >85% polio vaccine coverage

Acknowledgements

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 - Ms Kristina Grant
 - Mr Jason Roberts

