

Vaccine Preventable Diseases

Dr Rose Fitzgerald



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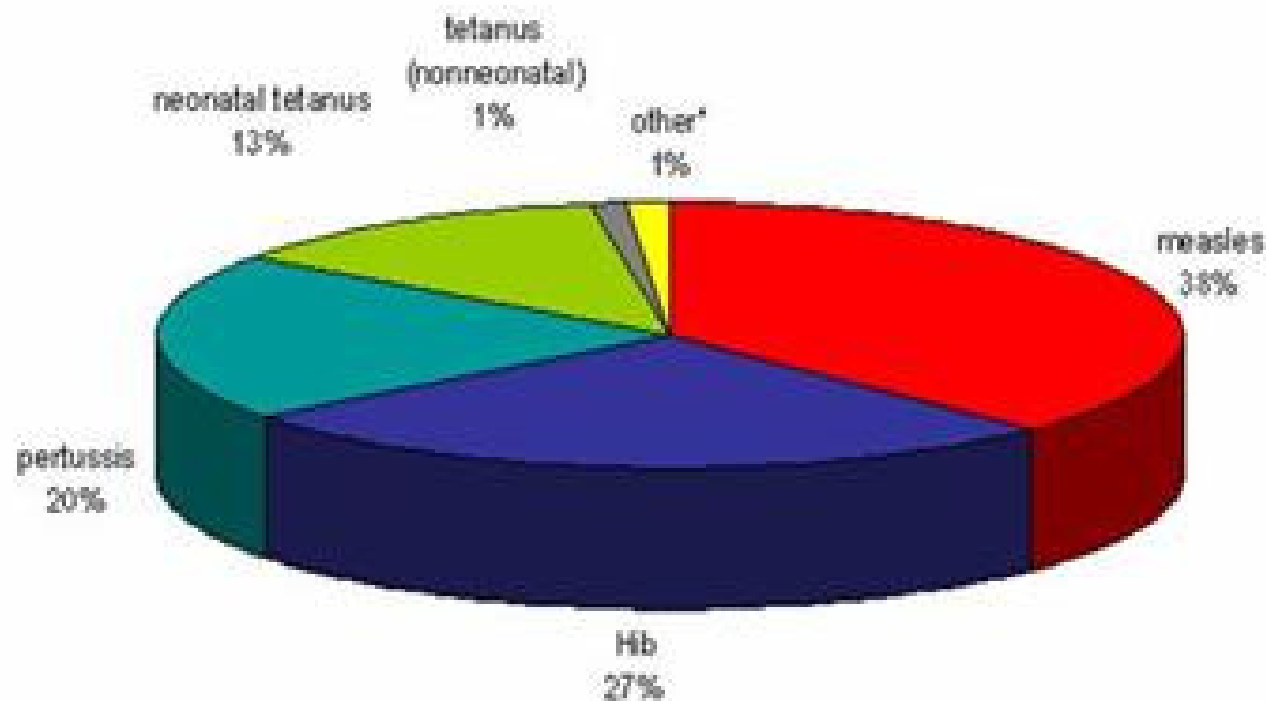
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Vaccine Preventable Diseases — not just a thing of the past



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Worldwide VPD Disease Burden



1.4 M
(14%)
deaths
children
< 5 yrs

* other – polio, diphtheria, yellow fever



WHO 2002

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Nearly Forgotten Vaccine Preventable Diseases

- Small pox →Gone
 - Diphtheria
 - Tetanus
 - Polio
-not gone



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Smallpox



In the 19th century

- killed one in three of those infected
- badly disfigured survivors

Somalia in 1977

- last naturally occurring case



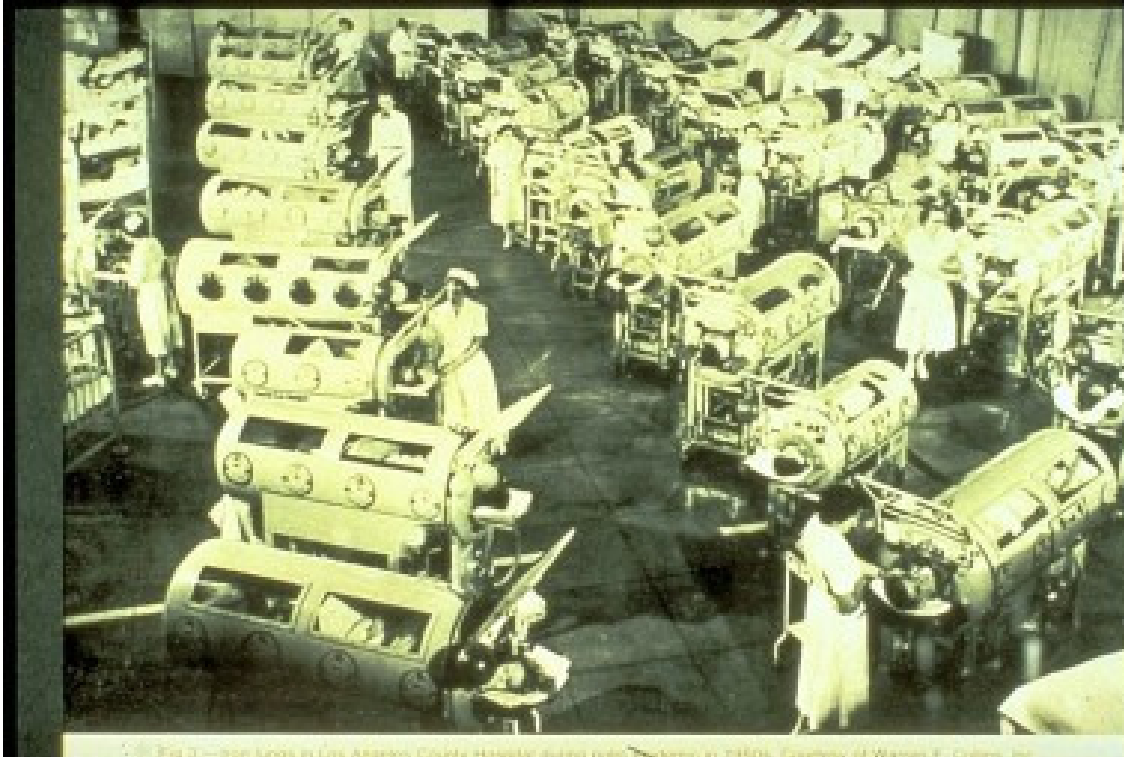
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Polio

Afghanistan, Pakistan, Nigeria,
Lao, Madagascar and Guinea

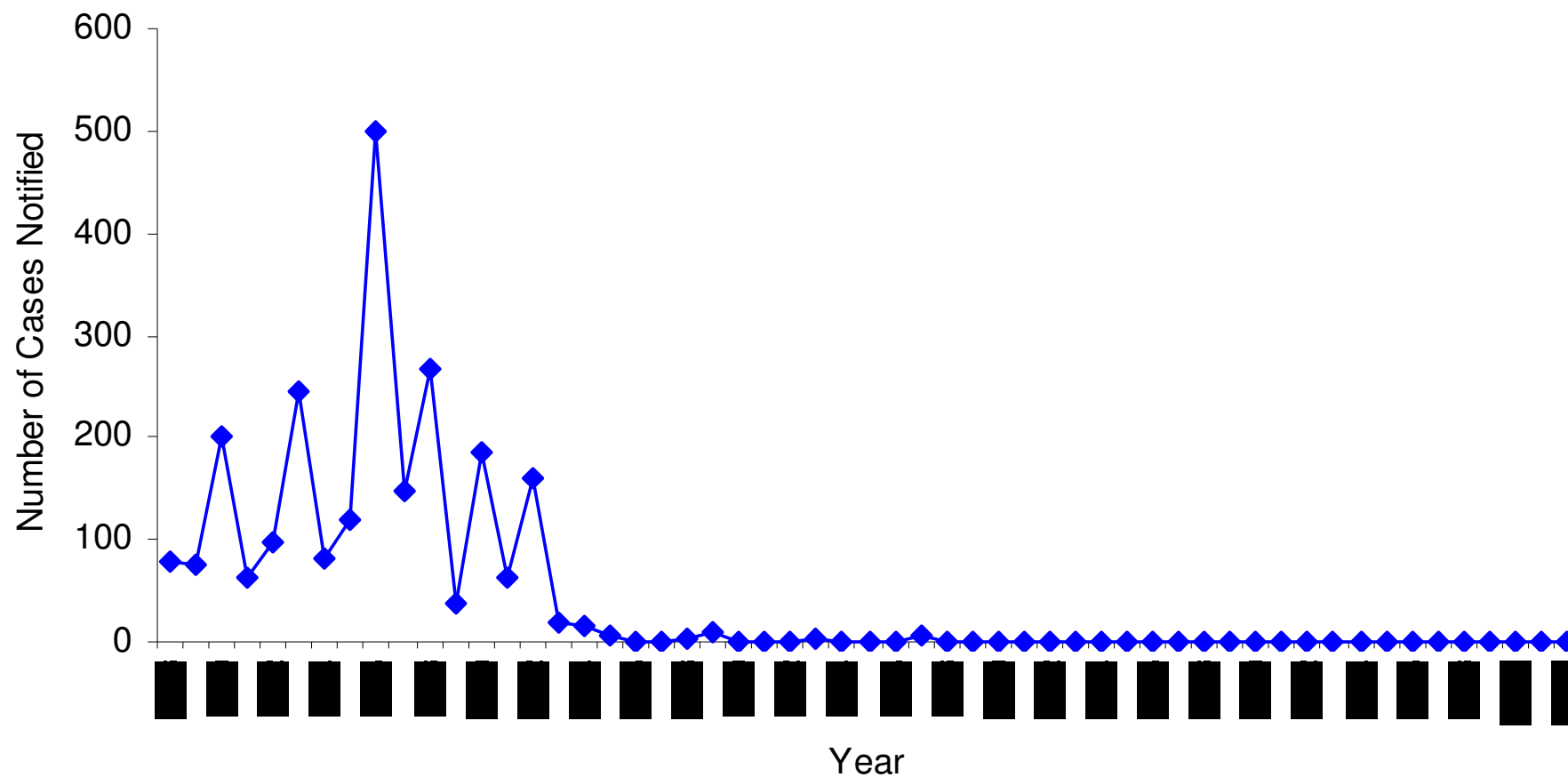


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Polio cases Ireland 1947 – 2004 (HPSC)

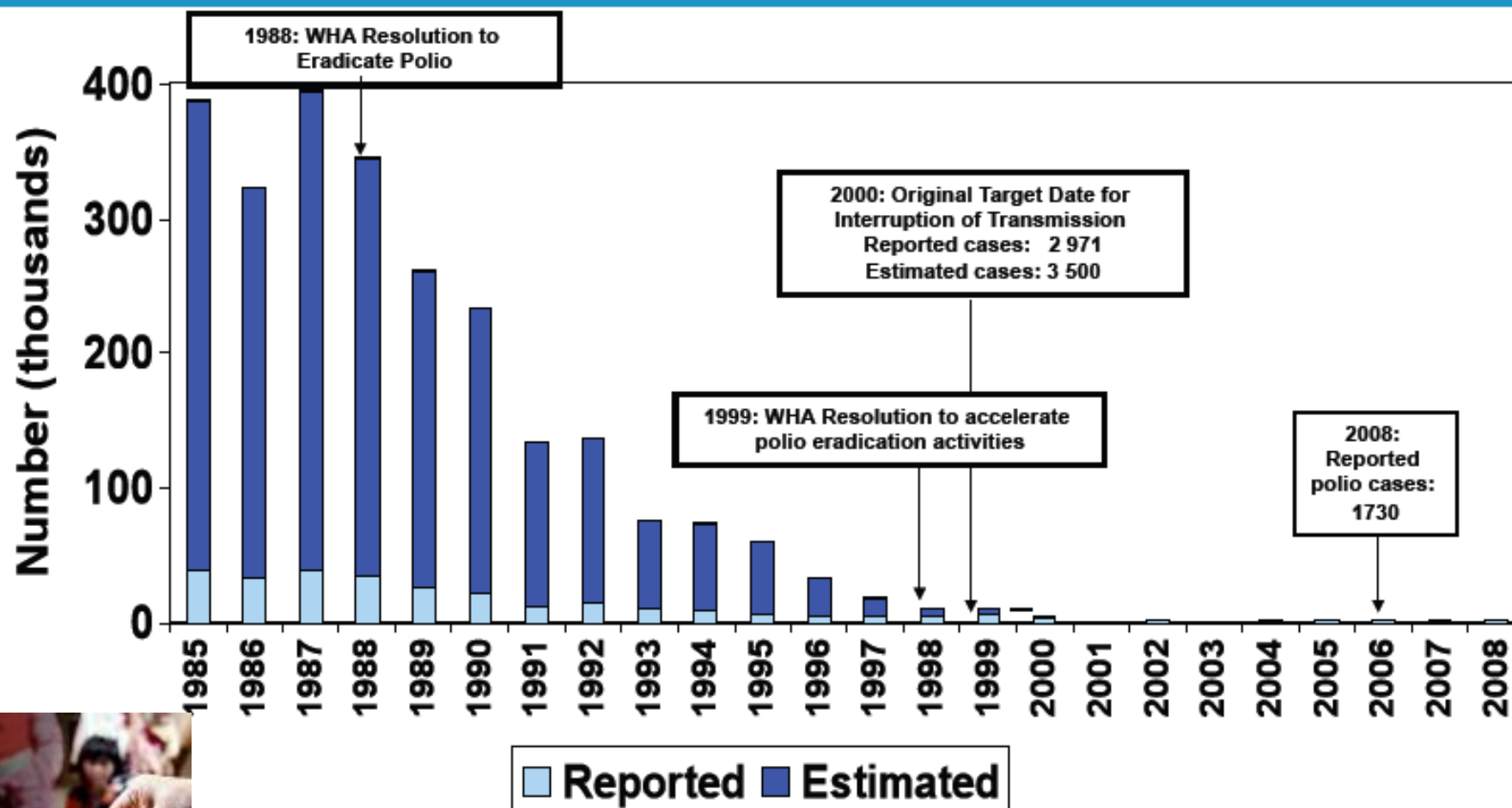


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Progress in Polio Eradication, Estimated and Reported Polio Cases, 1985-2008



Database, 23 September 2009

tates.

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World Health
Organization

reidhneannacht na Seirbhíse Sláimé
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Diphtheria

- Inflammatory exudate of upper respiratory tract
- Obstructive laryngotracheitis
- Myocarditis
- Ascending paralysis
- 7,321 cases in 2014

Courtesy of CDC

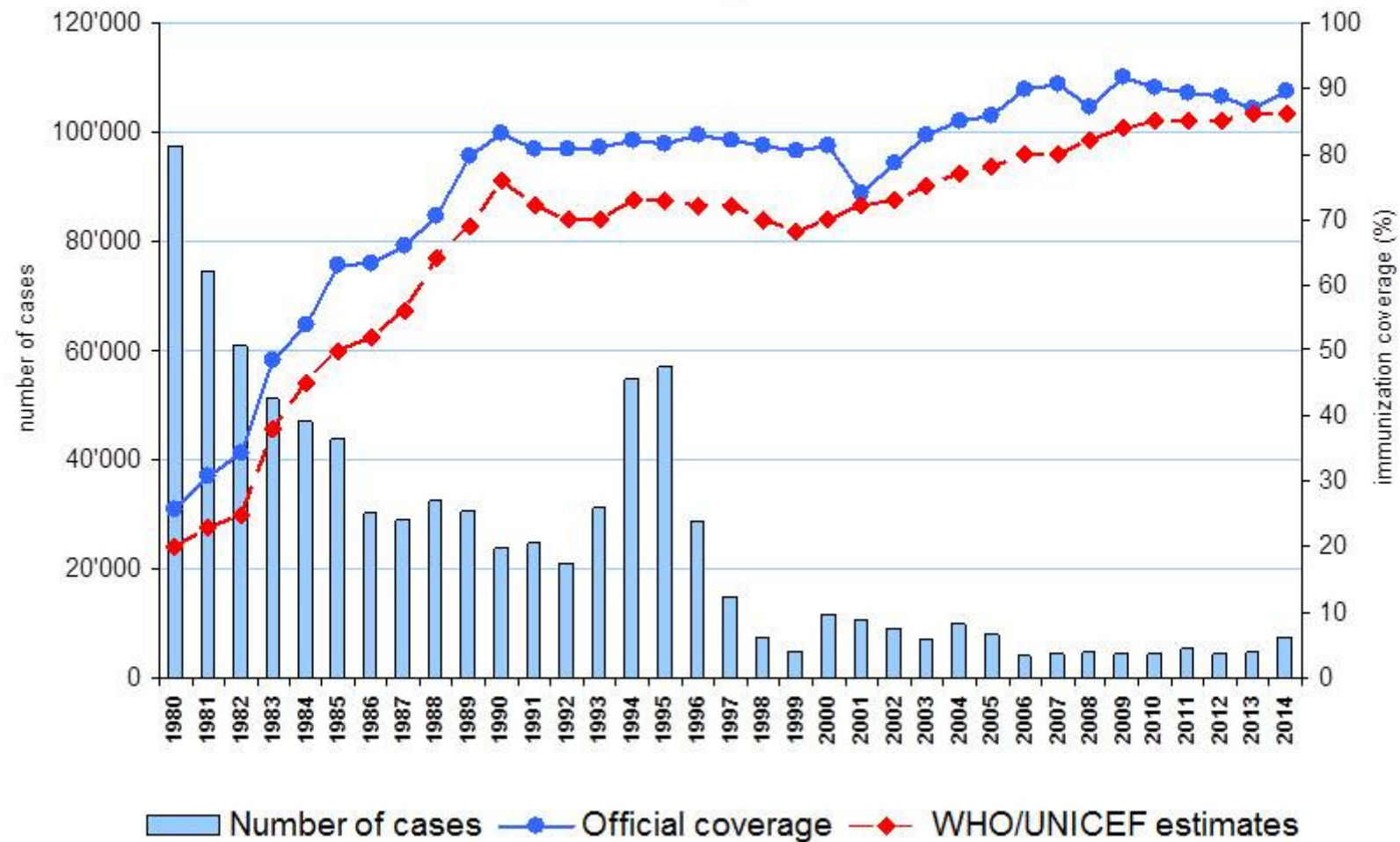


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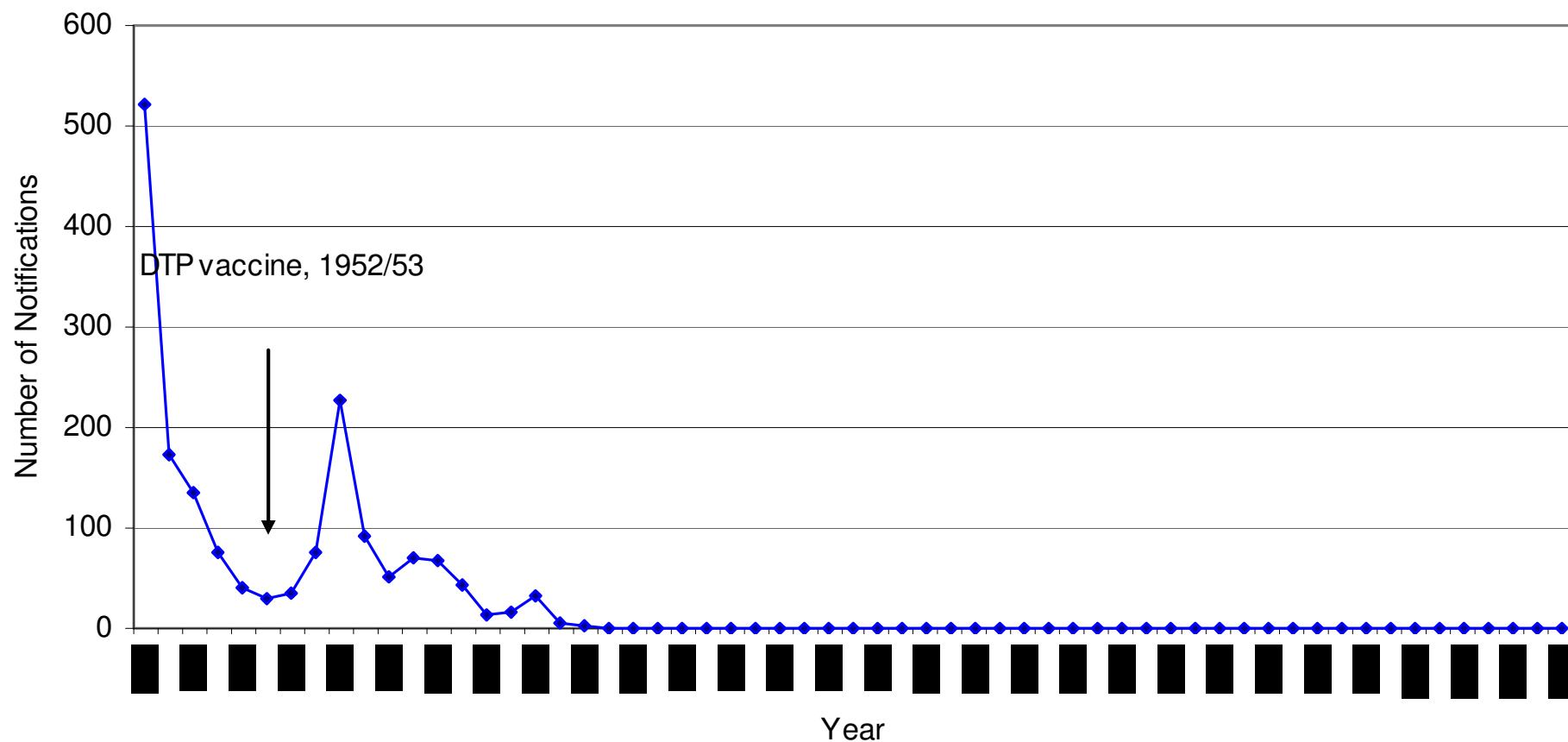


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Diphtheria global annual reported cases and DTP3 coverage, 1980-2014



Diphtheria Cases Ireland 1947 – 2006 (HPSC)

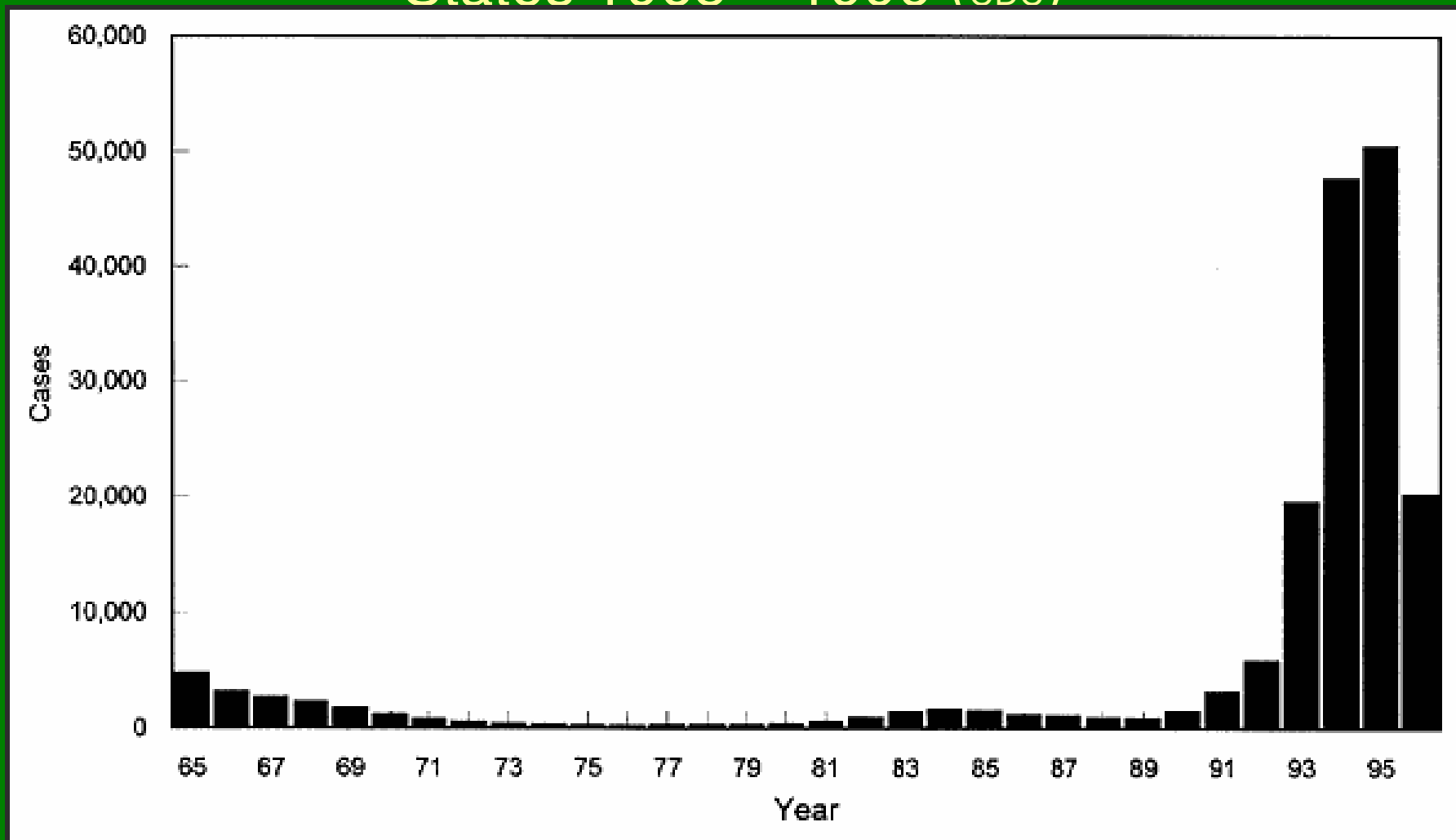


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Diphtheria Soviet Union and Newly Independent States 1965 – 1996 (CDC)



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Neonatal and Maternal tetanus

In 2000

- Neonatal tetanus caused 14% (215,000) neonatal deaths worldwide
- Maternal tetanus responsible for 5% (30,000) deaths

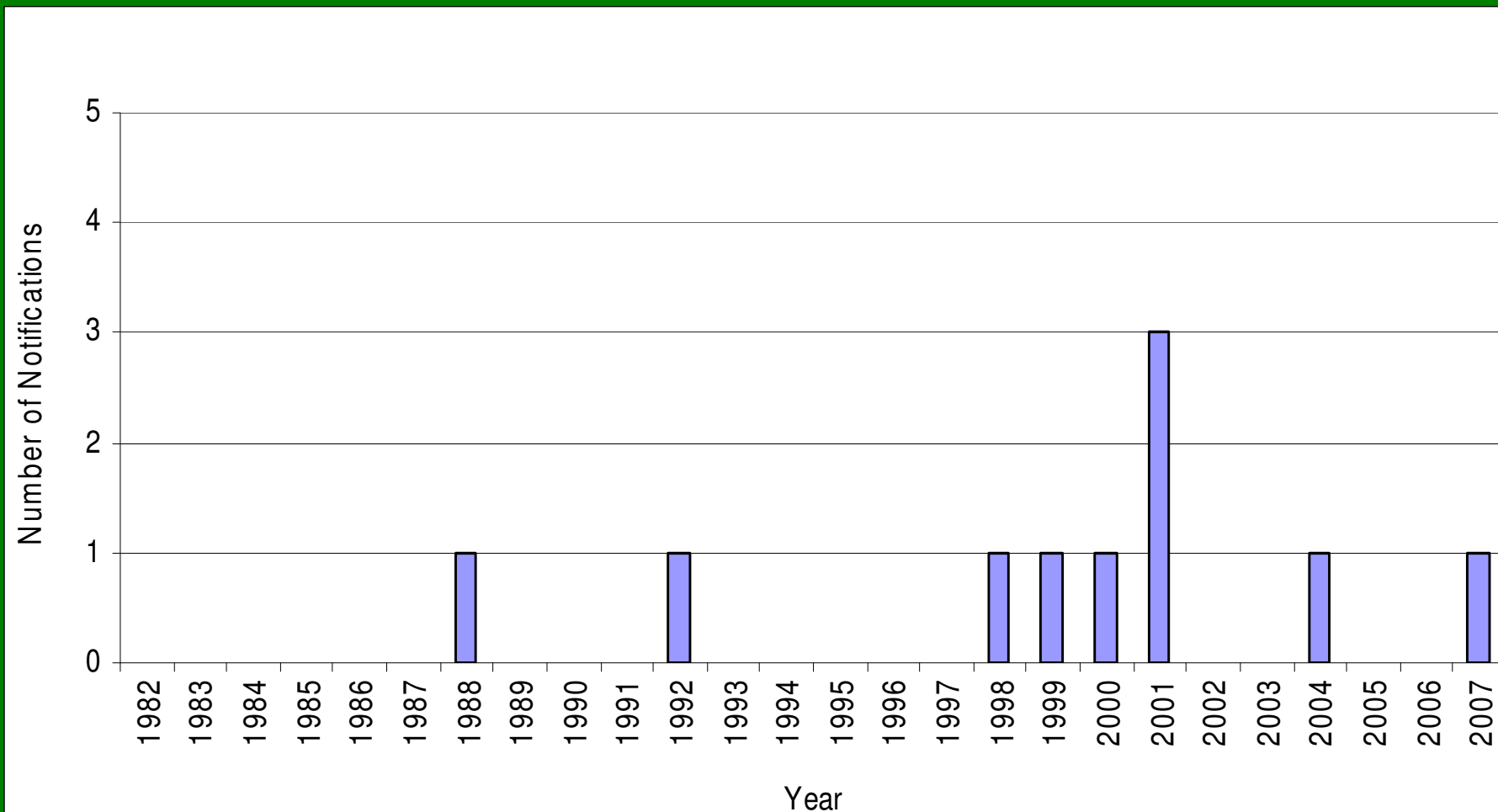


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Tetanus notifications Ireland, 1982- 2007 (HPSC)



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Haemophilus Influenzae B

- RTIs, Meningitis, Septicaemia, osteomyelitis, epiglottitis
- Vaccine since 1992



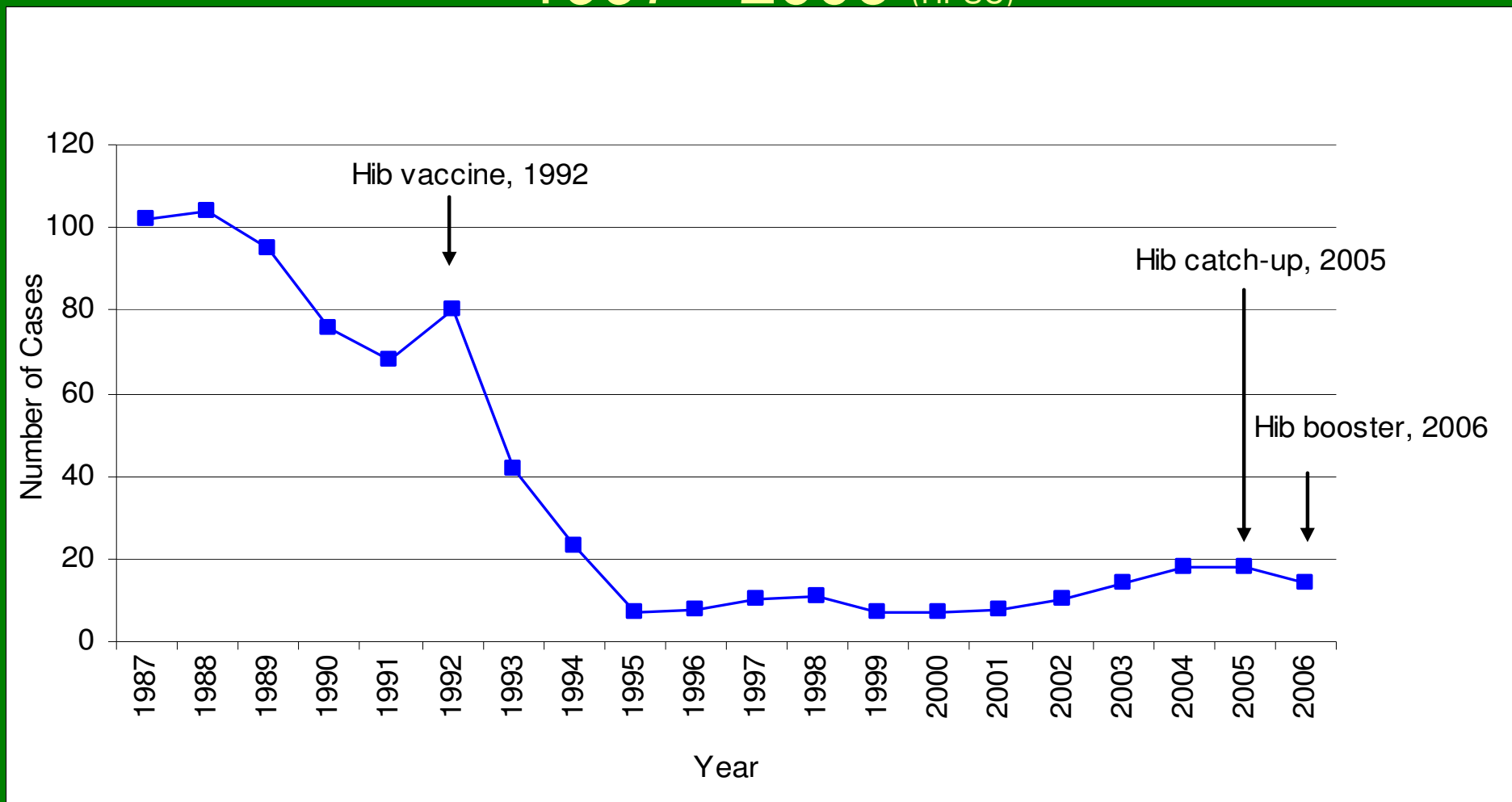
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Haemophilus influenzae type B

1997 - 2006 (HPSC)

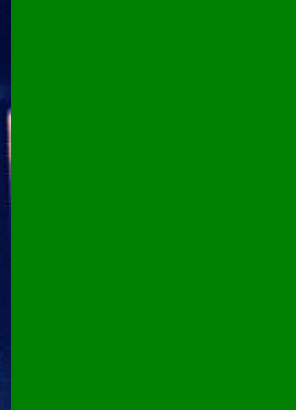


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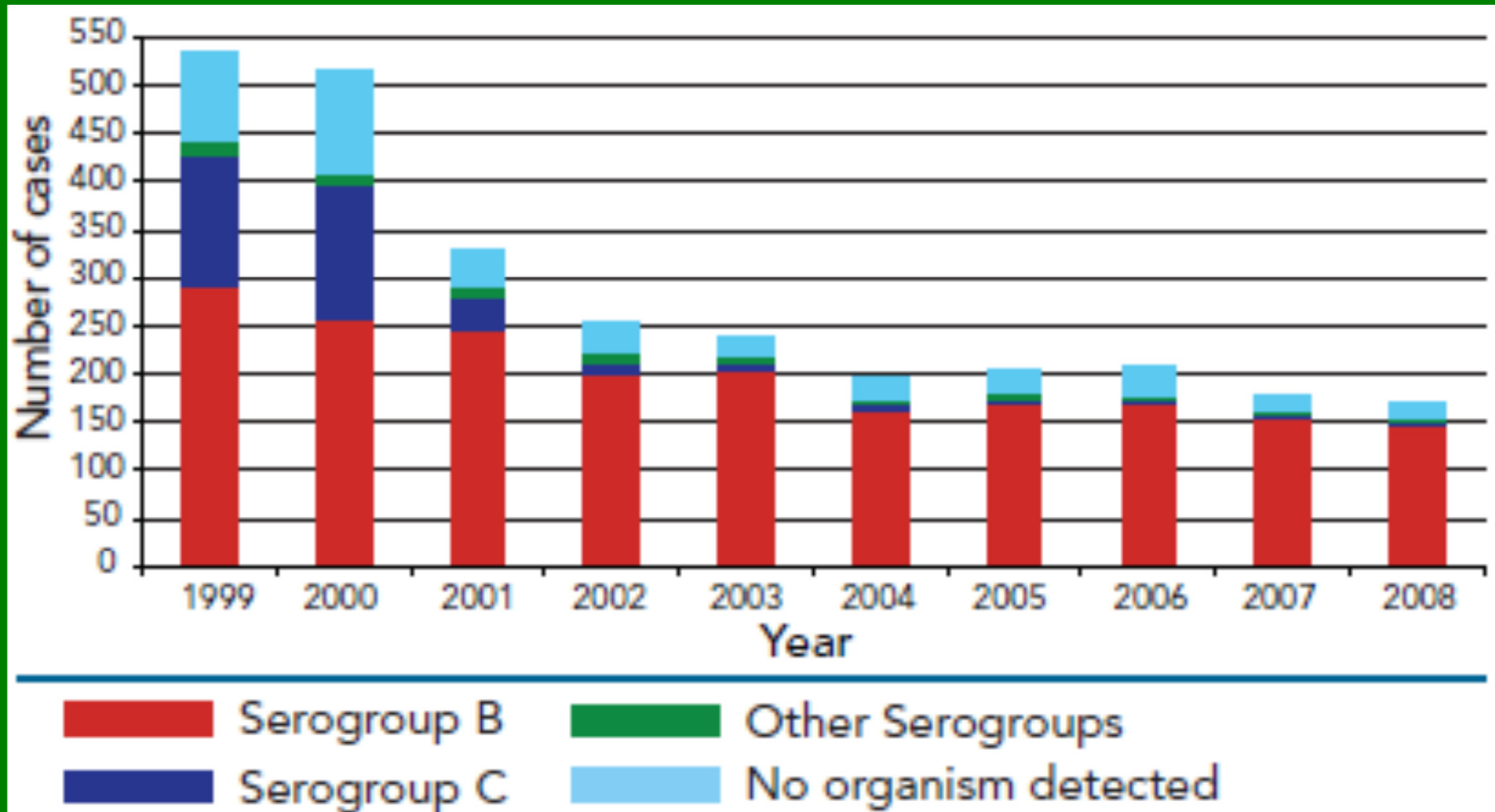
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Meningococcal Disease



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Invasive Meningococcal Disease by serogroup Ireland 1999 – 2008 (HPSC)

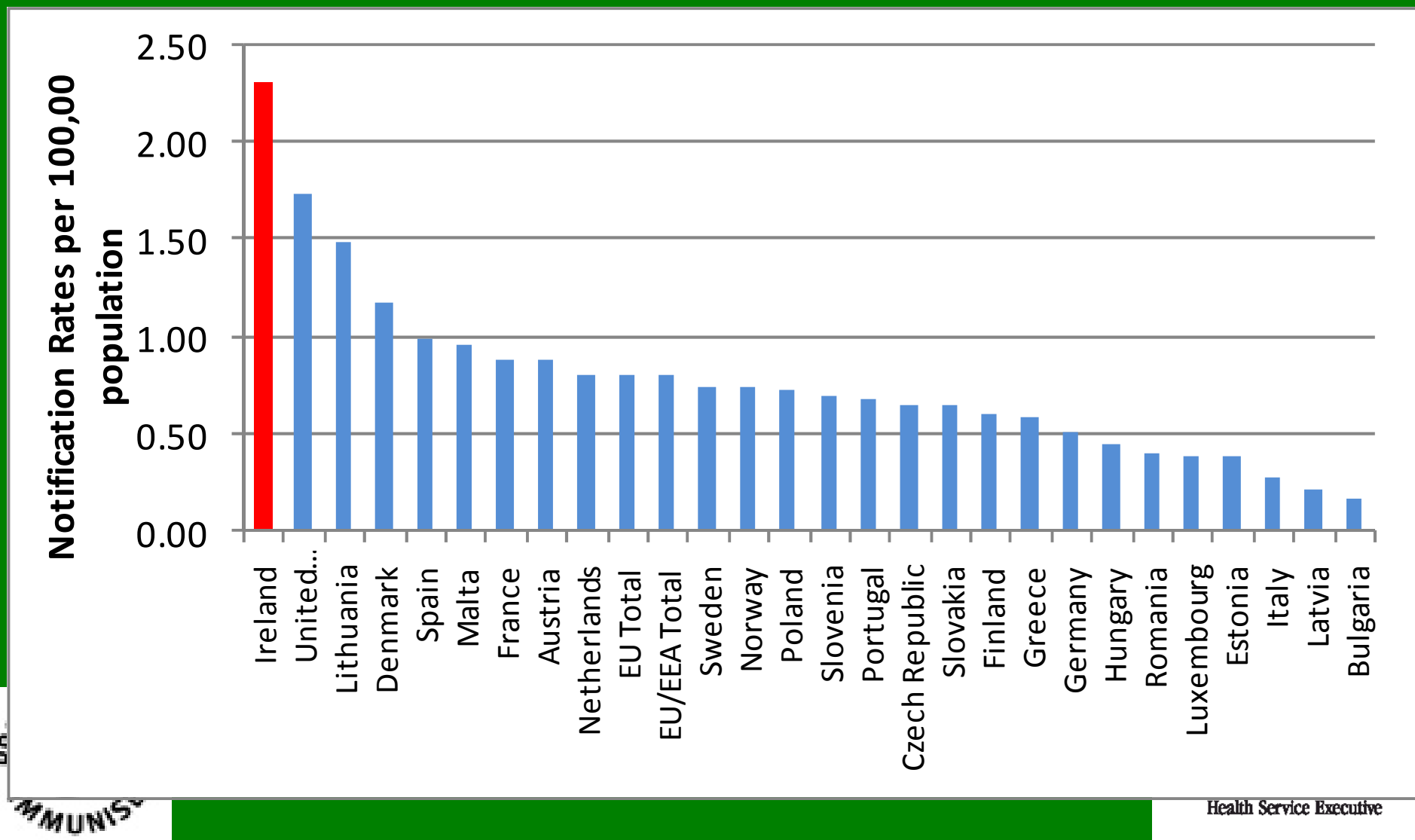


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Notification rates of invasive meningococcal disease (IMD) in Europe



Invasive Meningococcal Disease

- Ireland has the highest notification rates of invasive meningococcal disease in Europe
- 60 – 80 per year
- Predominately Serogroup B



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Pertussis

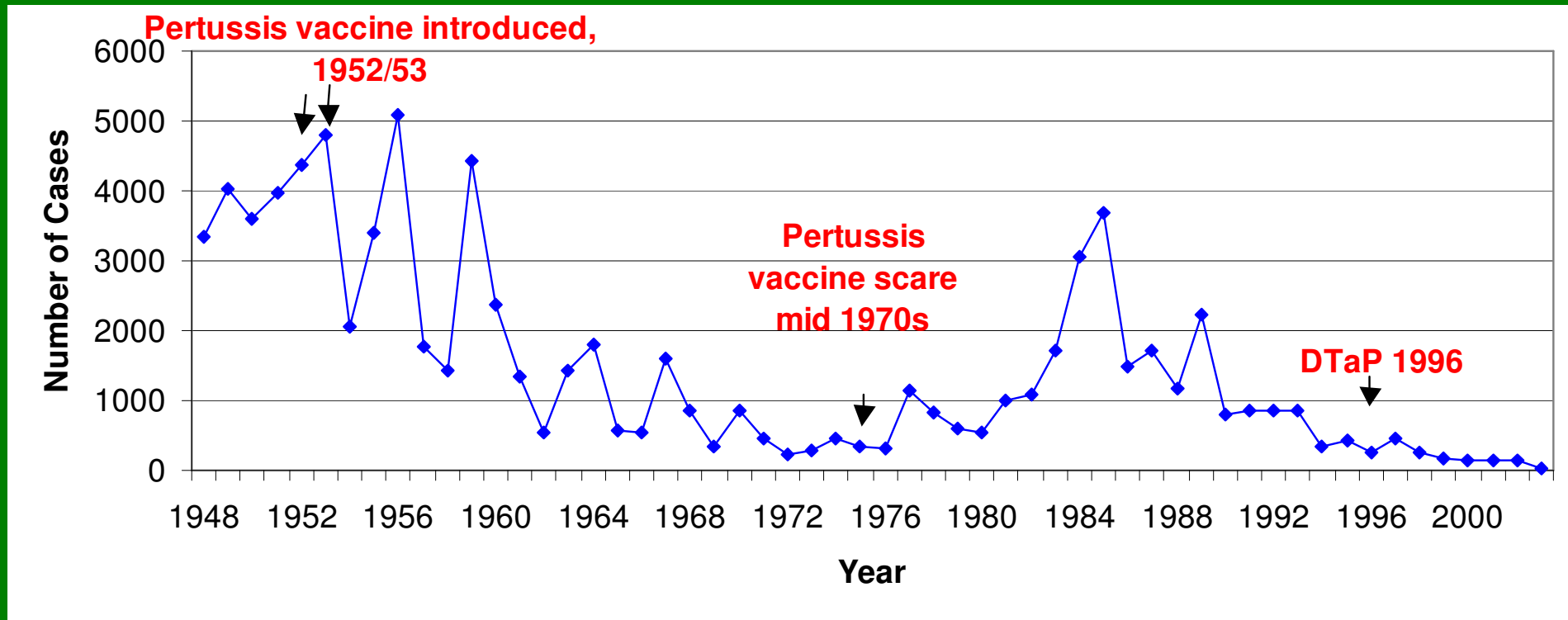
- Catharrhal stage - 2-3 weeks
- Paroxsymal cough 2-3 months
- Whoop +/- vomiting
- Bronchopneumonia,
- Cerebral hypoxia
- Encephalopathy
- Waning immunity 10 – 12 years following vaccination

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Pertussis Notifications Ireland 1948-2003



77 cases in 2007, 104 cases in 2008



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Pertussis in Neonates

- Mostly those too young to be vaccinated
- Boostrix (Tdap) recommended for all women in pregnancy
- Available from coldchain



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Mumps

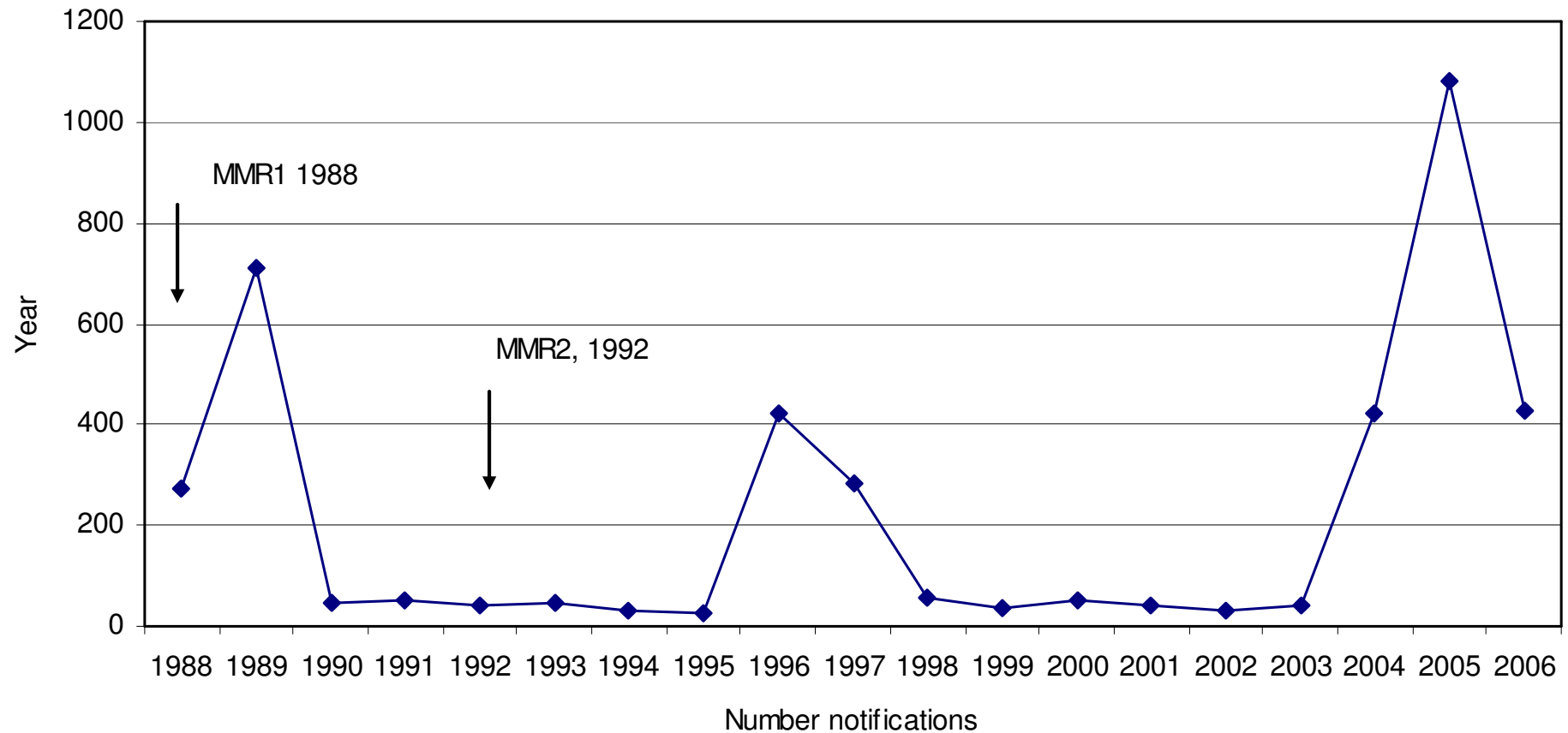
- Inflammation of salivary glands
- 40% asymptomatic
- Aseptic meningitis, encephalitis
- Transverse myelitis
- Sensori-neural deafness
- Pancreatitis
- Orchitis/Oophoritis
- Arthralgia, arthritis, cardiac

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Notifications of Mumps, Ireland 1988-2006

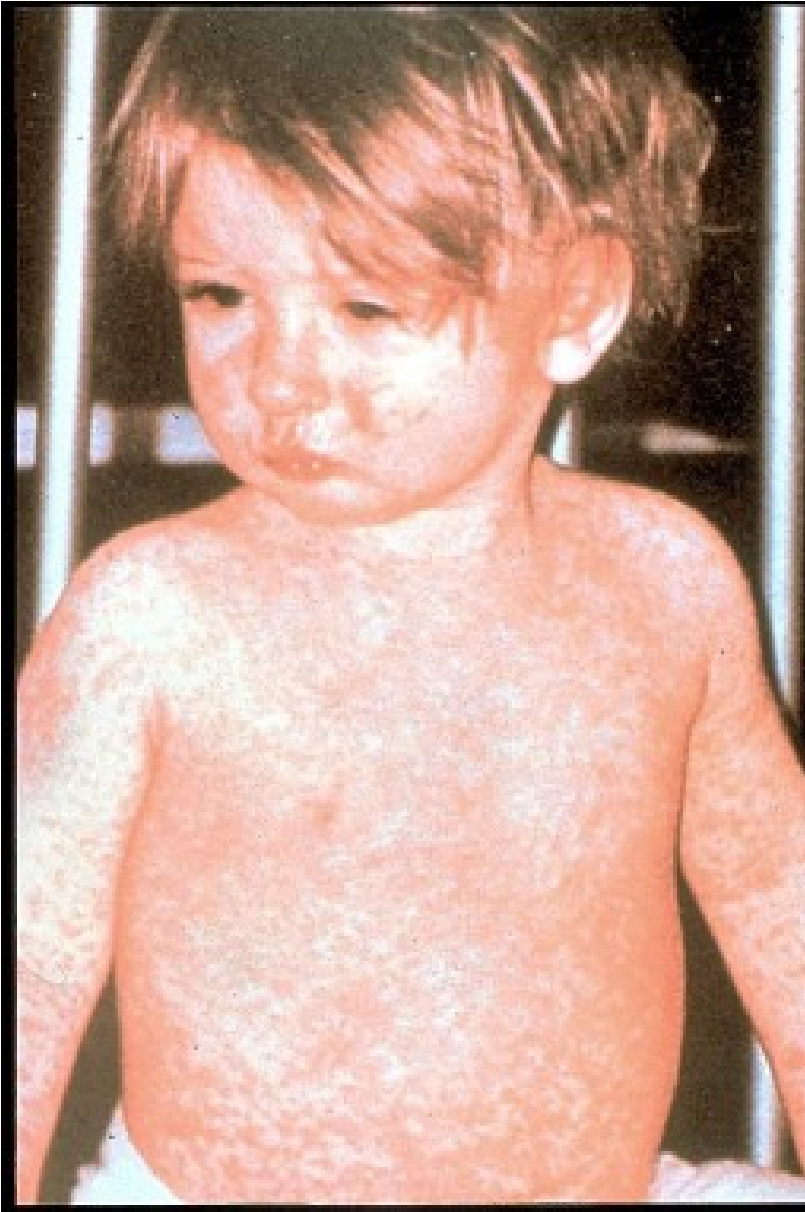


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Measles

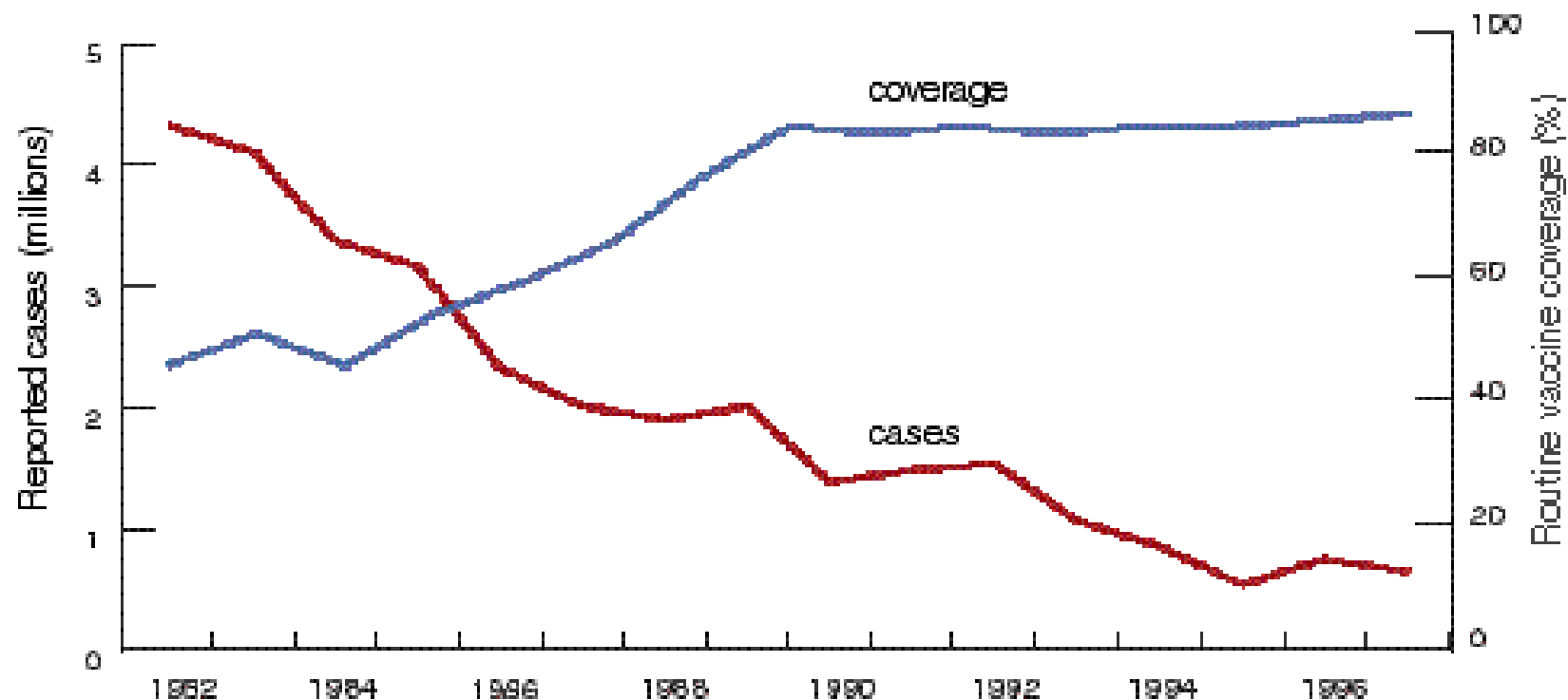


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Global annual reported measles cases 1982-1997



Note: Reported cases only. Estimated actual cases are many times higher.

Source: WHO/EPI Information System



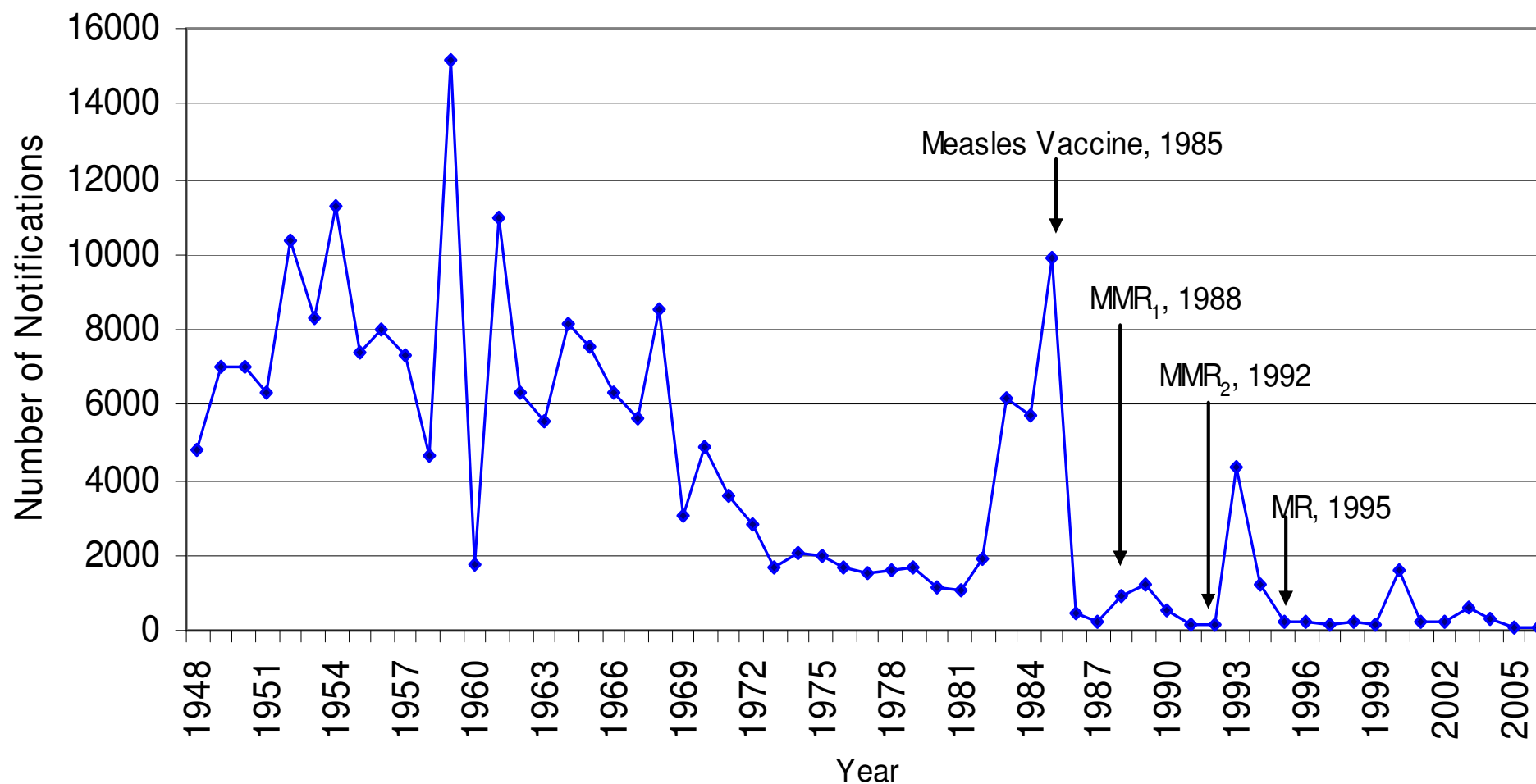
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Notifications of Measles Ireland 1948-2006



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Measles Globally

- In 2014, there were 114 900 measles deaths globally
- Measles vaccination resulted in a 79% drop in measles deaths between 2000 and 2014 worldwide
- During 2000-2014, measles vaccination prevented an estimated 17.1 million deaths making measles vaccine one of the best buys in public health.



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Measles Outbreak 2016

- Started from 1 imported case
- 43 cases notified from end April to beginning of September
- Mostly un-vaccinated
- 3 fully vaccinated
- Nosocomial spread a problem



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Measles Outbreak Control

- Advice GPs, Paediatricians, Pre-schools
- Isolation, exclusion, notification
- Vaccination of contacts within 72 hours
- MMR x 2 for anyone from 12 months who hasn't had 2 doses MMR
- MMR for children from 6/12 (will need a dose over 12/12)



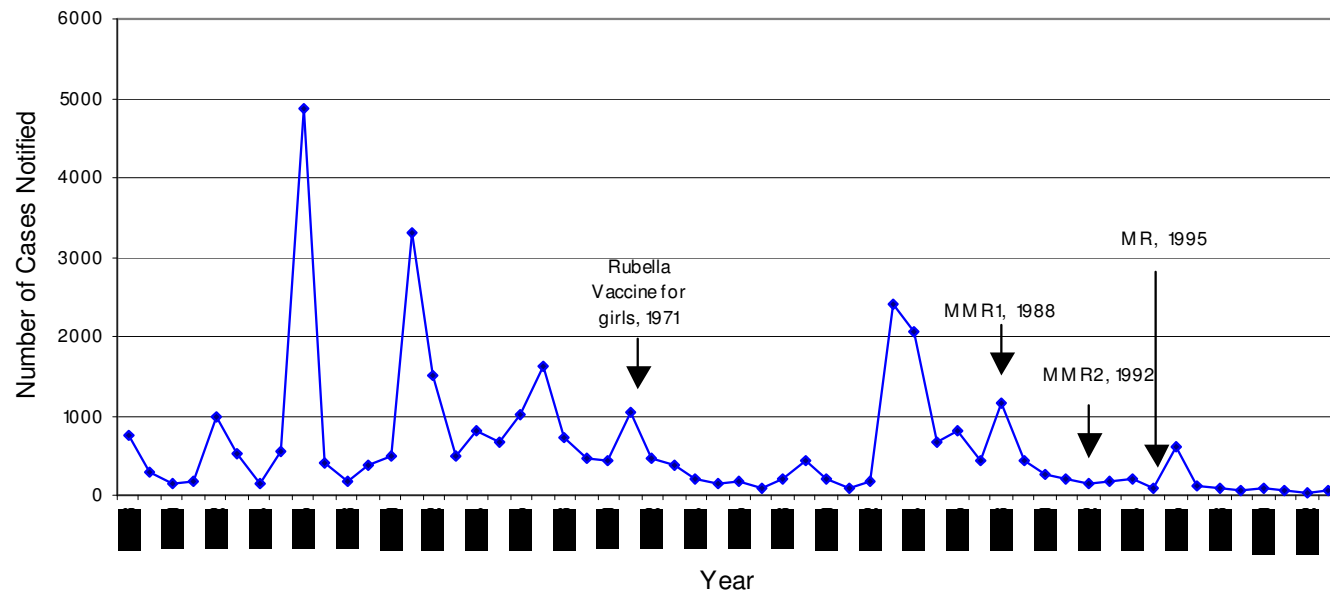
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Rubella

Number of Rubella Cases Notified in Republic of Ireland 1948-2003



HPSC
2008 WHO estimated 110,000 cases CRS annually
127 countries (40% birth) routine vaccination
Ireland - 40 notifications in 2008, 2 confirmed



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Human Papilloma Virus

- Programme since May 2010
- First year in secondary school
- 2 doses < 15 yrs
- Gardasil – quadrivalent vaccine (HPV types 6, 11, 16 and 18)
- Protects against 70% virus which cause cervical cancer
- National uptake of at least HPV stage 2 was 86.9% in 2014/2015



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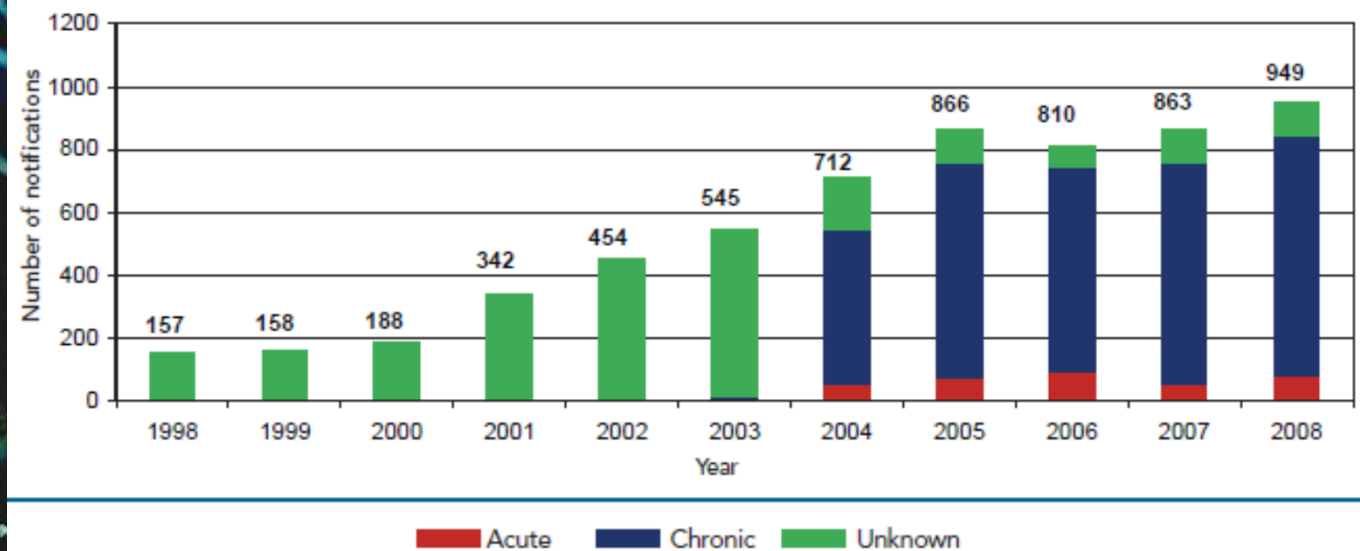
Courtesy CDC

Hepatitis B

- Globally 2 Billion infected
- 360 million chronically infected
- 500 000 – 700 000 deaths annually



Courtesy of Patricia Walker, MD,
Ramsey Clinic Associates, St. Paul, MN



Hepatitis B notifications Ireland 1998 – 2008 (HPSC)



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Hepatitis B Vaccine – At risk

Anti-HBs <10m IU/ml at 2 months

- a repeated course of vaccination, preferably with an alternative hepatitis B vaccine (protective anti-HBs titres in 50 to 100%)

If still no response

- a course of a double dose (2mls) of combined hepatitis A and B vaccine (Twinrix) at 0,1 and 6 months (protective anti-HBs response in >90%)

If still no response

- a single dose of Fendrix should be offered and anti-HBs checked 2 months later



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Pneumococcal Disease

- PCV7 introduced Sept. 2008, incl. catch up programme < 2 years
- In December 2010 changed to PCV13
- Since the introduction of PCV7 there has been a 91% decrease in the incidence of IPD in young children due to PCV7 serotypes
- PPV23 - indicated for ≥ 2 years



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Varicella

- Live attenuated viral vaccine
- Two doses, at least 4 weeks apart
- Risk groups:
 - HCWs without definite history of varicella,
 - Laboratory staff who may be exposed
 - Immunocompromised patients
 - Close household contacts of immunocompromised patients
 - HIV infected children
 - Children in residential units for physical and intellectual disability.
 - Women of childbearing age without a history of varicella



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Zostavax

- Live attenuated viral vaccine indicated for prevention of zoster and zoster-related post-herpetic neuralgia in those aged >50 years
- One dose (0.65 ml) **subcutaneously**, preferably in the deltoid region
- Defer vaccination for 1212 after zoster has resolved for effective immune response
- Zoster vaccine may be given to a recent receipt of an antibody containing blood product



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VPD Prevention & Control

Key Strategies

- Primary prevention - ensuring high population immunity
- Early diagnosis and rapid investigation
- Case management incl. infection control
- Notification to public health
- Management of close contacts (as appropriate)
- Strengthened surveillance



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Vaccines -Now and in the Future

- **Extended use of available vaccines**
 - e.g. Hepatitis A and Hepatitis B, Influenza, Pneumococcal, Varicella-zoster
- **New modes of vaccine delivery**
 - Oral, inhaled
- **Improved and safer vaccines**
 - Recombinant, oral/inhaled
- **New vaccines under development/research**
 - SARS, Malaria, HIV, asthma, diabetes mellitus

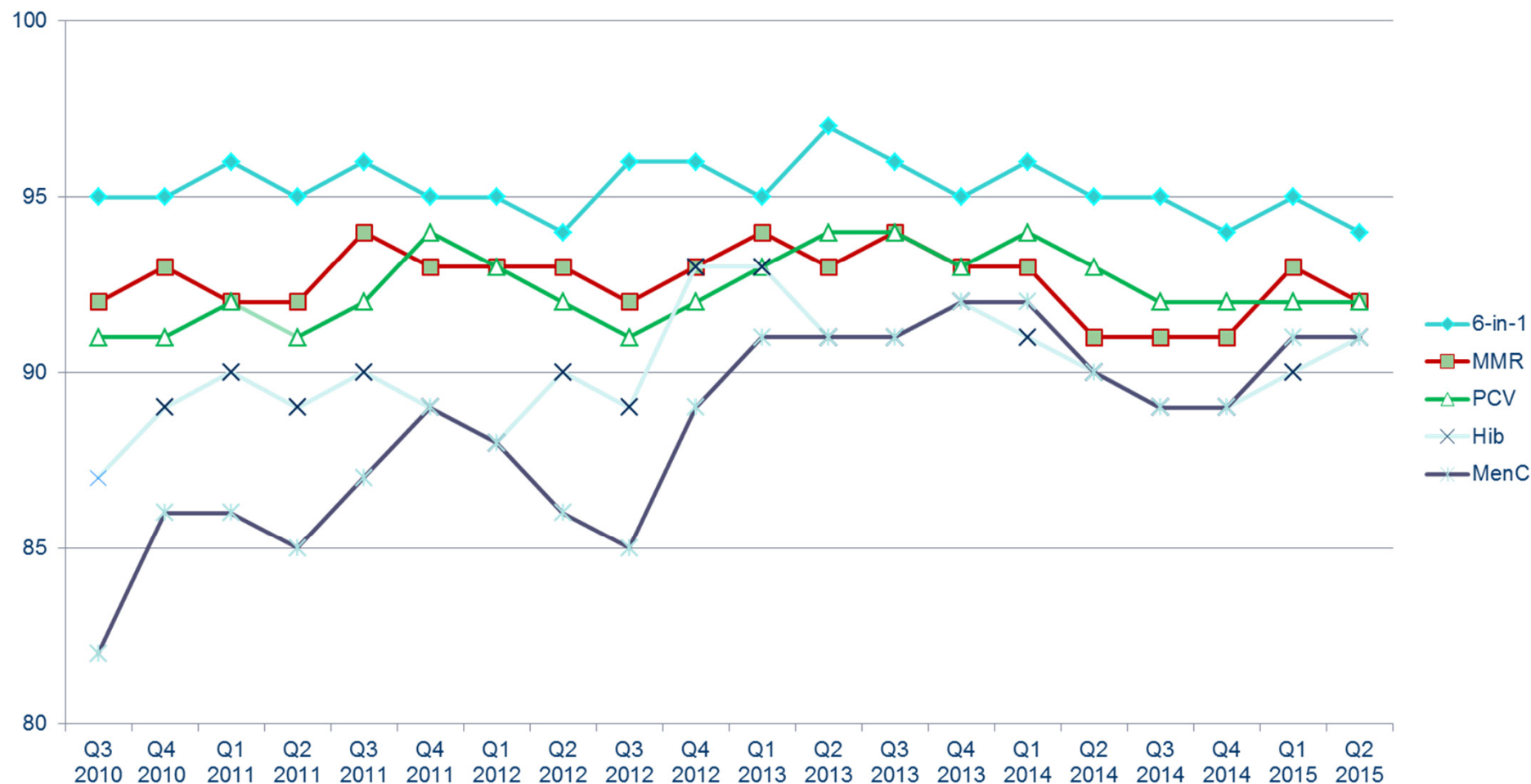


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Immunisation Uptake Mid West at 24 months



What would happen if we stopped vaccinating?

Compare the maximum number of U.S. cases of vaccine-preventable diseases in years before there were vaccines with the number of cases in 2003

Disease	Max. cases reported ¹	Year max. reported ¹	Reported cases in 2003 ²	Percent decrease
Diphtheria	175,885	1920–1922	1	99.9%
Pertussis	147,271	1925	11,647	92.1%
Tetanus (lockjaw)	1,314	1926	20	98.5%
Polio (wild virus)	16,316	1951–1954	0	100%
Measles	503,282	1958–1962	56	99.9%
Mumps	152,209	1968	231	99.8%
Rubella	47,745	1968	7	99.9%
Hib	20,000	1985	259	98.7%
Hepatitis B	26,612*	1985	7,526	71.7%
Hepatitis A	59,606	1971	7,653	87.2%

*The estimated mean number of new infections in the 1980s was 259,000, although the reported number of cases is much lower.³





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CLOSE THE IMMUNIZATION GAP

VACCINATION FOR ALL



World Health
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WWW.WHO.INT/CAMPAIGNS/IMMUNIZATION-WEEK/2015



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