

History and aims of immunisation

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Objectives

- To examine the history of immunisation
- To explain the aim of immunisation
- To develop an understanding of the role of the following agencies in relation to immunisation
 - The National Immunisation Advisory Committee (NIAC)
 - The Department of Health (DoH)
 - The Health Service Executive (HSE)
 - The National Immunisation Office (NIO)
 - The Health Protection Surveillance Centre (HPSC)
- To understand the importance of infectious disease surveillance in Ireland

Smallpox

Variola virus

Infected humans 10,000 years ago

Known in China 11th century BC

Inoculation described 6th century BC

1796 vaccinia virus isolated

In 1798 Jenner showed that inoculation with cowpox virus produced protection against smallpox.



Edward Jenner (1749 –1823)

Smallpox

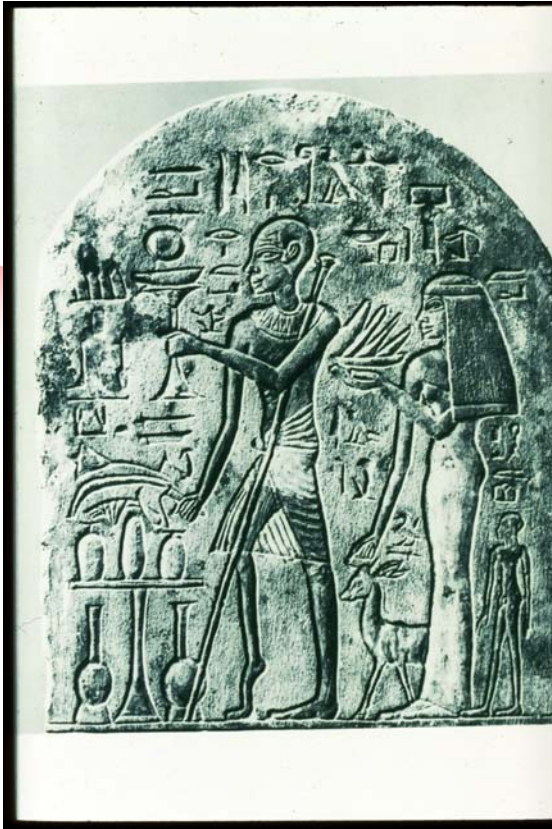


1977 Last reported case Somalia

1980 WHO declared eradication

CDC. Public Health Images Library (PHIL) id# 131. Source: CDC/Barbra Rice

www.immunisation.ie



Polio

Endemic for thousands of years

1955 Inactivated polio vaccine

1962 Live oral polio vaccine

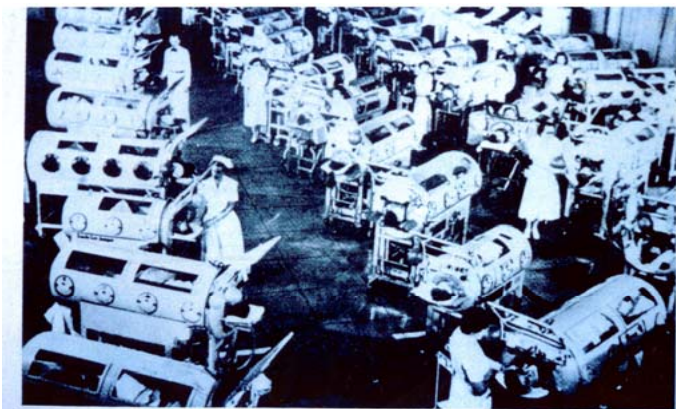


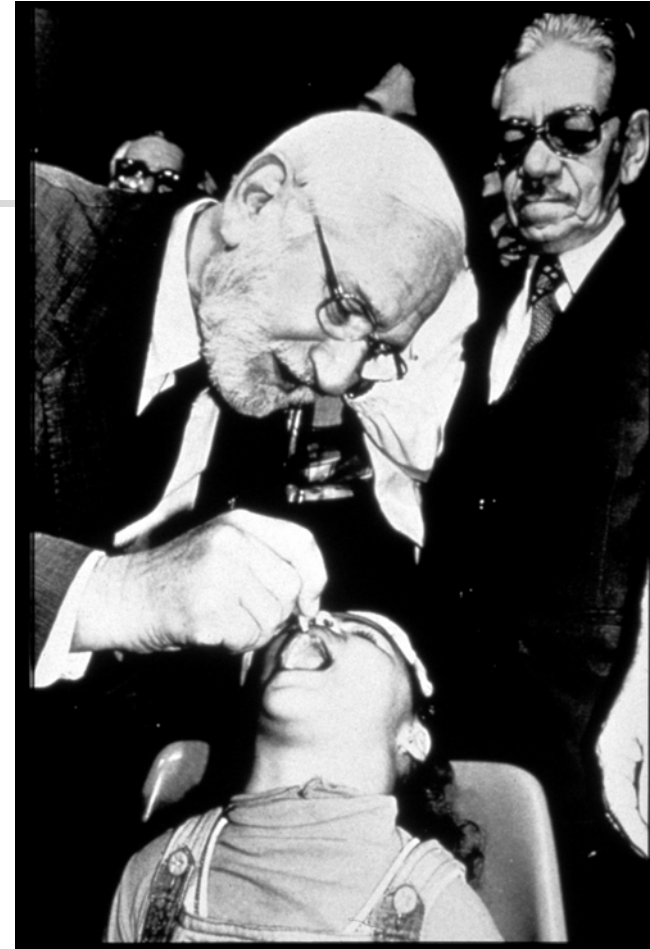
Figure 1.2 A ward of patients suffering from bulbar poliomyelitis

Polio

Immunisation campaigns in
Cuba and Eastern Europe

Wild polio virus eradicated
in large areas

Basis for eradication



Polio 2014

Global Polio Eradication Initiative

- 416 cases in 2013
- 256 (62%) in non endemic countries
- 149 cases to date in 2014

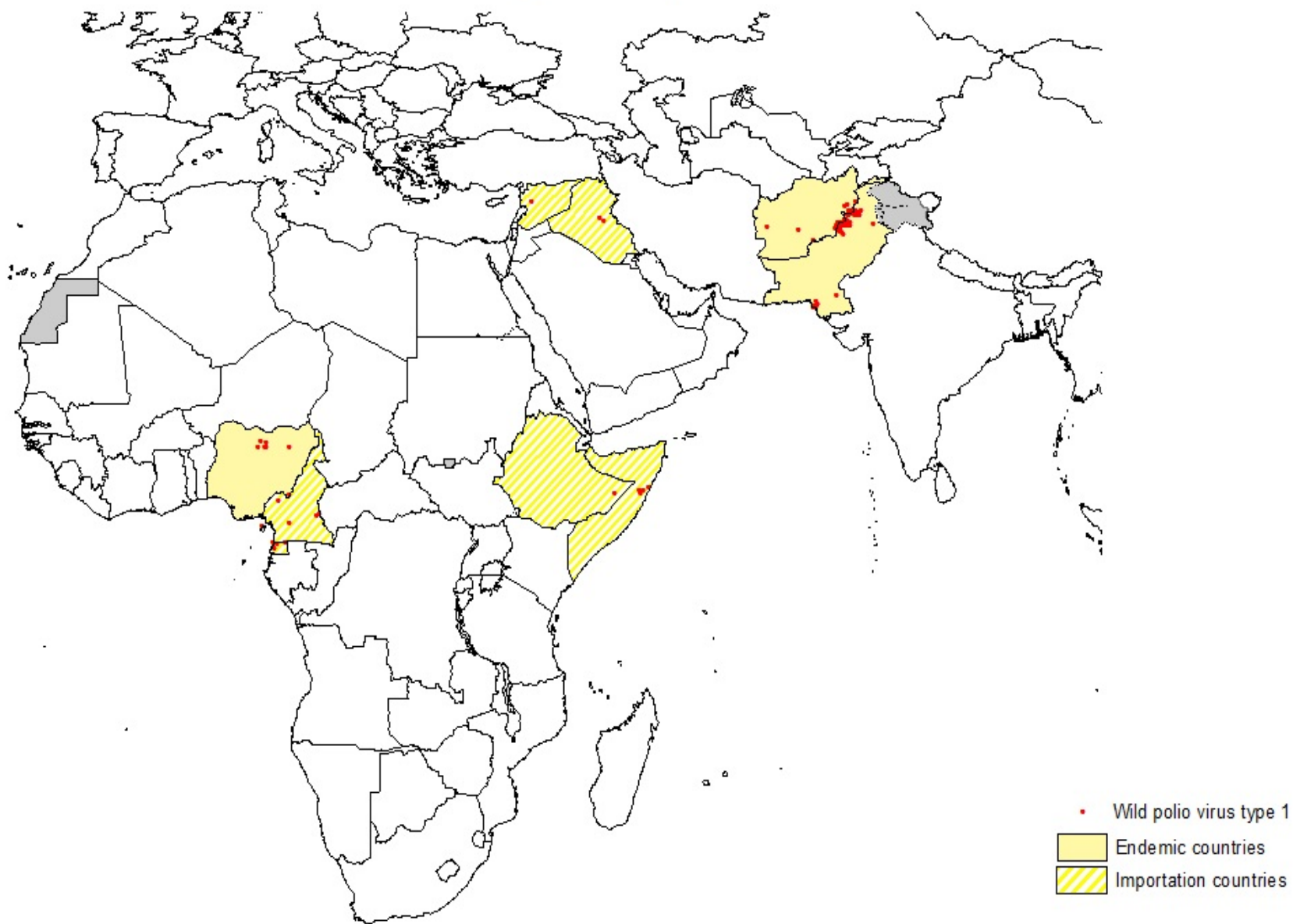


This vaccine delivery in the mountains of Afghanistan illustrates the challenges to the cold chain.



Wild Poliovirus - 2014

01 January - 02 September



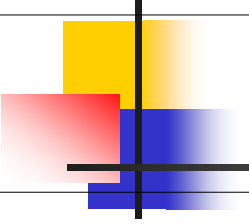
Excludes vaccine derived polioviruses and viruses detected from environmental surveillance.



The Development of Human Vaccines

Vaccine	Year
Smallpox	1798
Rabies	1885
Typhoid	1896
Cholera	1896
Plague	1897
Diphtheria	1923
Pertussis	1926
BCG (Tuberculosis)	1927
Tetanus	1927
Yellow Fever	1935
Influenza	1936
Polio (IPV)	1955
Polio (OPV)	1962
Measles	1964
Mumps	1967
Rubella	1970
Hepatitis B	1981

Comparison of annual morbidity from vaccine-preventable diseases during the 20th century and 2010



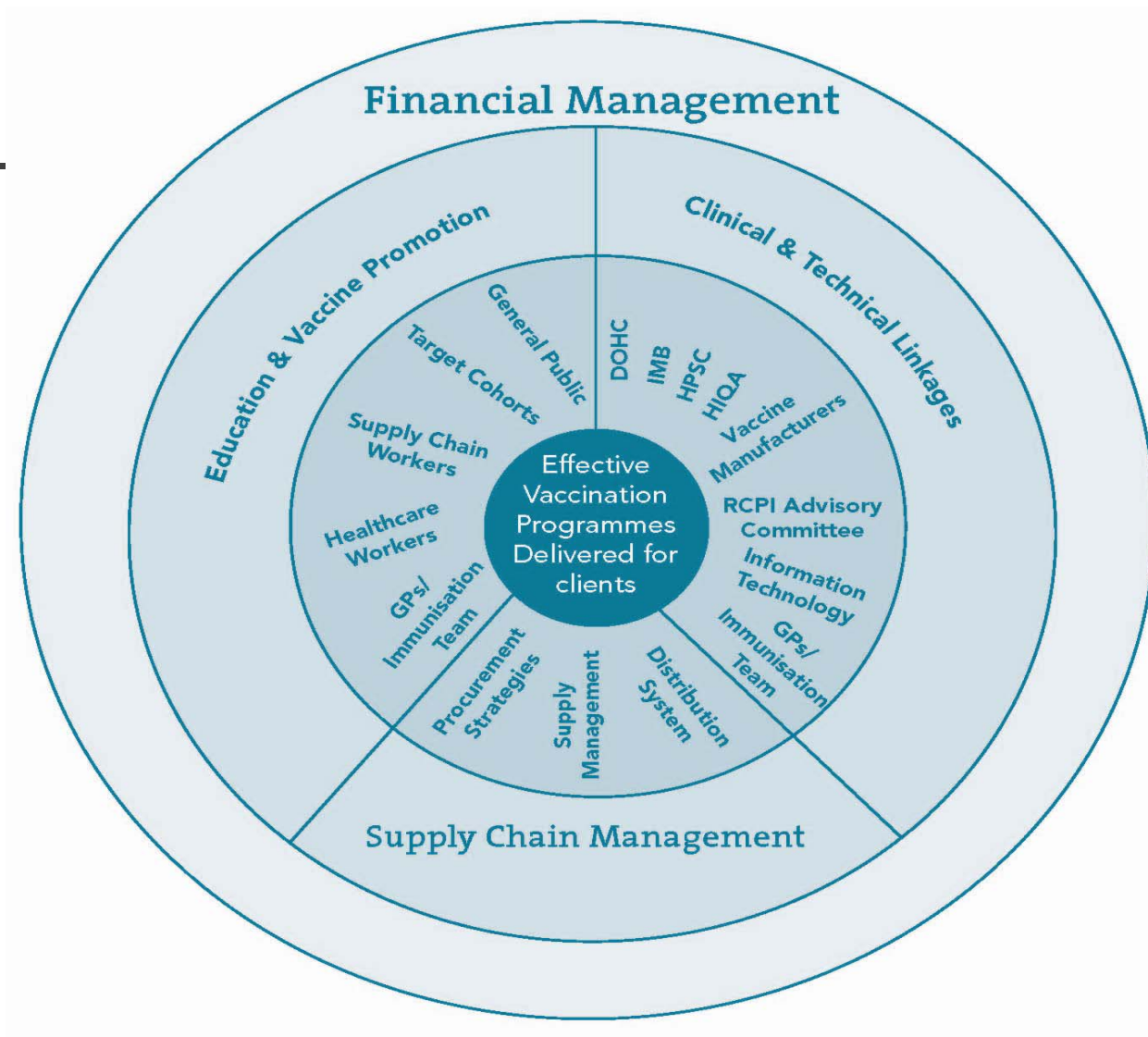
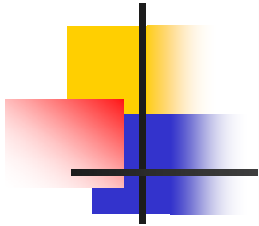
Disease	20th Century*	2010	% Reduction
Diphtheria	21,053	0	100
<i>Haemophilus influenzae</i> type b in children aged <5 yrs.	20,000	240	99
Measles	530,217	63	>99
Mumps	162,344	2,612	98
Pertussis	200,752	27,538	86
Poliomyelitis, paralytic	16,316	0	100
Rubella	47,745	5	>99
Congenital rubella syndrome	152	0	100
Smallpox	29,005	0	100
Tetanus	580	26	96



Aim of Immunisation

- The aim of immunisation is the prevention of disease in individuals or groups.
- Examples
 - 1980 elimination of smallpox (WHO)
 - 1991-Elimination of polio from the Americas
- Achieved by
 - a comprehensive immunisation programme achieving the World Health Organisation target uptake of 95% for childhood vaccines and 70% for influenza vaccines
 - intensive surveillance of these diseases

Multidisciplinary components of an immunisation system





The National Immunisation Advisory Committee (NIAC)

- Independent committee of the RCPI
- Variety of experts
- Advises the Department of Health
- Produces the National Immunisation Guidelines for Ireland
 - Based on
 - best evidence regarding the safety and efficacy of vaccines
 - the disease burden
 - pharmacoeconomic analyses



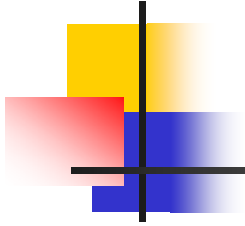


The Department of Health (DoH)

- Responsible for making policy decisions regarding the immunisation programme including changes to the current immunisation programme.

The Health Products Regulatory Authority (HPRA)
(formerly the Irish Medicines Board)

- Regulatory body responsible for licensing of vaccines and ensuring their quality and safety and efficacy
- Responsible for monitoring and evaluation of adverse events following immunisation



HSE

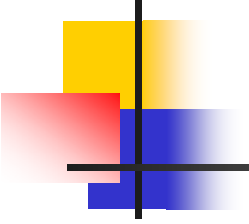
- Responsible for the implementation of the primary childhood, school immunisation and seasonal influenza vaccination programmes
- Delivered by general practitioners (GPs), practice nurses, community health doctors and public health nurses and support staff



The National Immunisation Office (NIO)

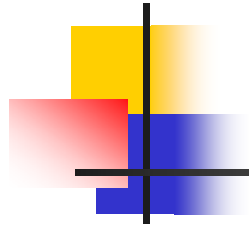
Coordinating Unit

- Standardised implementation of all publicly funded immunisation programmes
- Protocols and immunisation training
- Information materials for the general public
- National immunisation website www.immunisation.ie
- Vaccine contracts and the HSE National Cold Chain delivery Service to provide vaccine deliveries to all GPs, hospitals and HSE clinics
- Development of a national IT database
 - Currently different IT systems modified with any changes to schedule



Health Protection Surveillance Centre (HPSC)

- Responsible for surveillance of vaccine preventable diseases
- Monitors immunisation uptake data from each HSE area and reports on uptake rates
- HPSC website www.hpsc.ie



Infectious Disease Surveillance

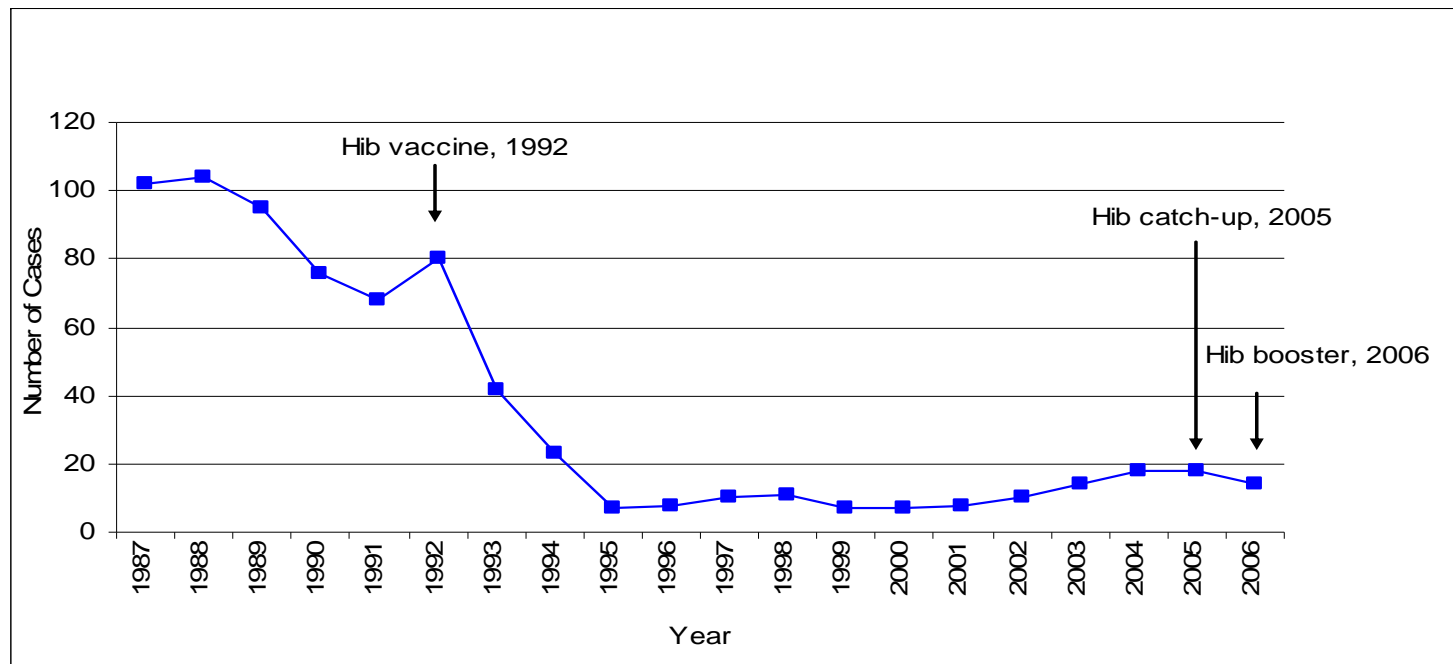
- ***Public health surveillance is the systematic collection, collation, analysis and dissemination of data so that action can be taken.***



Importance of surveillance

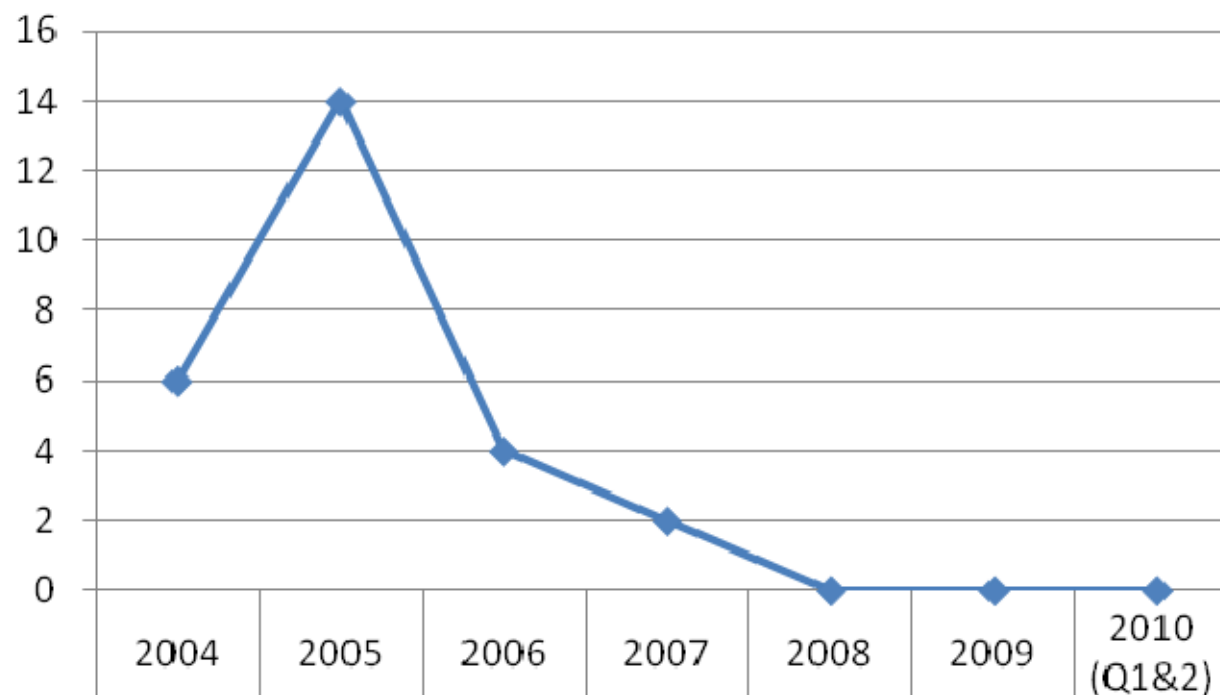
- Monitor the epidemiology of the disease. Epidemiology can be defined as the study of the distribution and determinants of disease (who, where, when and how) in different populations
- Monitor trends in disease incidence
- Detect outbreaks and enable effective control mechanisms to be put in place
- Monitor the effectiveness of interventions and evaluate programmes
- Identify high risk groups and risk factors
- Identify gaps in existing services and set priorities for allocation of resources
- Facilitate research.

Importance of surveillance- Hib



Impact of Hib campaign

Number of cases of Hib disease in fully vaccinated children 2004 - 2010

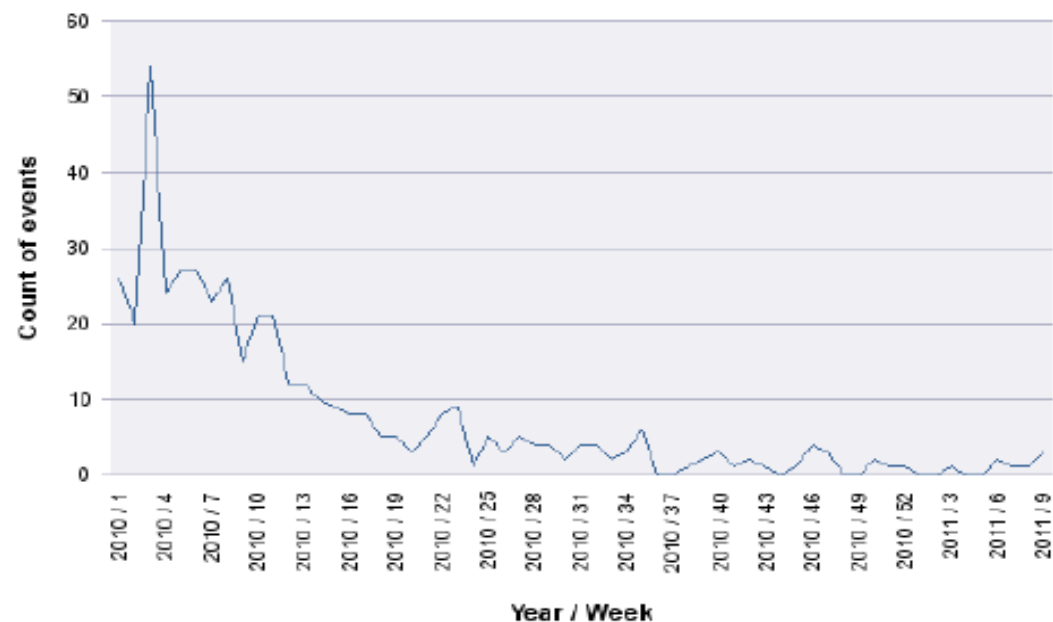


No of cases	6	14	4	2	0	0	0
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YEAR

www.immunisation.ie

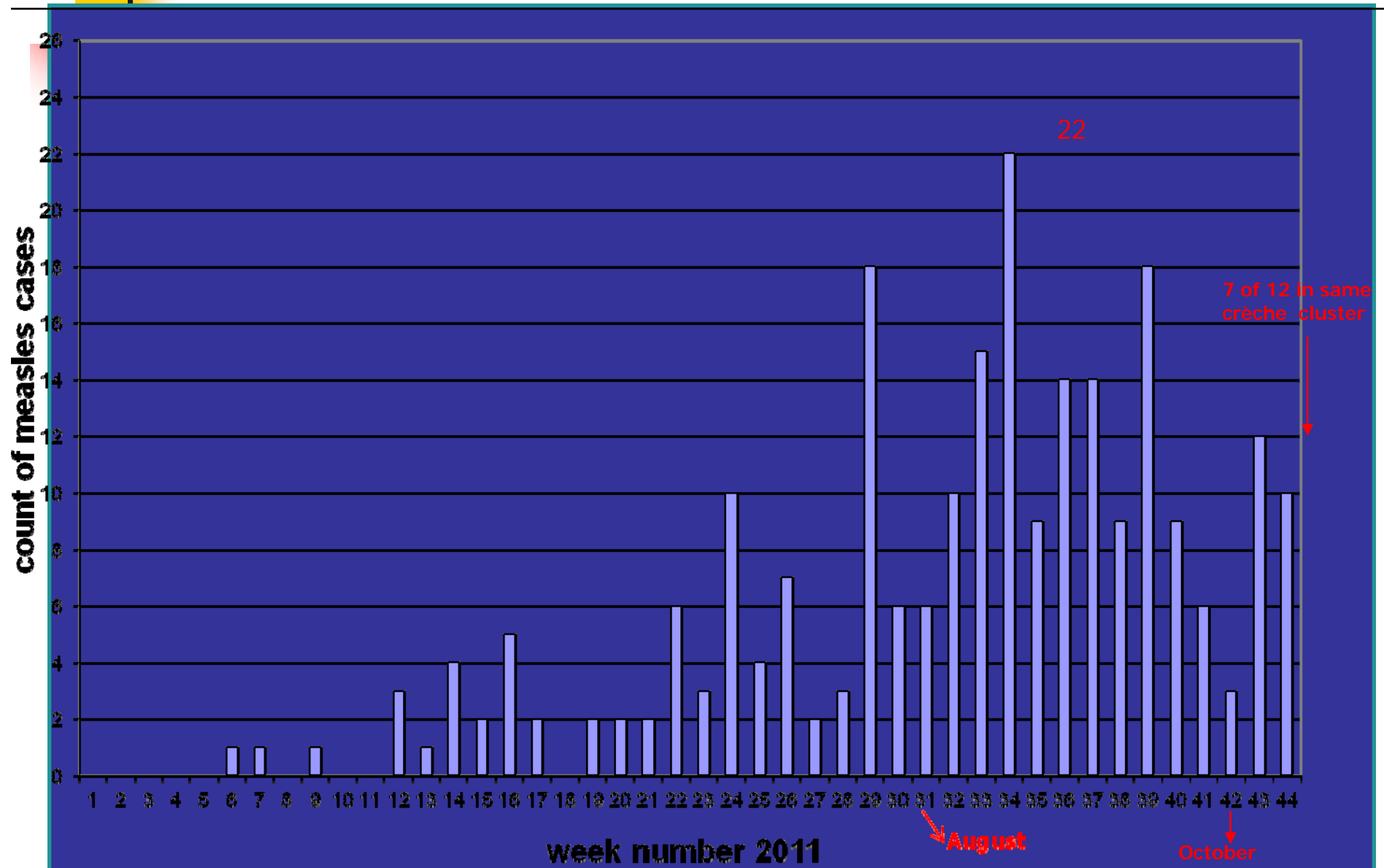
Measles Event by week 2010-2011



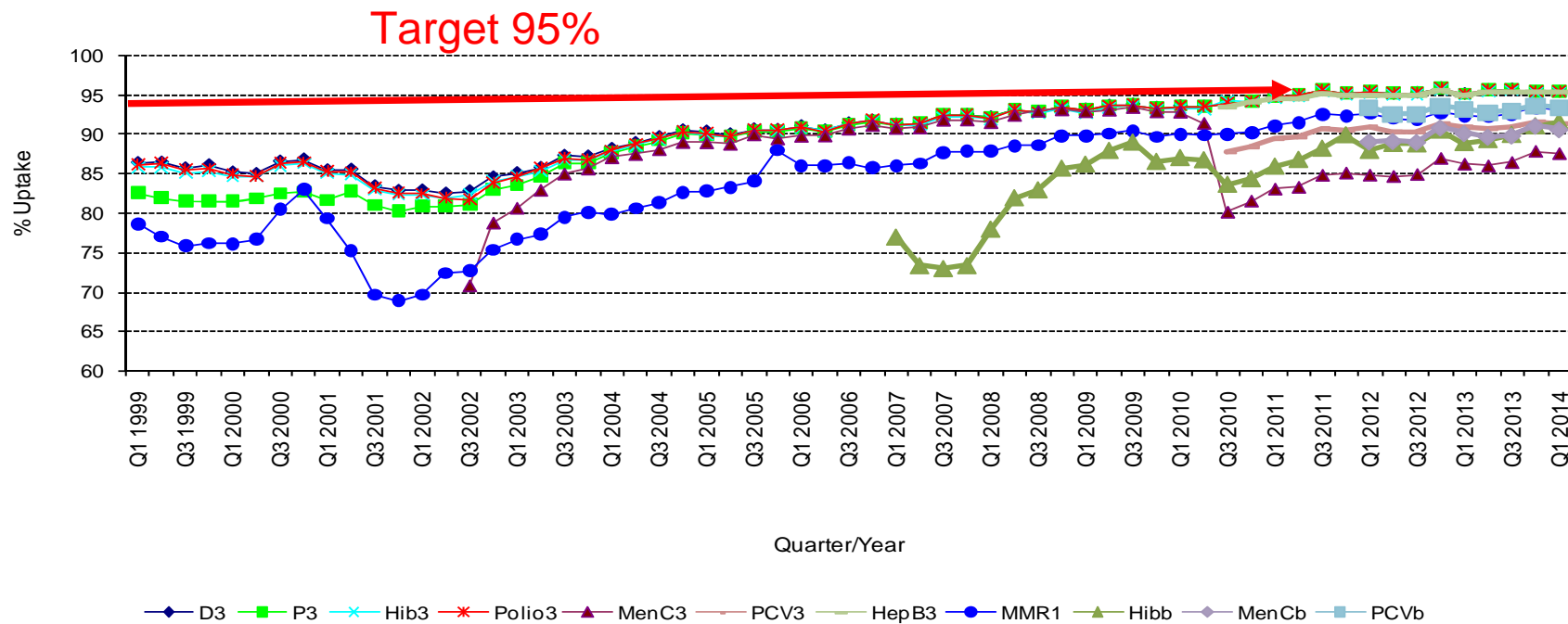
Health Protection Surveillance Centre

Measles cases, week 1 - 44, HSE-E, 2011

(N = 242)

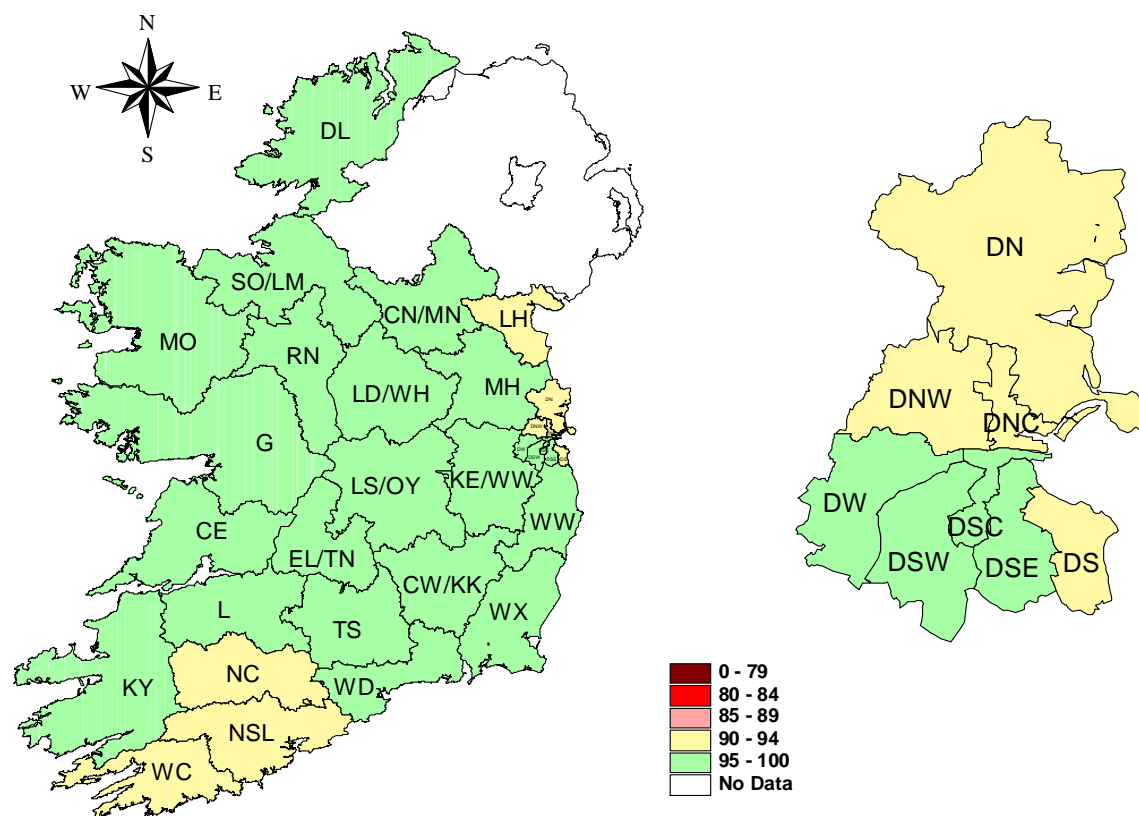


Vaccine uptake rate at 24 months 1999-2014

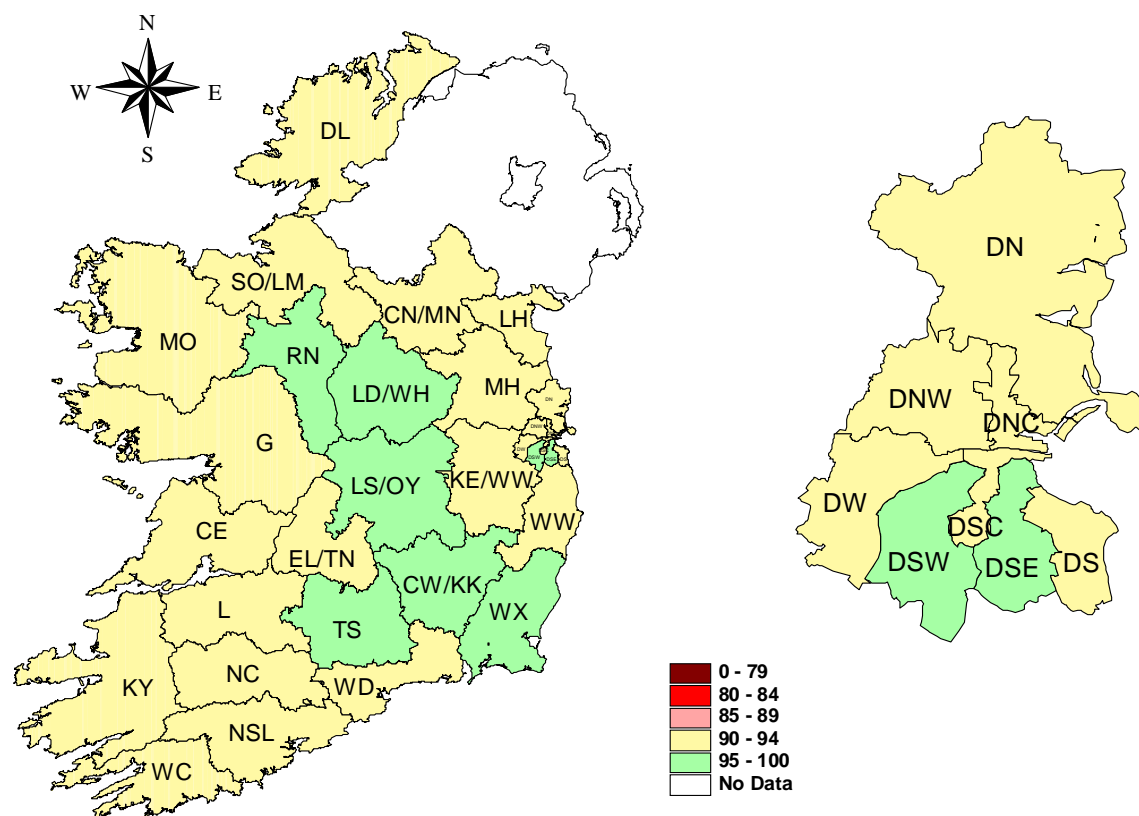


Source: HPSC

Quarter 1 2014 D3 immunisation uptake rates (%) by LHO, in those 24 months of age in Ireland and Dublin (source HPSC)



Quarter 1 2014 MMR immunisation uptake rates (%) by LHO, in those 24 months of age in Ireland and Dublin (source HPSC)





Why Immunise?

- Immunisation is one of the most cost effective and safest of all health interventions
- Immunisation has saved more lives than any other public health intervention apart from the provision of clean water



Immunisation Successes

- Meningococcal C Campaign (Reduced incidence of cases by 90% since October 2000)
- Eradication of smallpox
- Control of others, e.g. Hib, diphtheria, pertussis
- Successful immunisation - more attention to vaccine related illness

