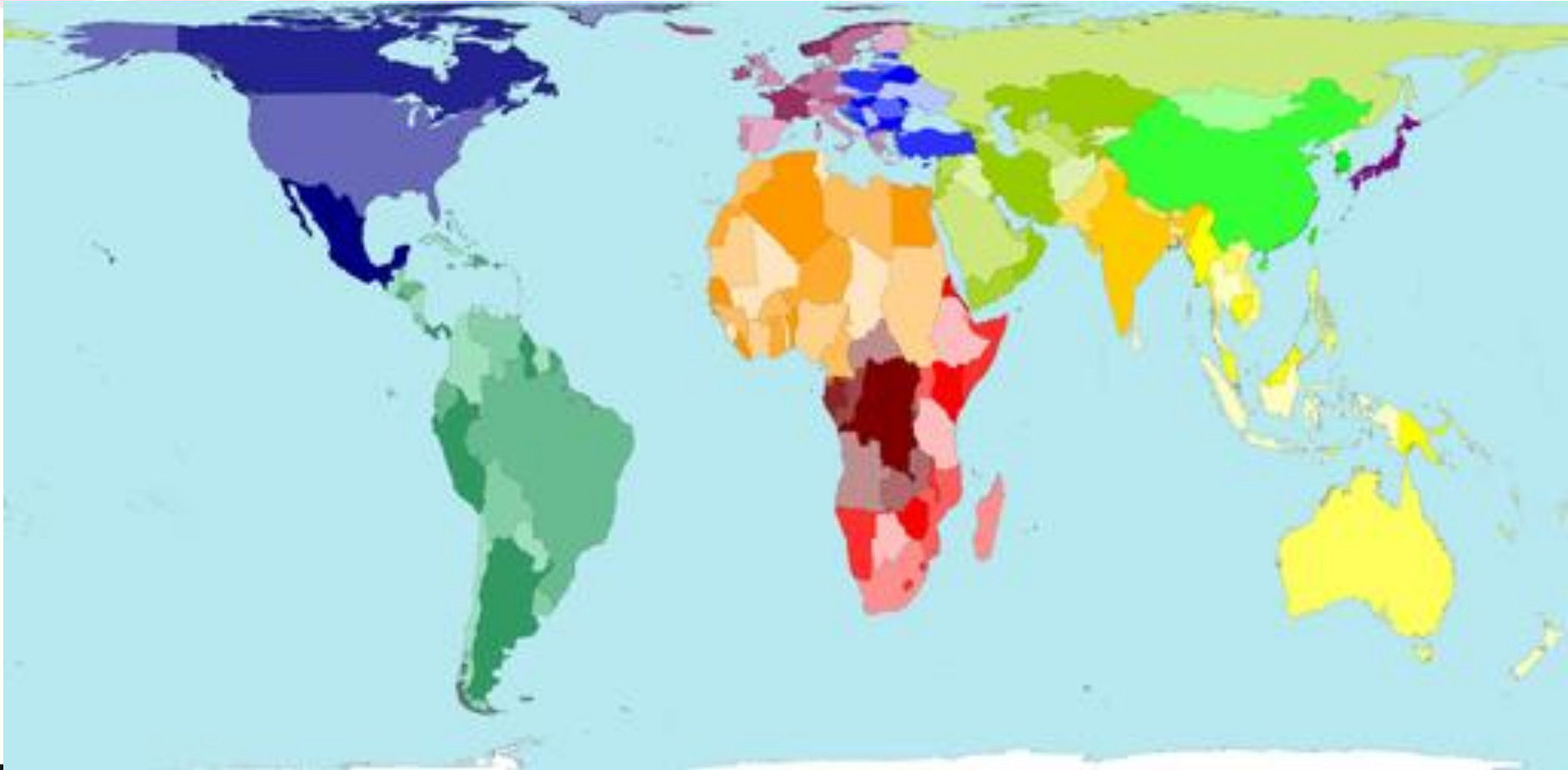


# Is Australia the World Capital of pertussis?

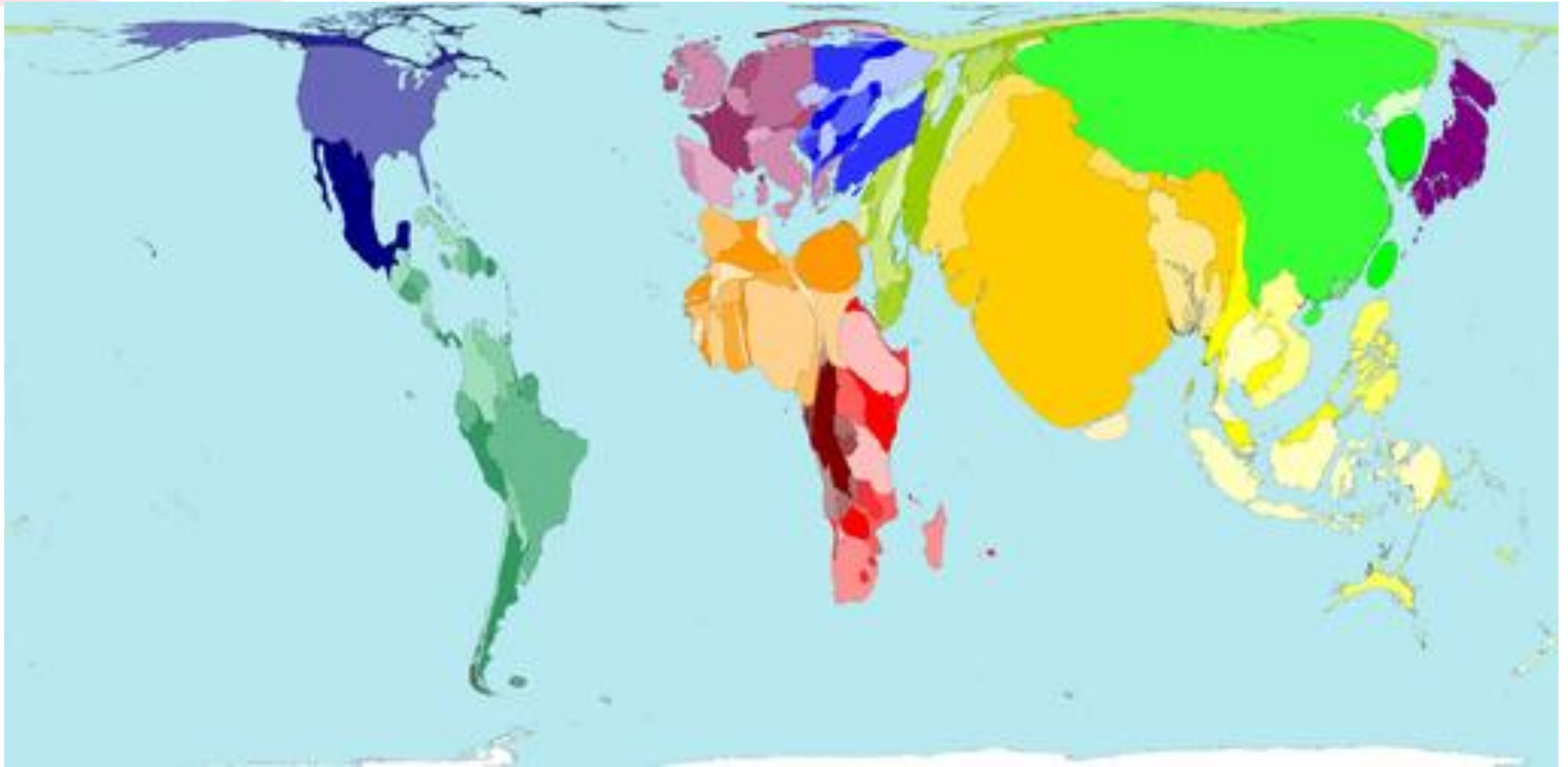
**Peter McIntyre**

**National Centre for Immunisation Research and  
Surveillance, Sydney, Australia**

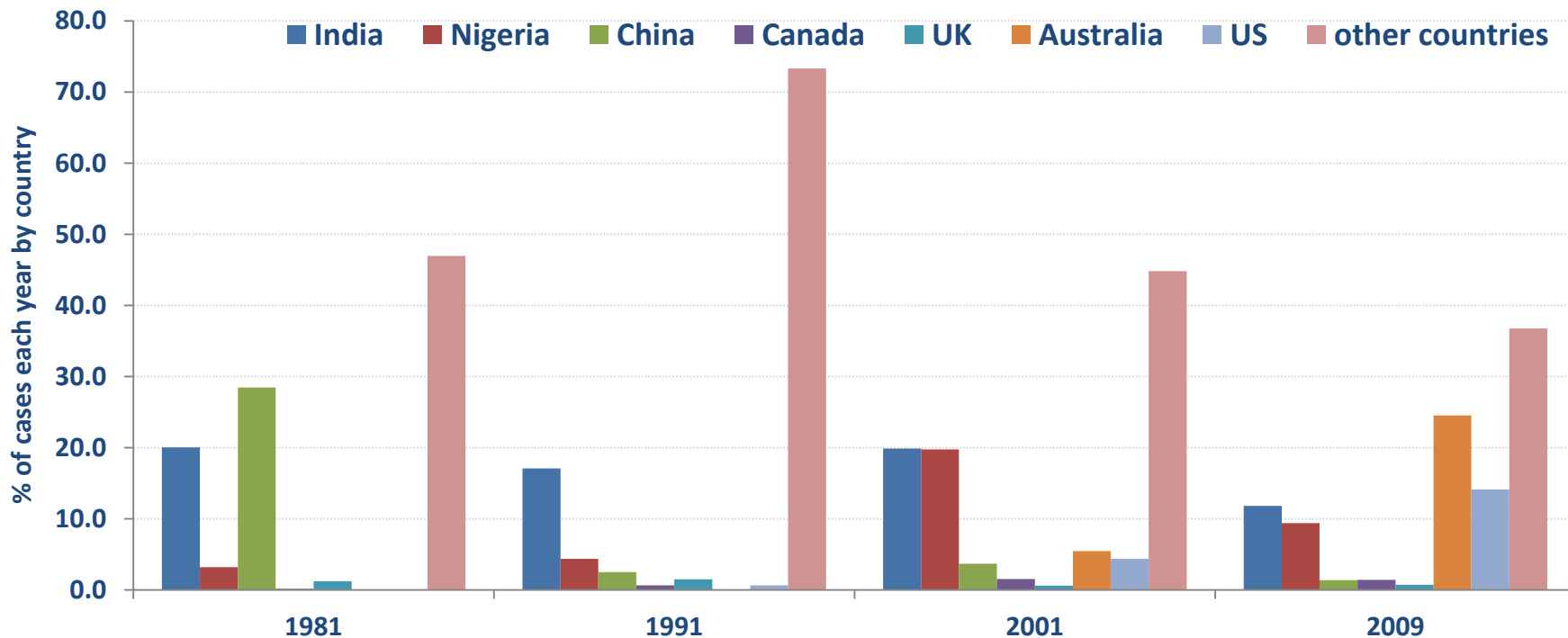
# World - Land Area



# World – Population



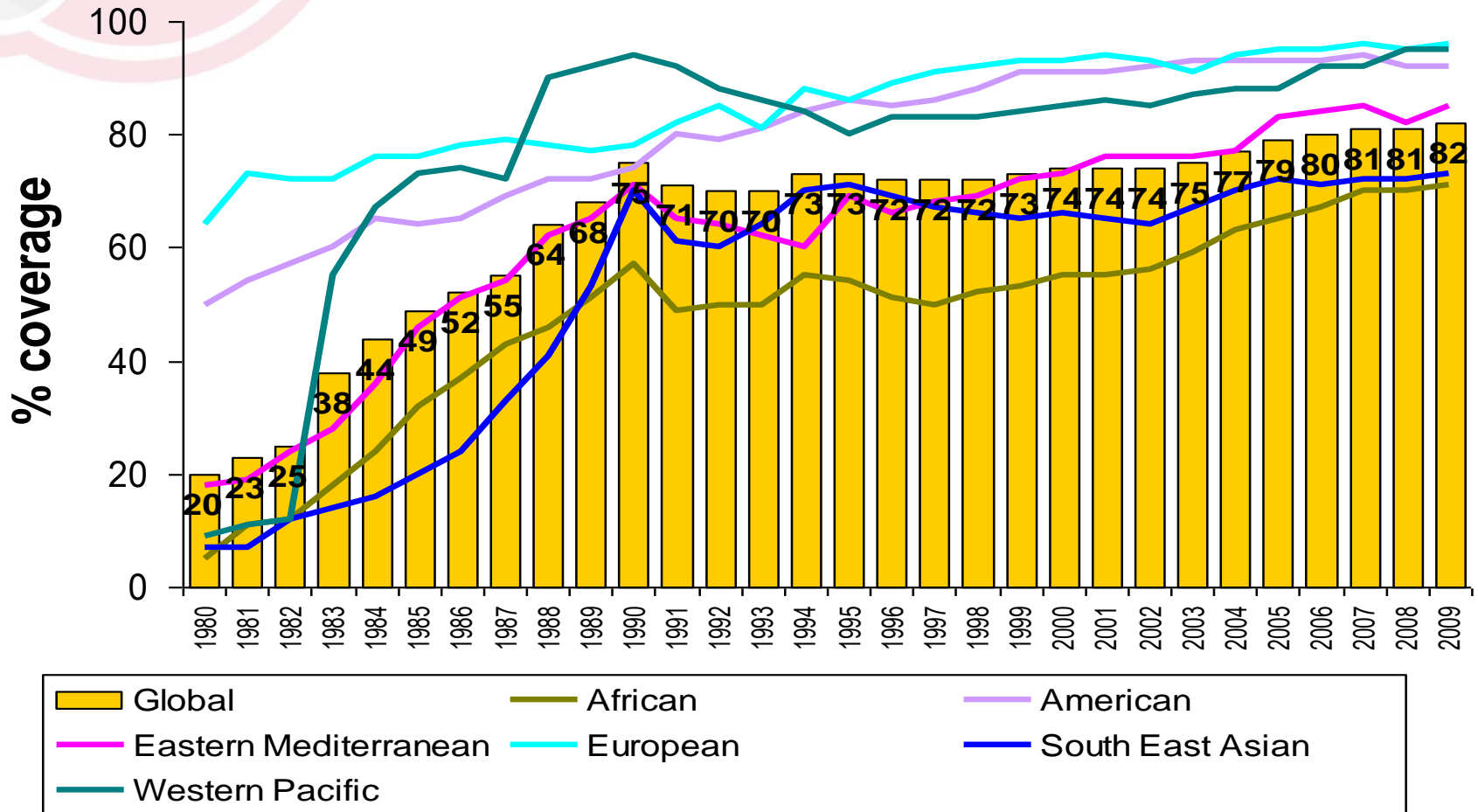
# Pertussis cases reported to WHO - % by country



	1981	1991	2001	2009
India	359288	73520	34703	14237
Nigeria	56913	18685	34517	11281
China	510601	10679	6407	1612
Canada	2632	2724	2678	1667
UK	21461	6282	1049	846
Australia	170	337	9538	29545
US	1248	2719	7580	17000
other	843180	315547	78375	44256
world	1795493	430493	174847	120444

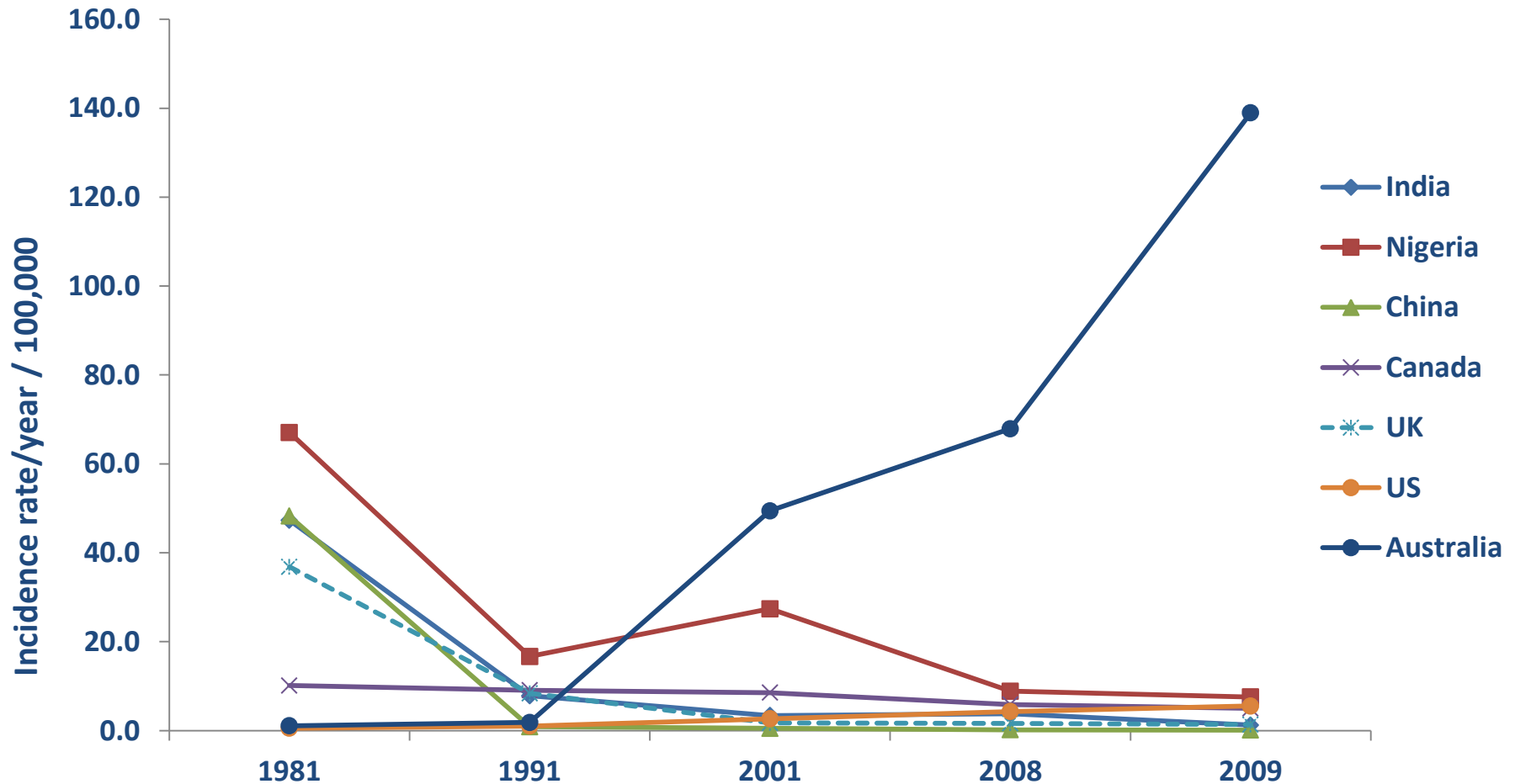
# Global Immunization 1980-2009, DTP3 coverage

## global coverage at 82% in 2009

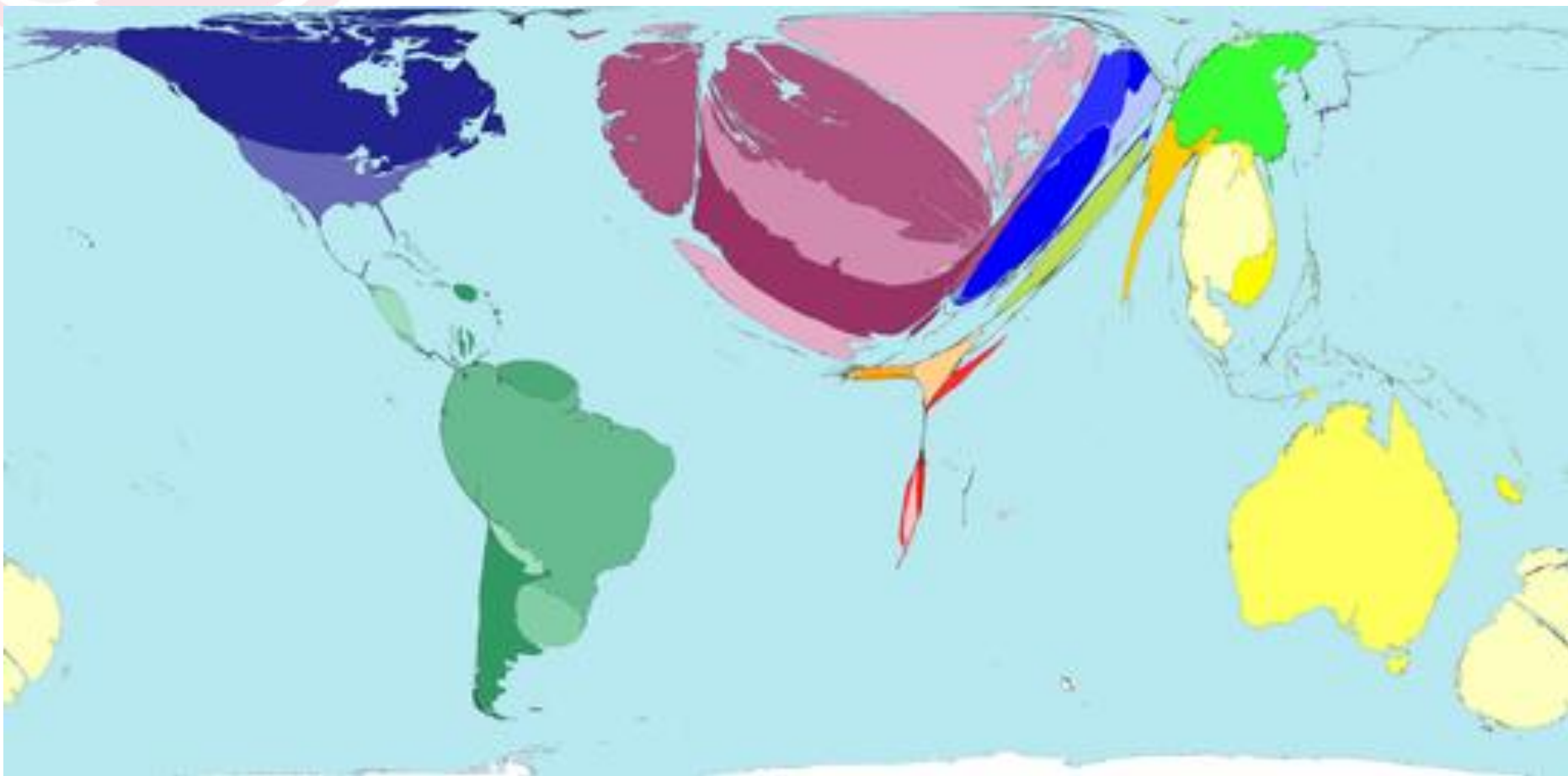


Source: WHO/UNICEF coverage estimates 1980-2009,  
 July 2010 Date of slide: 13 July 2010

# Pertussis incidence rate by WHO region



# World – Meat Exports



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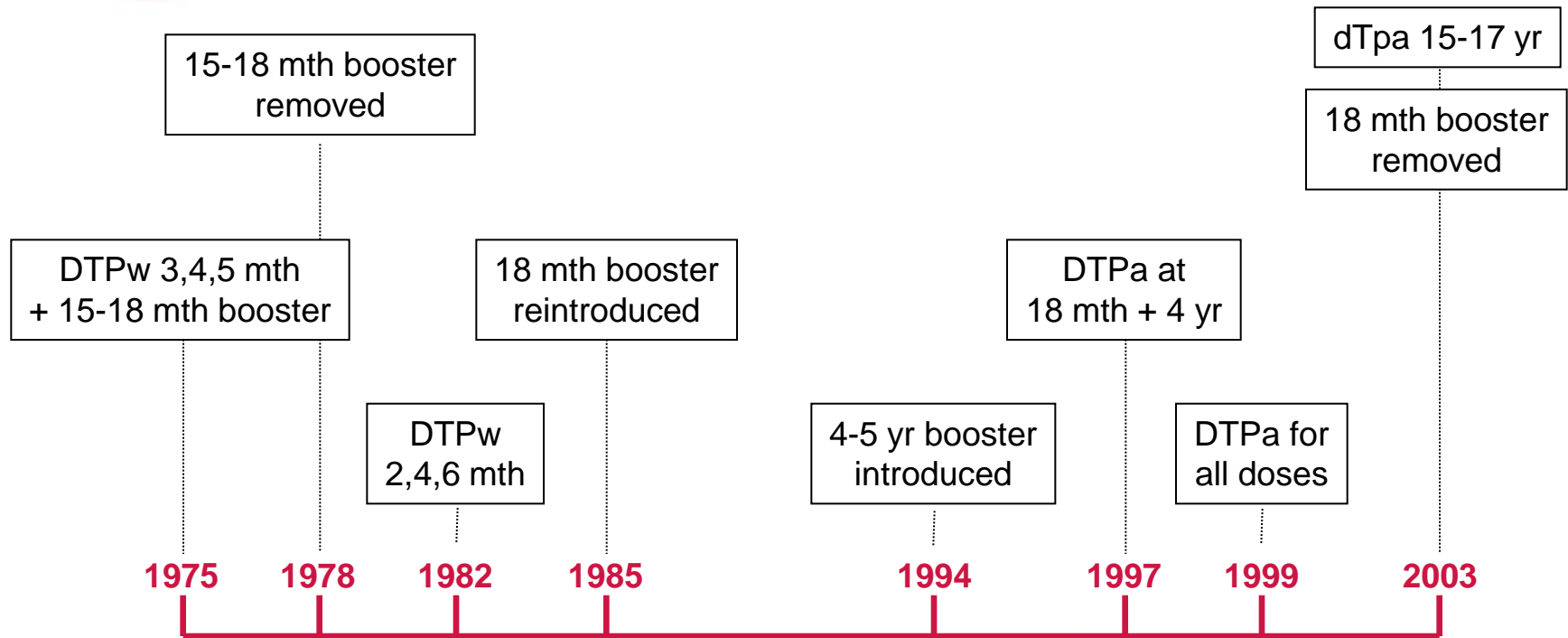
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# What is going on?

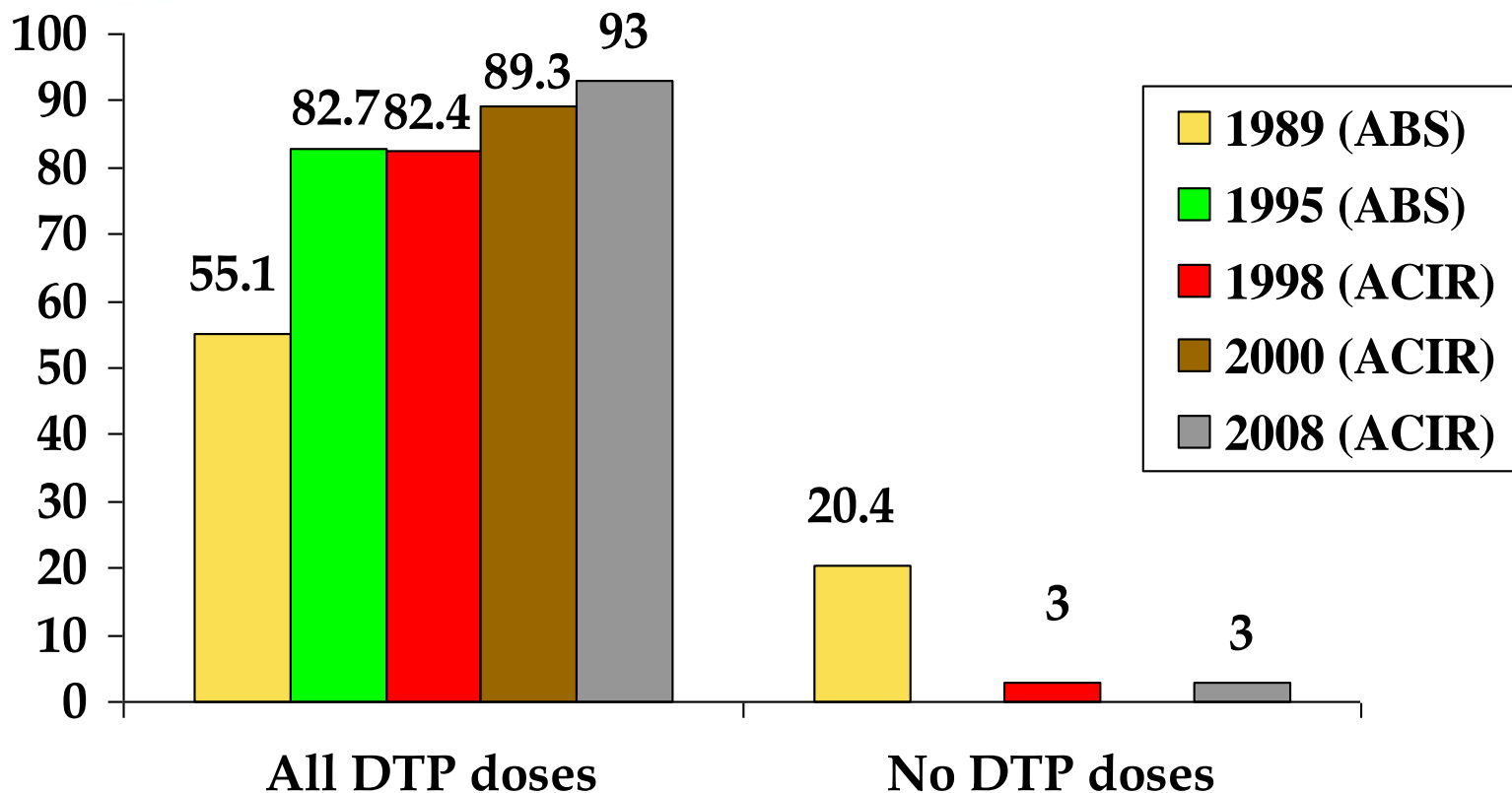
# Changes impacting on pertussis in Australia since 1991

- **Vaccines**
  - Coverage
  - Schedule, Vaccine type
- **Diagnosis – tests and awareness**
  - Serology – 1990s
  - PCR – 2000+
- **Surveillance systems**
  - NNDSS
  - Laboratory notification

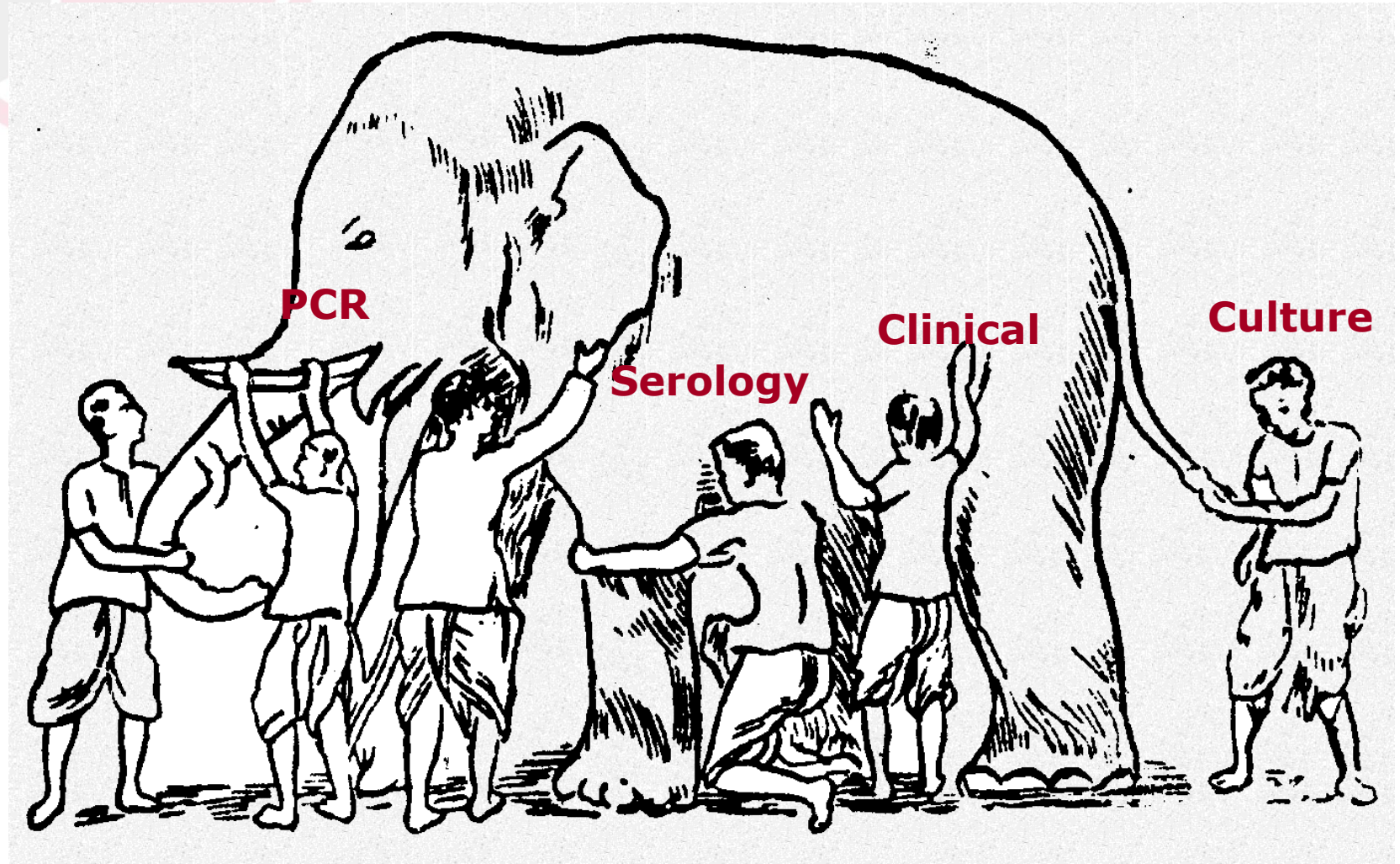
# Australian Pertussis Schedule - 1975 onwards



# DTP immunisation at 12 months: Australia 1989 to 2000



# Measuring pertussis - diagnostic tests

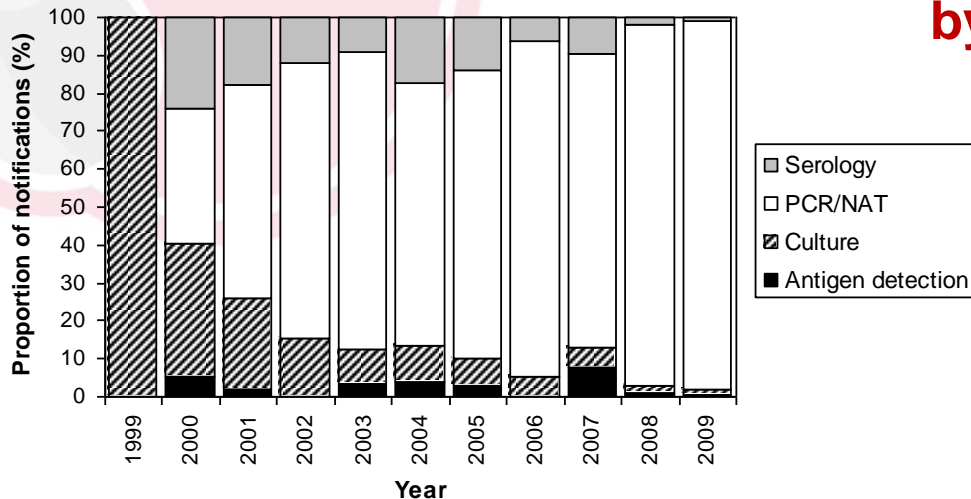


# Diagnostic tests

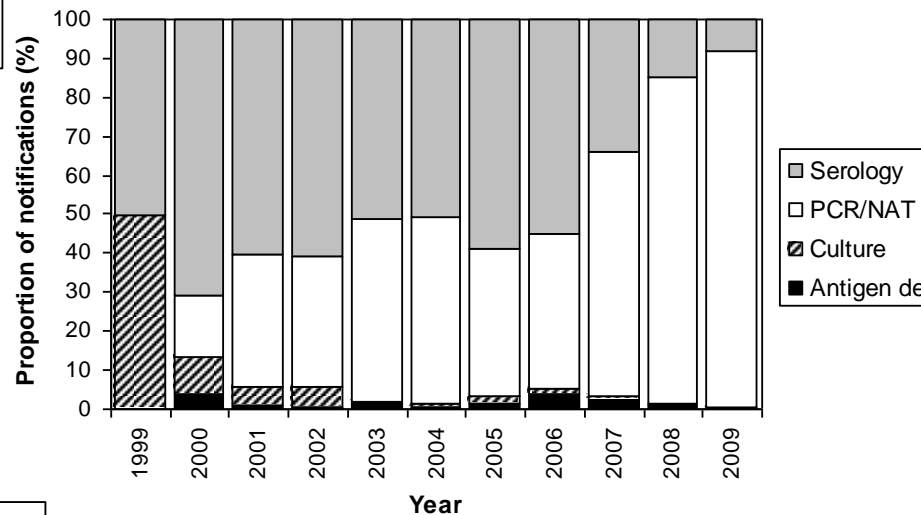
<b>TEST</b>	<b>Profile</b>	<b>Value</b>
<b>Culture</b>	Insensitive Highly specific	Unimmunised infants
<b>PCR</b>	More sensitive Specific	All < 21 days
<b>Serology</b>	Most sensitive Standardisation problematic	Not infants > 21 days

# Trends in PCR use by age - NNDSS

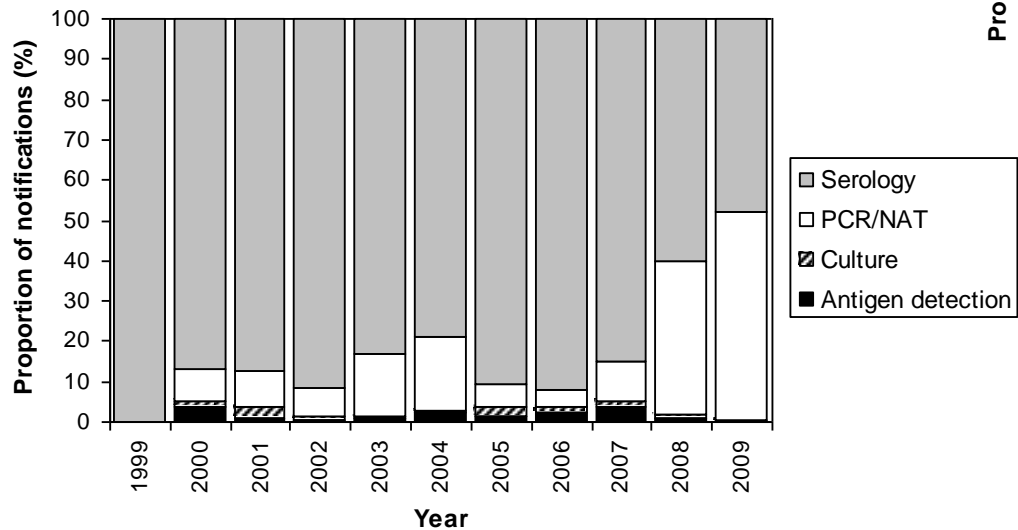
<1 yr olds



1-10 yr olds



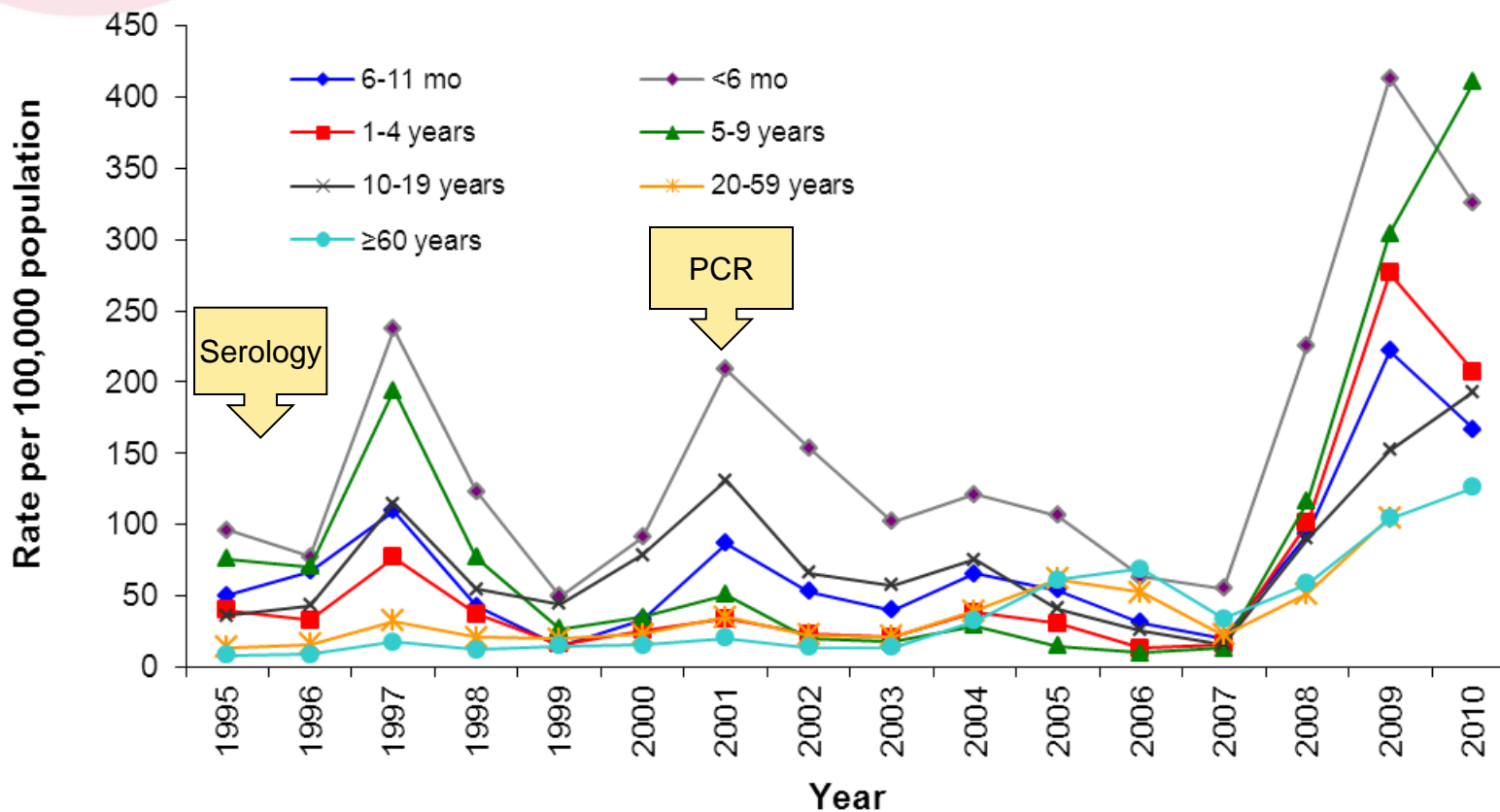
10+ yr olds



# Notifications

**Australian notification is highest internationally and has been since early 1990s**

# Pertussis notification rate, Australia 1995 to 2010, by age group



# Proportion of notifications by age 1995 to 2010

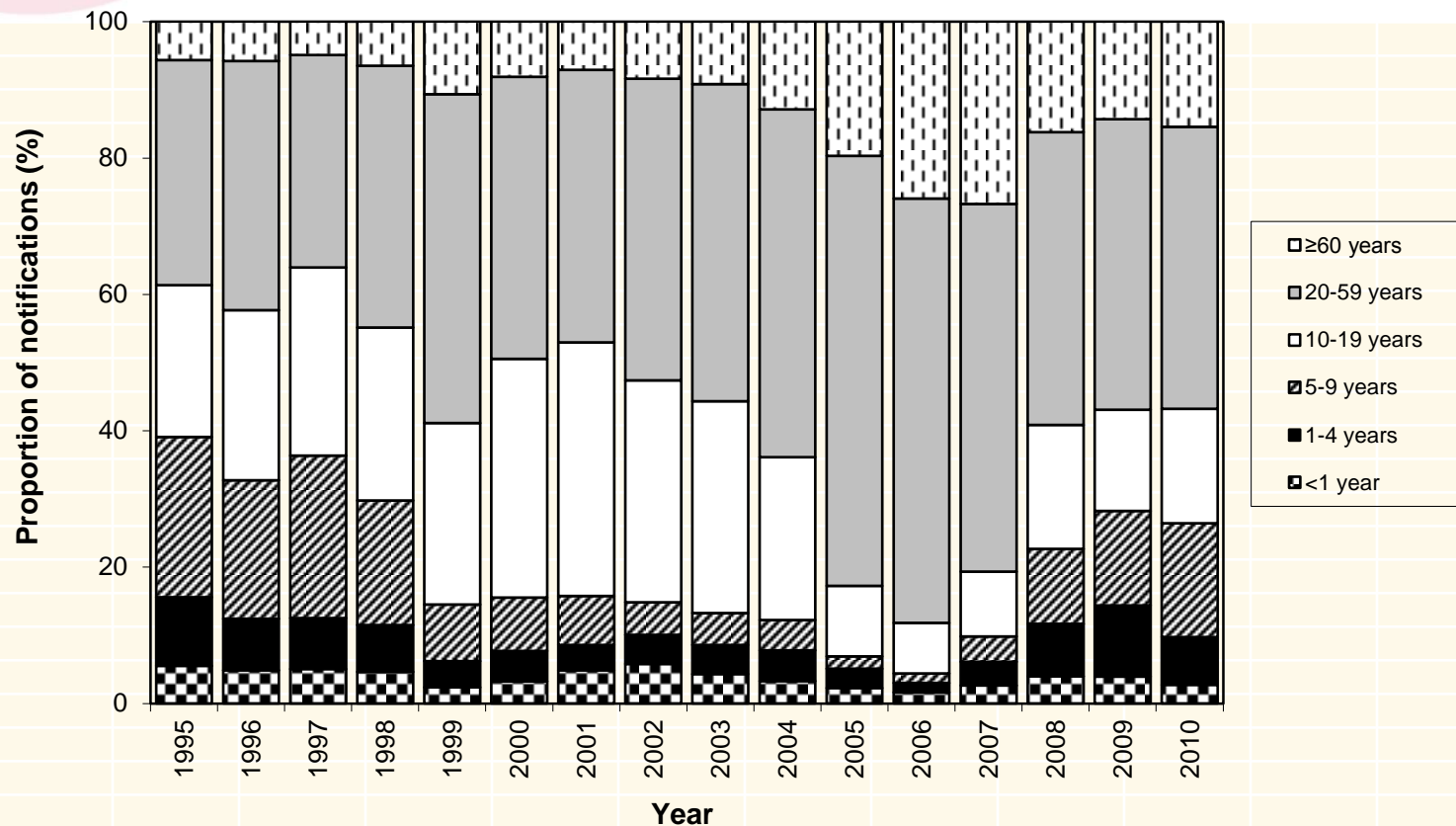
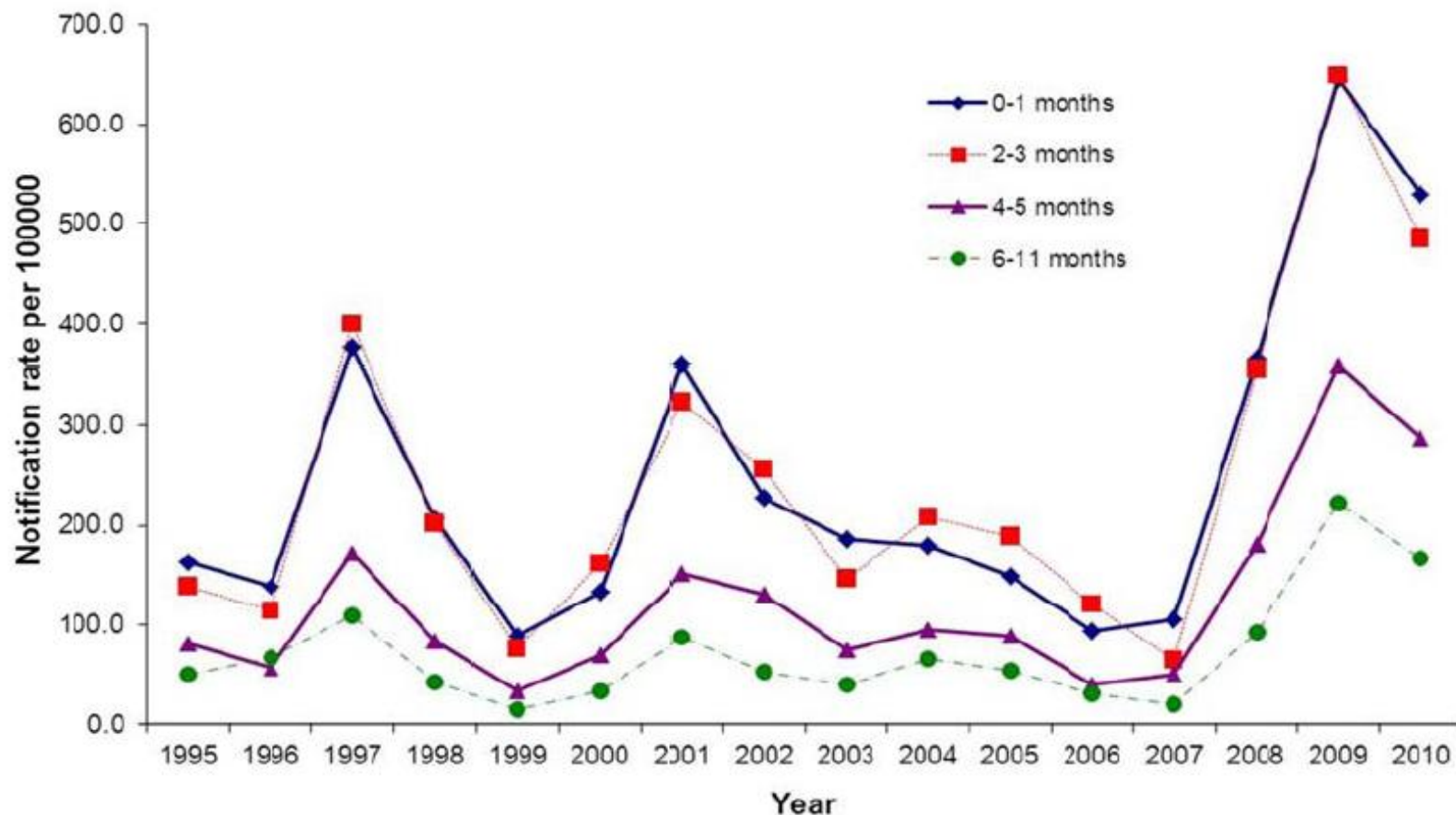


Figure 5. Pertussis notification rates in infants 0-11 months of age, 1995–2010, Australia

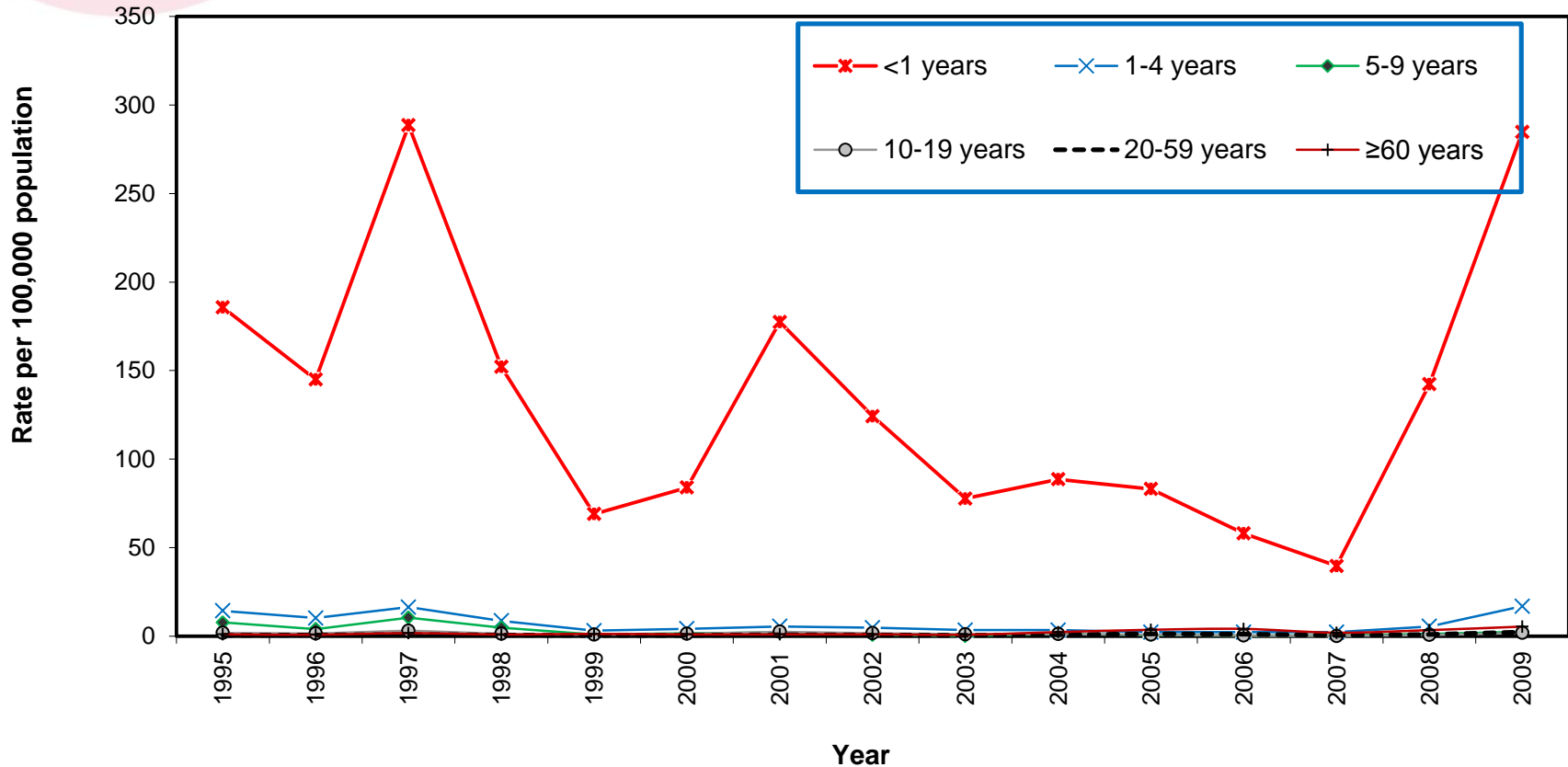


# Importance of disease severity

**Notifications vs  
Hospitalisations and Deaths**

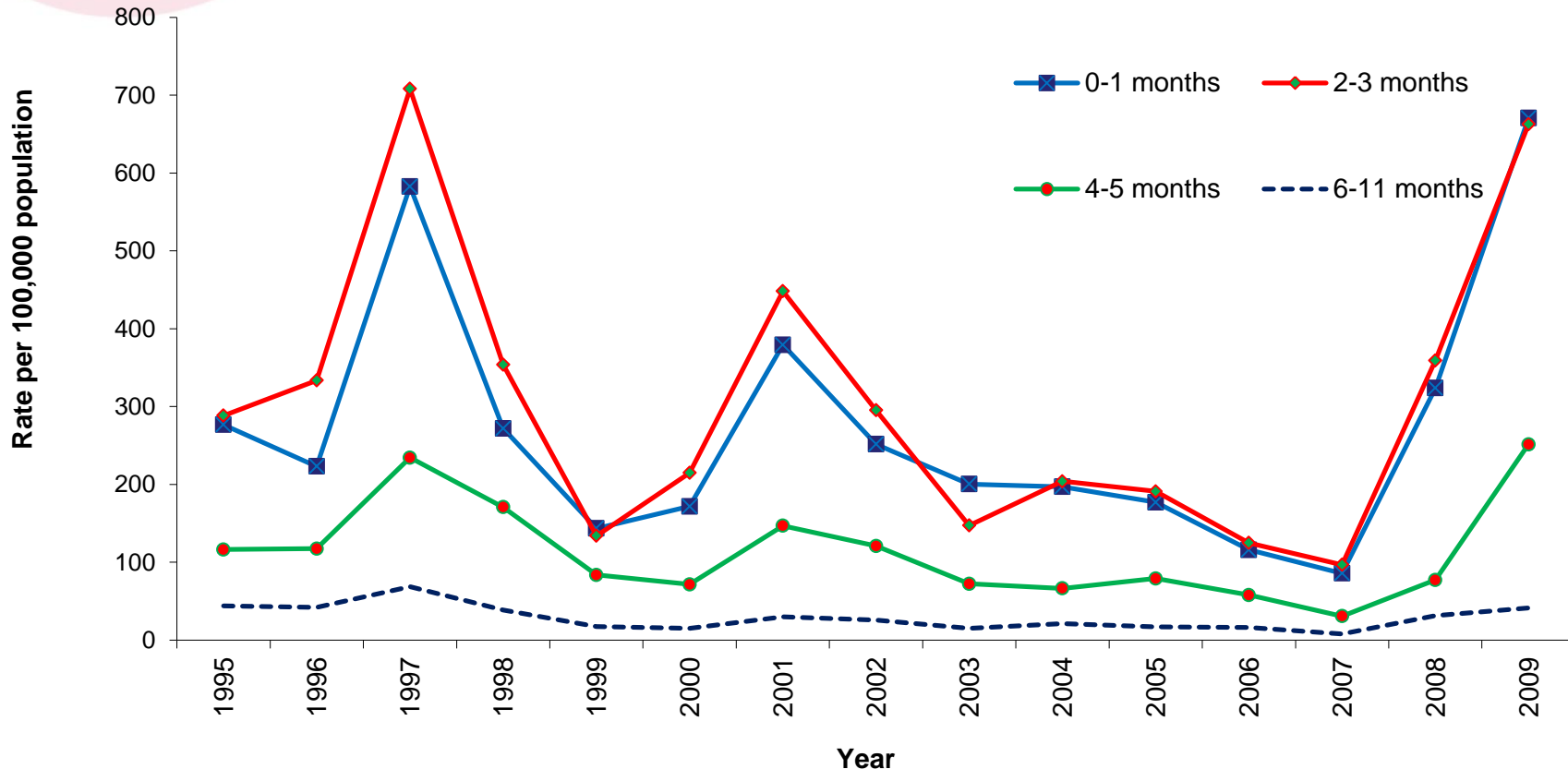
# Hospitalisations

# Hospitalisations coded as pertussis – Australia 1995 - 97



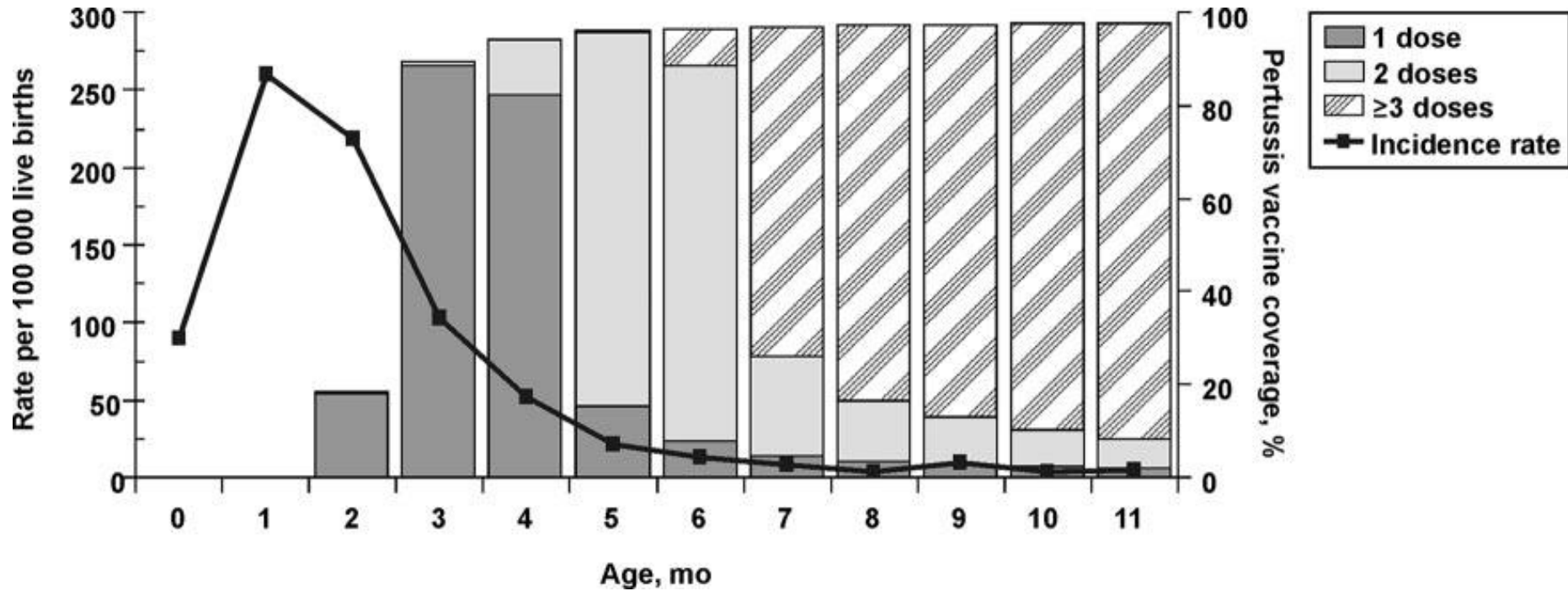
\* Data to 30 June 2009 - rates have been annualised.

# Hospitalisations coded as pertussis – Australia 1995 - 97

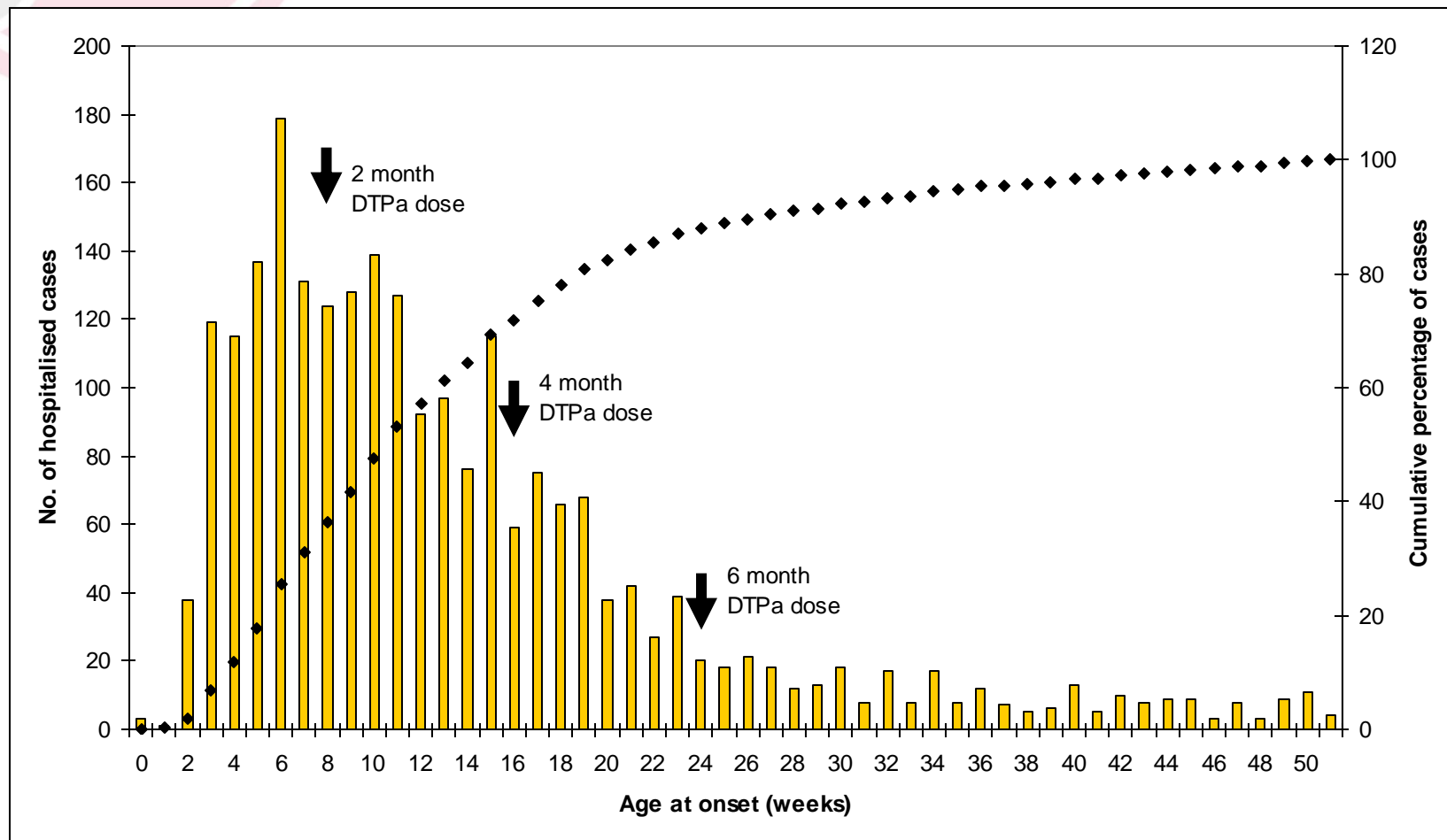


\* Data to 30 June 2009 - rates have been annualised.

# Incidence of hospitalisation in US infants by month of age and estimated vaccination coverage: 1993-2004



# Cumulative percentage of pertussis hospitalisation in infants aged <1 year, Australia, 1995 to July 2008



# Deaths

# Pertussis deaths

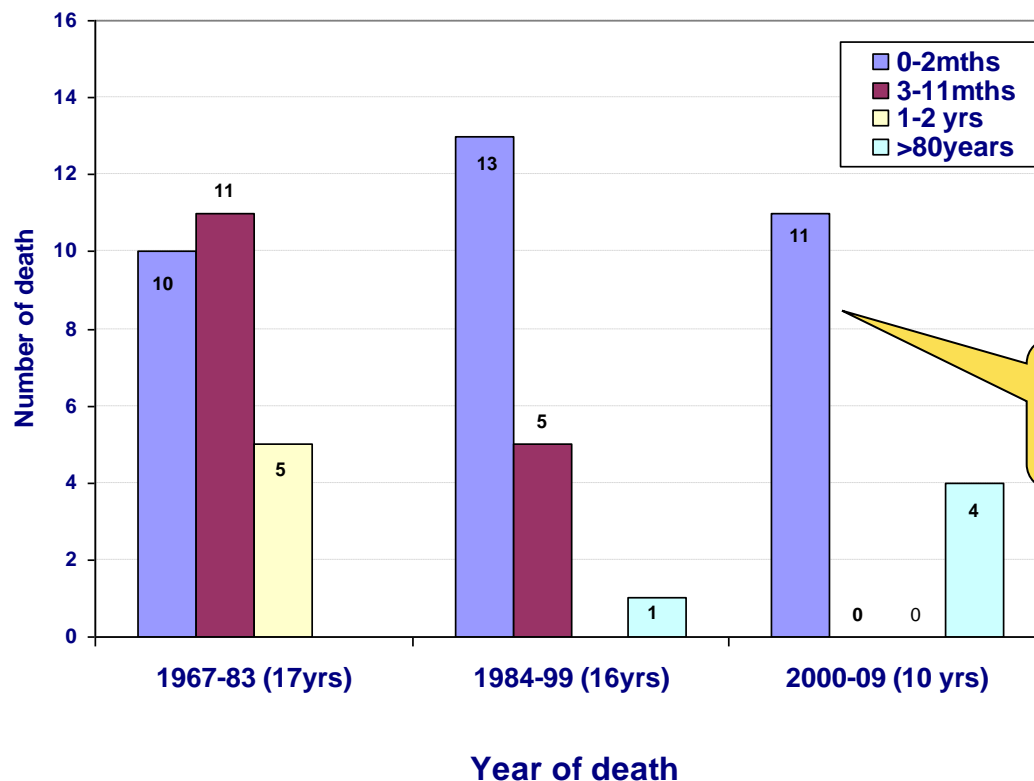
– routine national collections by country 1995-2004<sup>1</sup>

COUNTRY	Years	Total (<6m)	Incidence (per 10 <sup>6</sup> )
Australia	95-2003	15 (12)	0.8
US	95-2003	154 (140)	0.6
Netherlands	95-2003	8 (8)	0.5
UK	95-2003	50 (45)	0.9
Finland	95-2003	4 (4)	0.8
Sweden	97-2007	8 (6)	0.8

1. With thanks to Dr Jussi Mertsola (Finland), Dr Joop Shellekens (Netherlands), Dr Liz Miller (UK), Dr Shelley Deeks (Canada), Dr Trudy Murphy (US)

# Age at death - pertussis

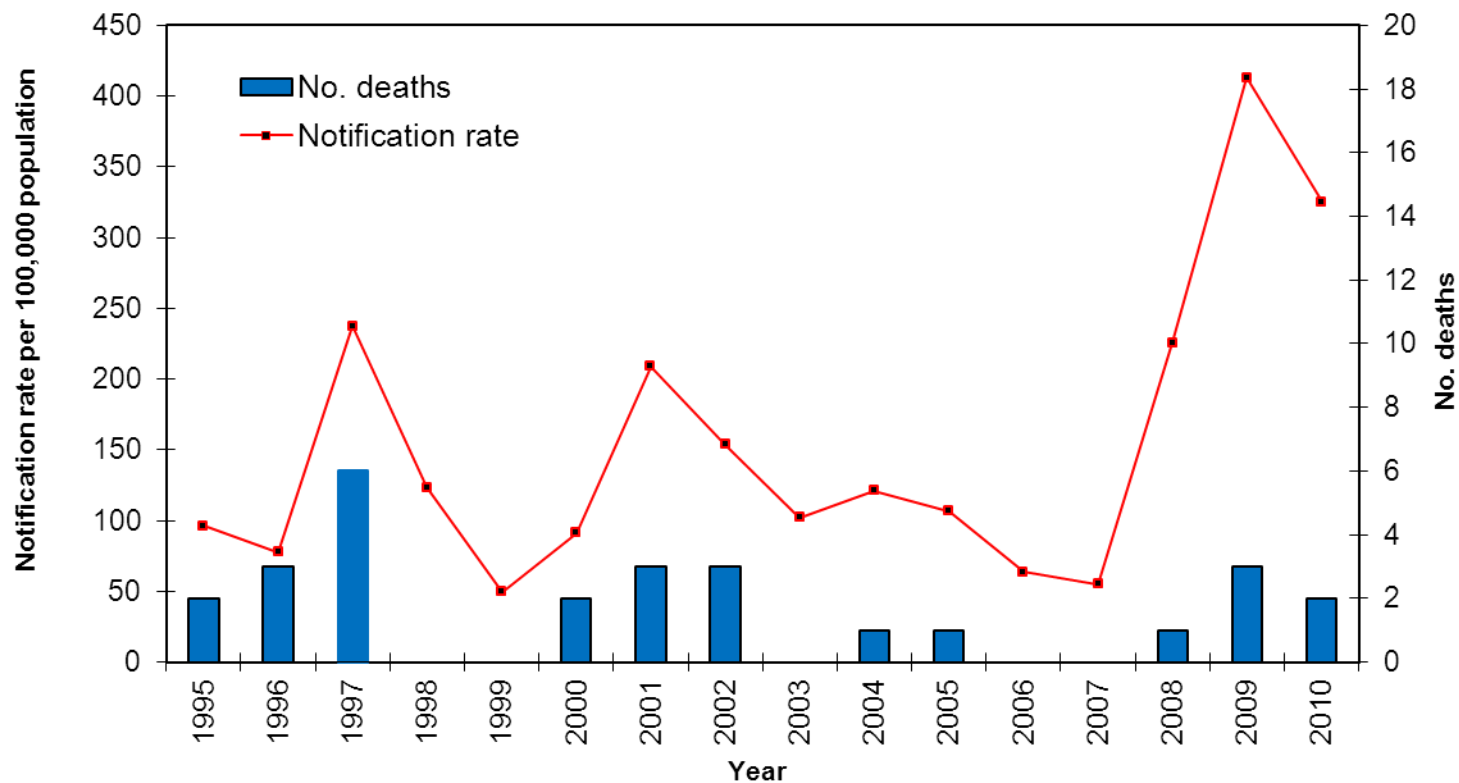
## Australia 1967 to 2009 in 3 time periods (N=60)



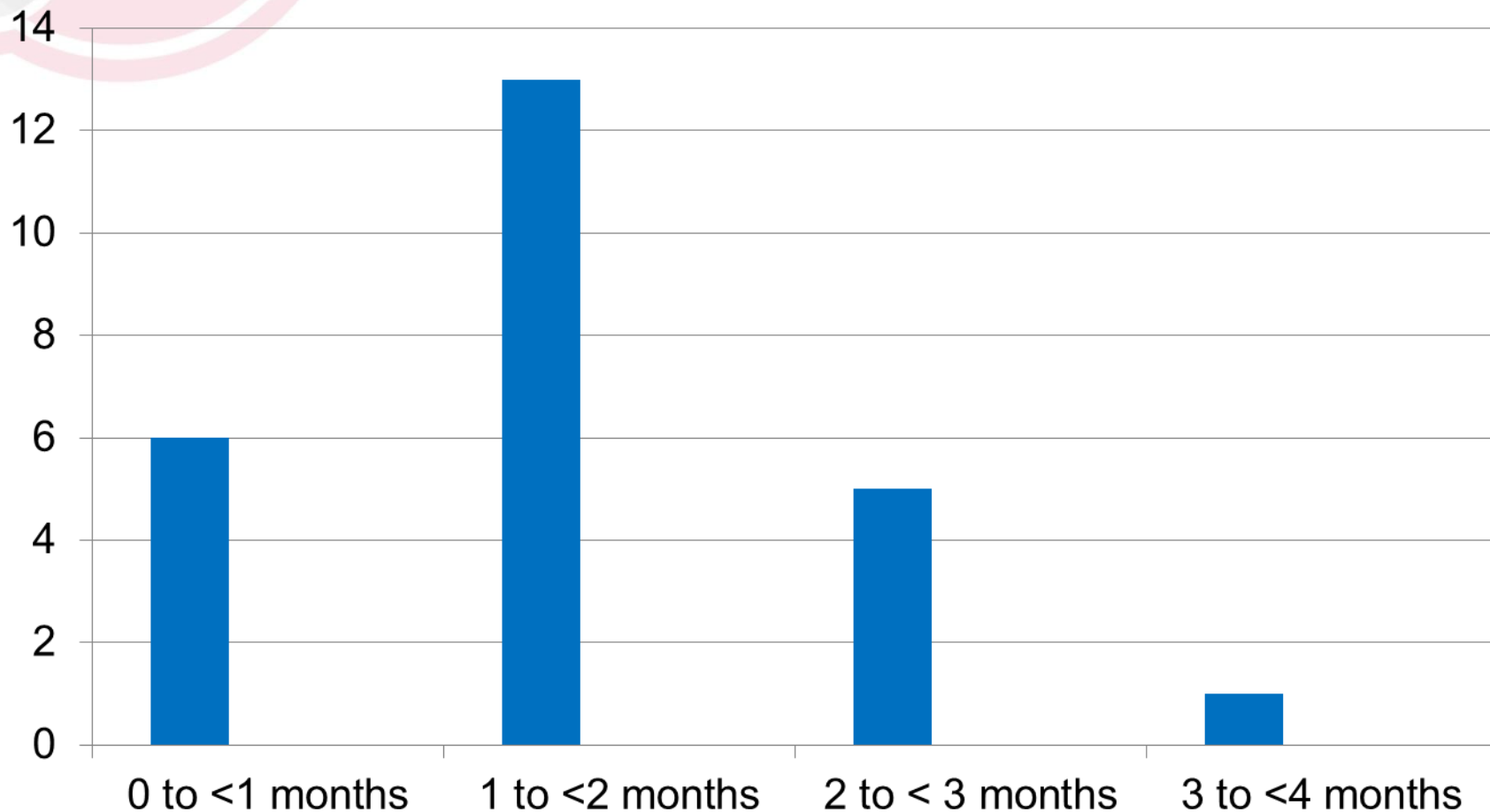
4.2 per million live births  
US = 3.8 per million<sup>1</sup>

1. Haberling et al PIDJ 2009; 28:194

# Pertussis notification rates and deaths, 1995-2010 Australia



# Deaths from pertussis under 12 months of age Australia 1995 to 2009 N=25



## Dana McCaffrey - Facebook Page

- DANA Elizabeth McCaffrey died in March 2009 at 4 weeks of age from Whooping cough (Pertussis).
- Sadly, she is one of three babies that has died from this totally vaccine preventable disease in Australia this year.





**John Della Bosca MLC**

Minister for Health  
Minister for the Central Coast  
Leader of the Government in the Legislative Council

9 May 2009

*Call for review of Whooping Cough education and prevention*

**“I urge new parents, grandparents ... who regularly care for infants under 12 months old to get vaccinated against whooping cough”**

Mr Della Bosca raised the issue at the Australian Health Workforce Ministerial Council in Melbourne yesterday (8 May).

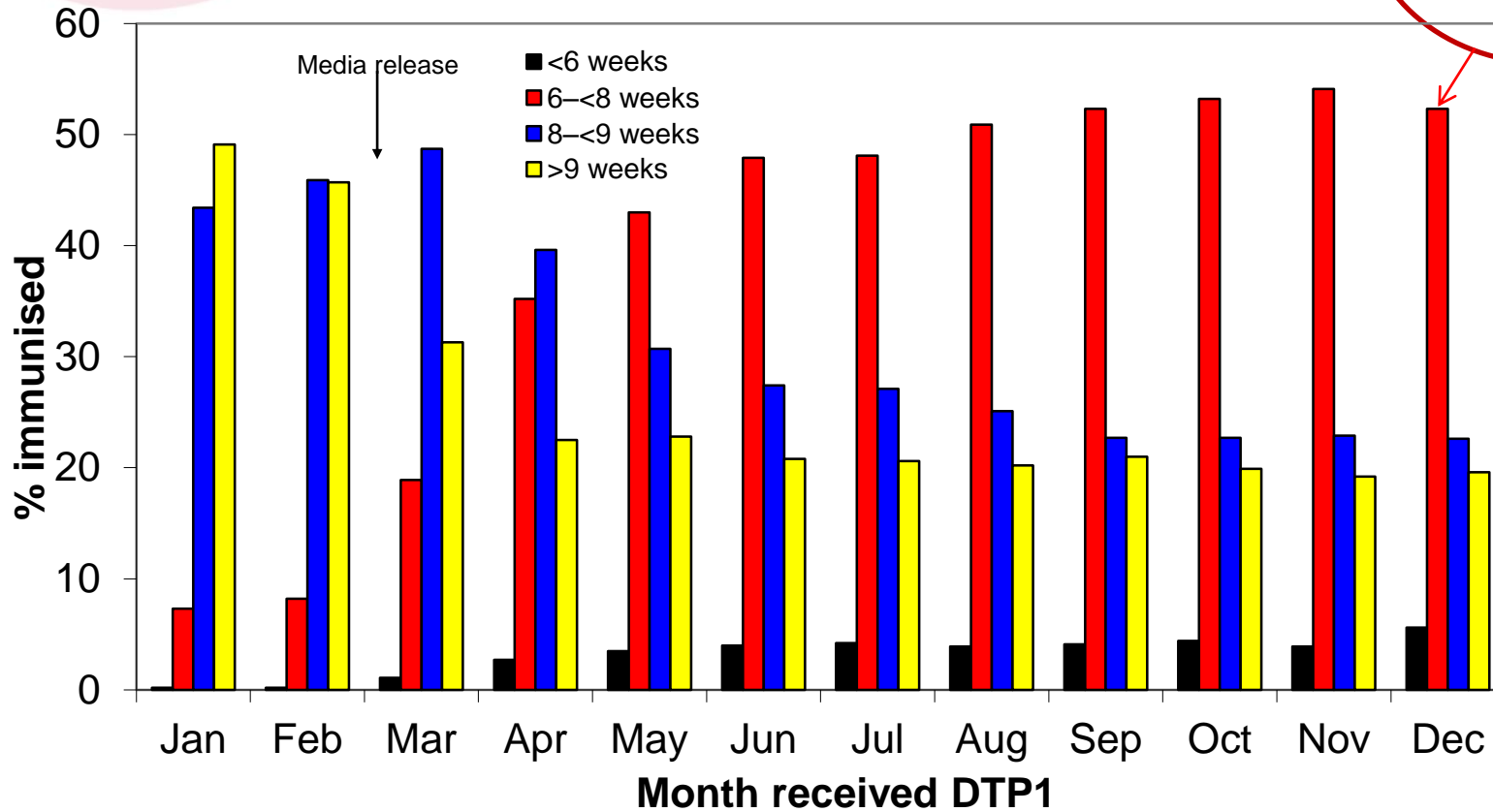
**“parents and GPs are asked to bring the first dose forward to 6 weeks”**

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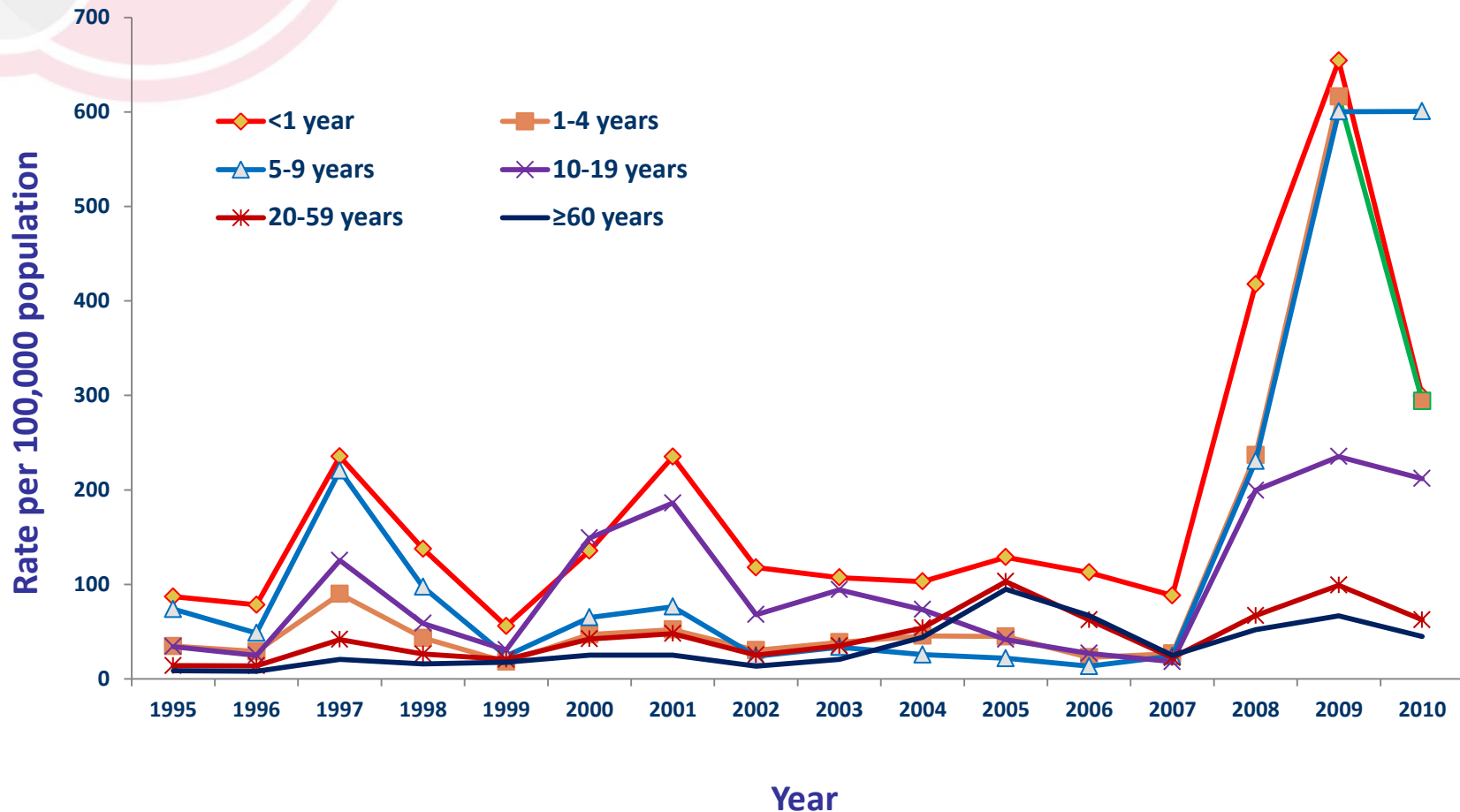
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## Timeliness of DTP1 immunisation, NSW, 2009

60% of doses before 8 weeks



# Pertussis notifications – NSW to 2010



# Is Australia the World Capital of pertussis?

# Re-introduction of pertussis vaccination – the Swedish experience<sup>1</sup>

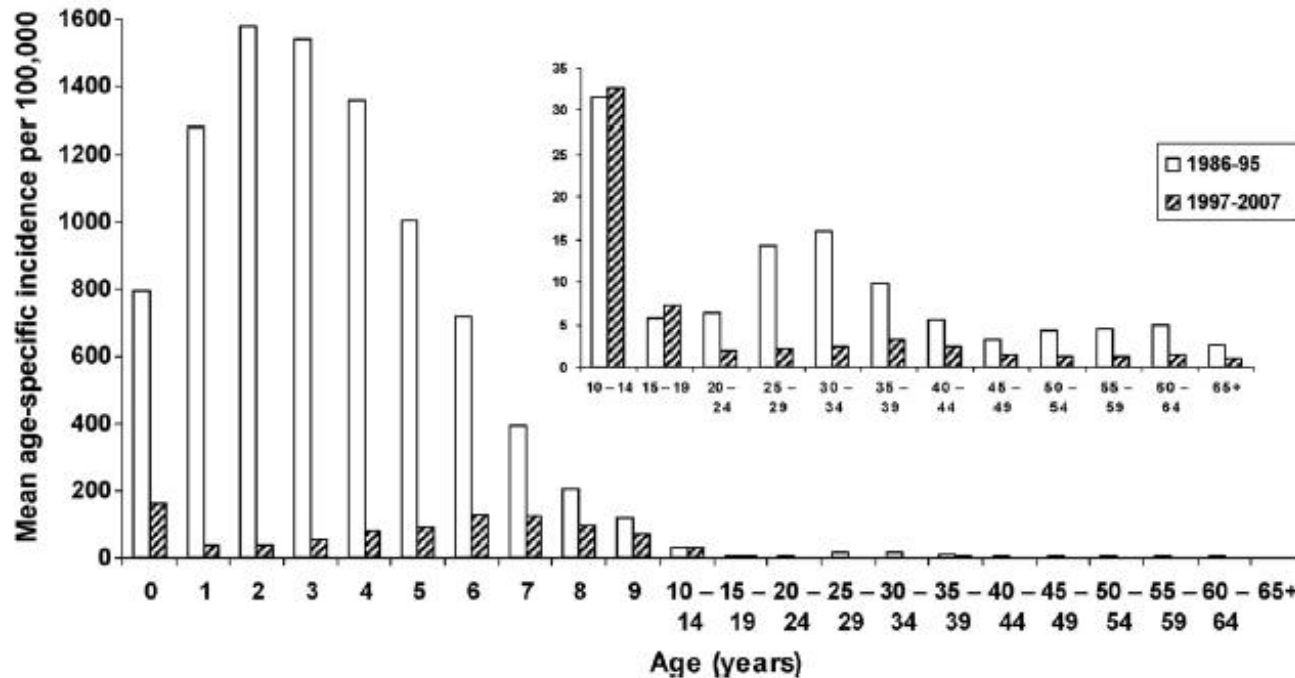


Fig. 2. Age-specific incidence of laboratory-confirmed pertussis in Sweden during 10 calendar years before and 11 calendar years after introduction of pertussis vaccination (using aP-containing vaccines) into the general vaccination programme in 1996 (mean incidence rates per 100,000 population 1986–1995 and 1997–2007). An enlarged version of the bar chart for the age groups 10 years and above is shown in the insert [2].

## 1. Carlsson and Trollfors Vaccine 2009



# Acknowledgements

- NCIRS surveillance staff
  - Helen Quinn Epidemiologist
  - Han Wang Statistician
- CDNA – NNDSS data
- AIHW & ABS – Hospitalisation and death data
- Medicare Australia – ACIR data
- Department of Health and Ageing



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