



Dr Michael Hale

Public Health Medicine Specialist

Auckland Regional Public Health Service

Saturday, August 10, 2019

(Plenary)

15:00 - 15:20 Whooping Cough and Mumps

Whooping Cough - Pertussis

Auckland Regional Public Health Service

Rātonga Hauora ā Iwi o Tamaki Makaurau

Dr Michael Hale

10th August 2019

GPCME Christchurch



Working with the people of Auckland, Waitemata and Counties Manukau

Outline

- Disease
- Control Strategy
- Laboratory Testing
- Epidemiology
- Treatment
- Maternal Vaccination



Bordetella pertussis

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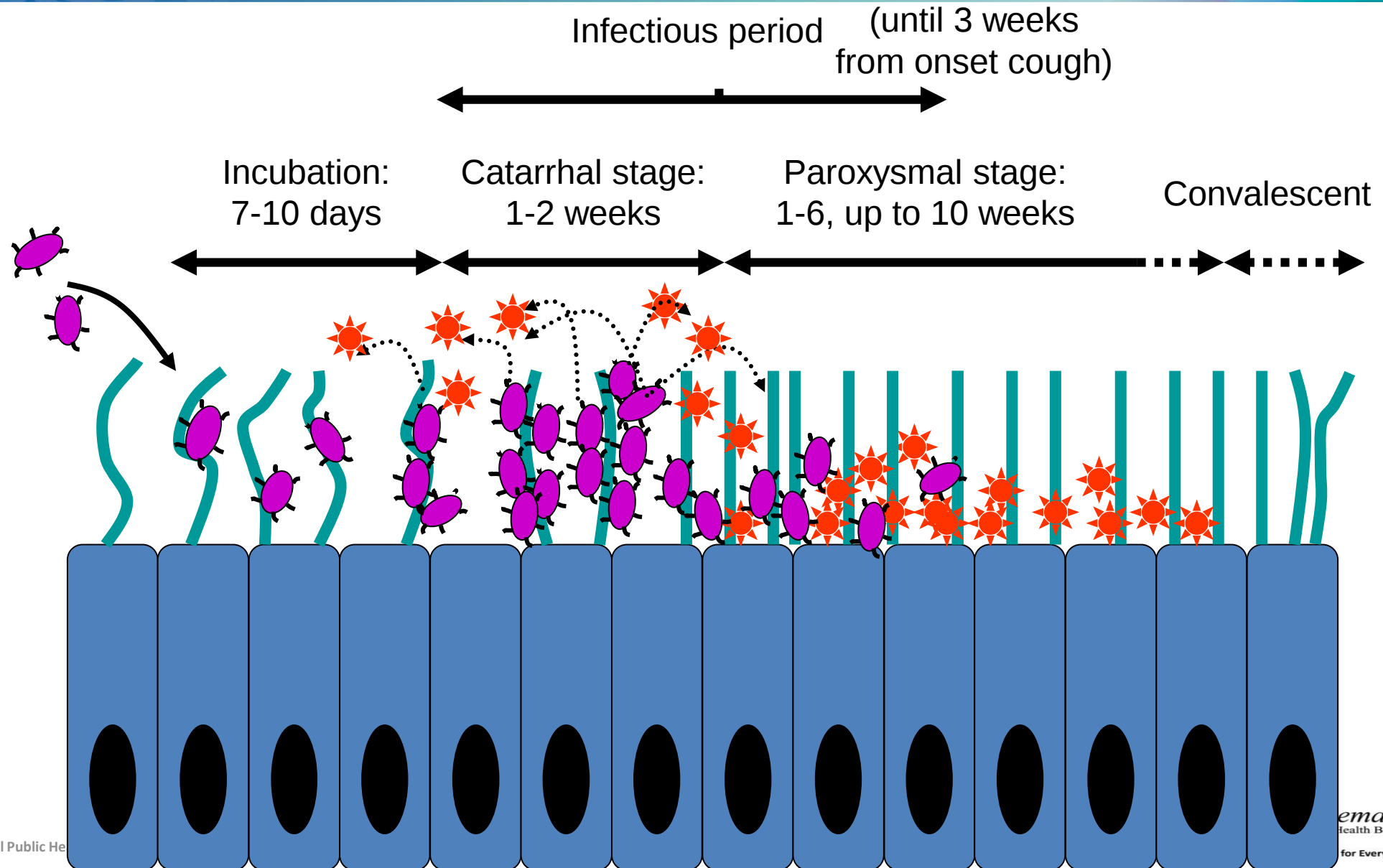
Organism	Bacteria
Source	Humans
Transmission	Respiratory droplets/aerosols
Incubation	7-10 days (Range 5-21)
R ₀	12-17
Household Attack Rate	80% unimmunised 20-30% immunised



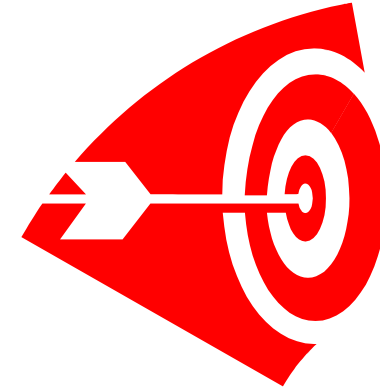
Pathogenesis of pertussis

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- **Goal** Minimise impact
- **Target** Infants <12 months



- Public Health Actions
 - Immunisation
 - Early diagnosis/treatment
 - Restriction
 - Chemoprophylaxis



Delivery

Maternal /
Primary
Care / Infection
Control

Pertussis <12 months old

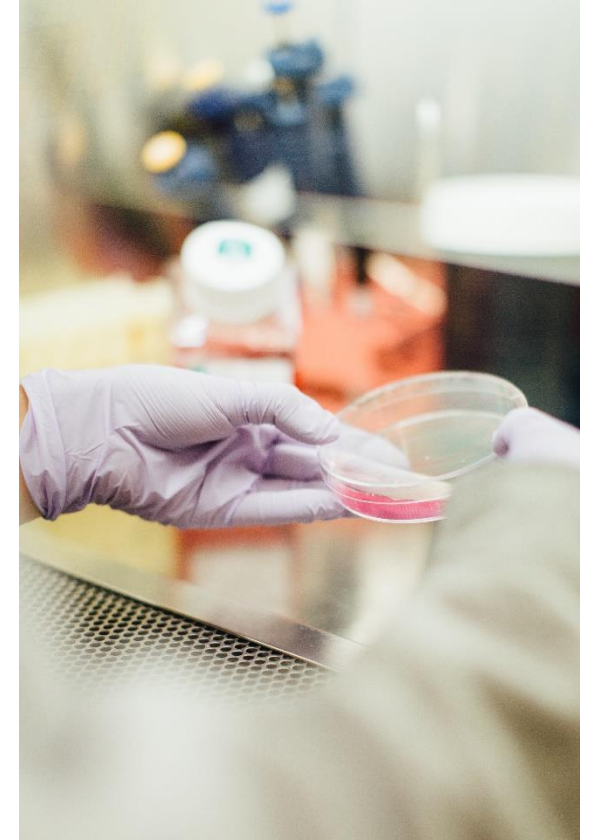
- Of 100 infants with pertussis
 - ~70 will be admitted to hospital
 - ~7 will need intensive care
 - 1-2 will have serious complications / die
- Serious complications
 - ~50% apnoea
 - ~10-15% pneumonia
 - ~1% seizures
 - ~1/1,000 encephalopathy



A case characterised by **cough**
AND one or more of:

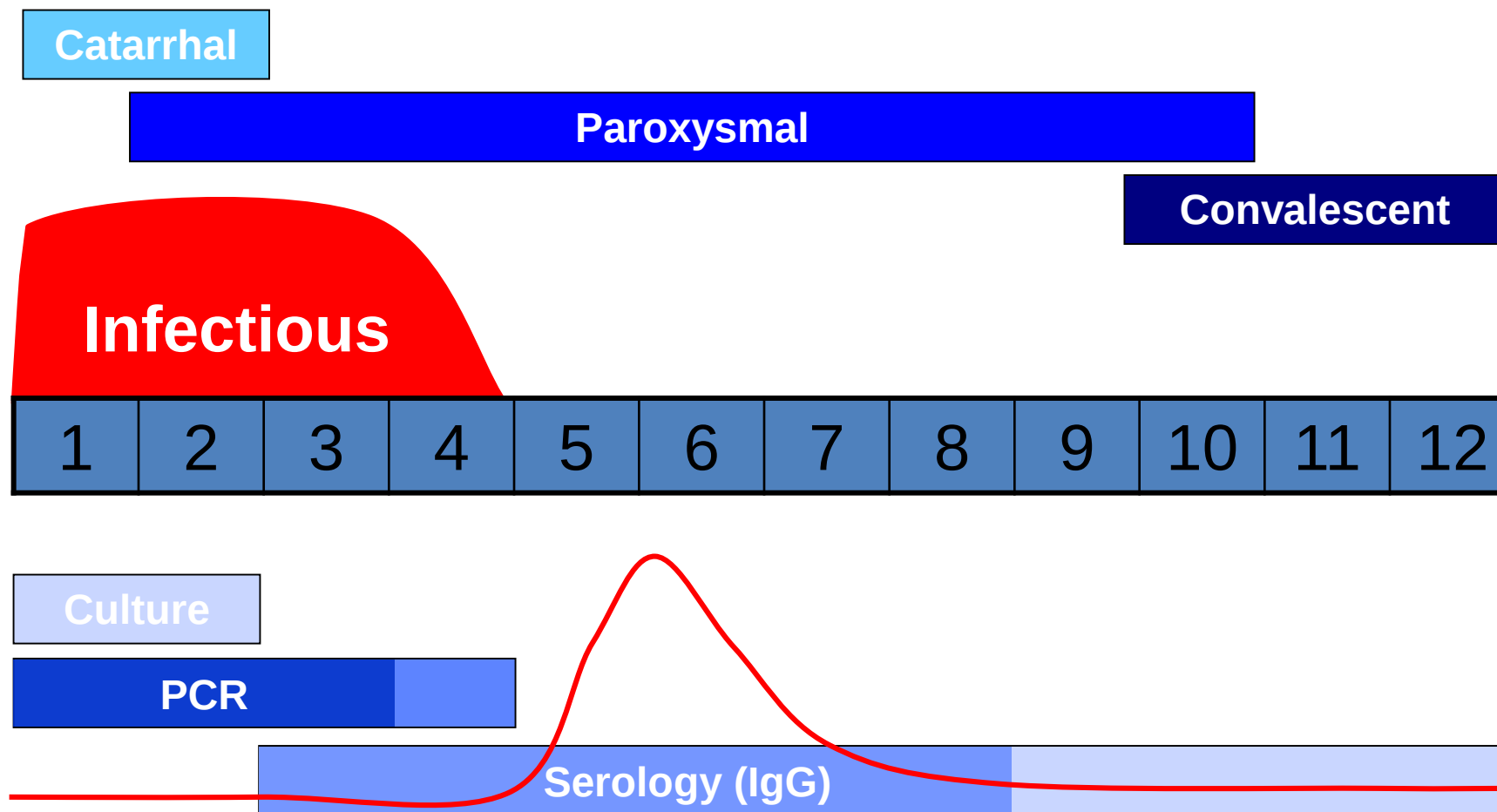
- Paroxysms (coughing fits)
- Cough ending in vomiting, cyanosis or apnoea
- Inspiratory whoop

- Culture is the gold standard but insensitive
 - 15-45% if <21 days cough, 0% by 3 weeks
 - Only helpful in the first week of illness
- **PCR preferred test**
 - Sensitivity 73-100%; specificity 100%?
 - Only helpful if taken within 3 weeks of the illness
- Repeat serology only useful for later diagnosis
 - 76% sensitivity & 99% specificity
 - Unknown correlation of IgG and immunity or acute illness (must have a clinically compatible illness to be probable)

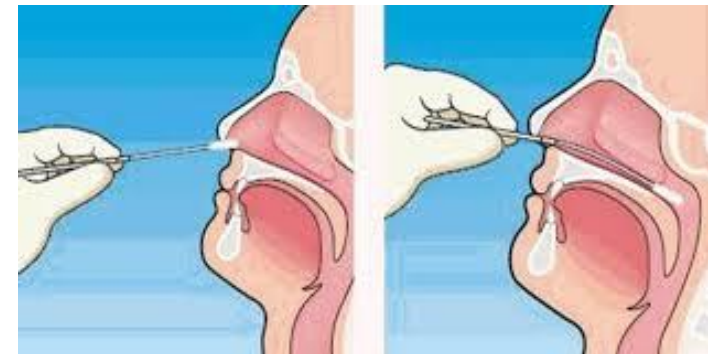
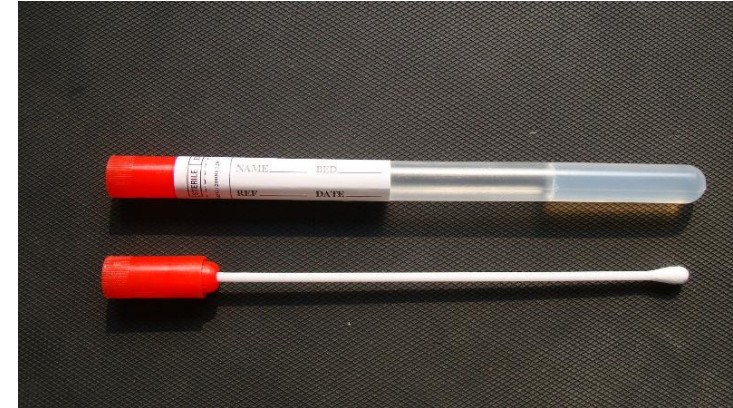


Whooping Cough

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- 1st Choice test – PCR
(Polymerase Chain Reaction)
- Nasopharyngeal swab
(throat and nose swabs unreliable)
- Taken within 3 weeks of onset
of paroxysmal cough



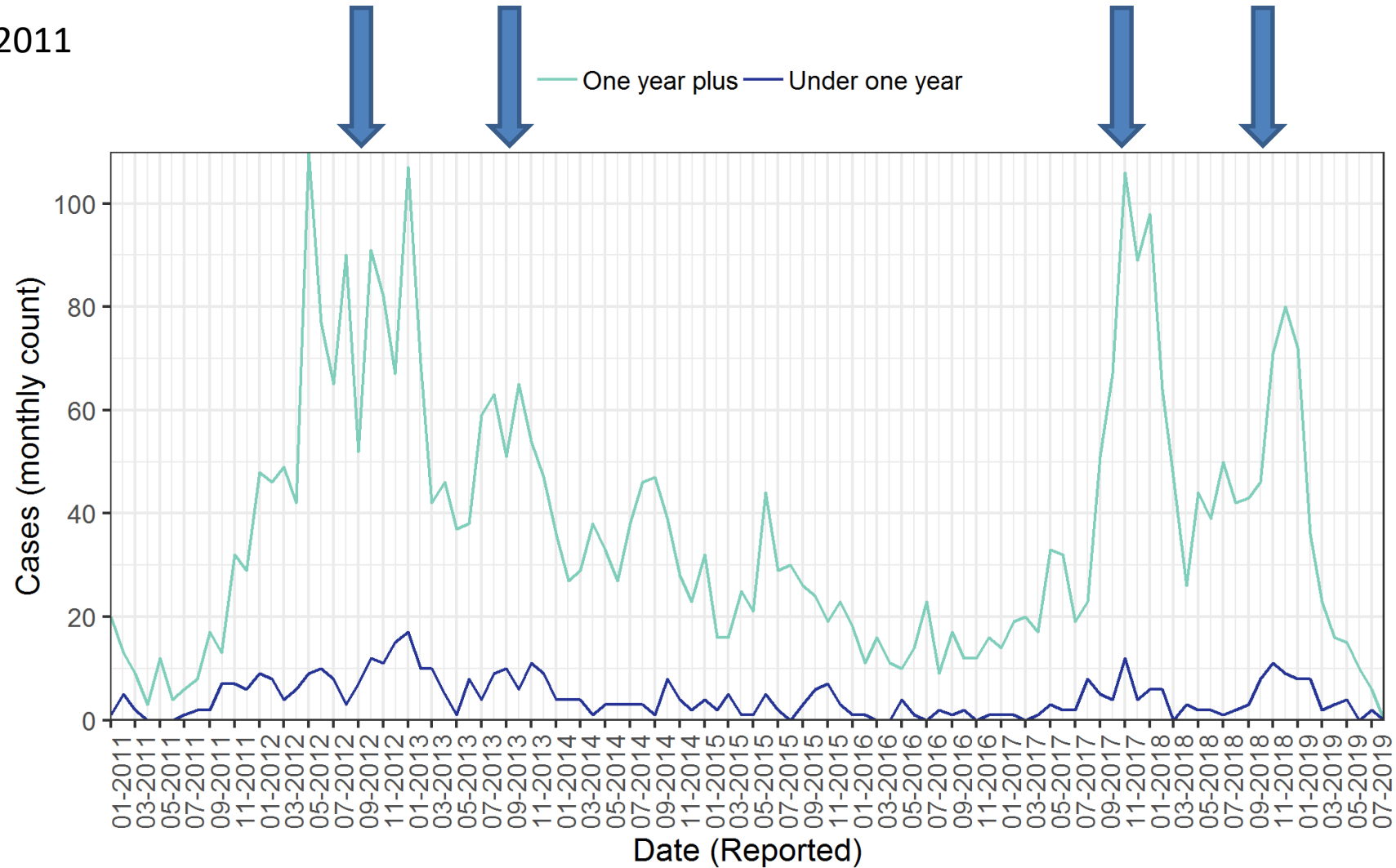
- 3 – 5 yearly cycle of pertussis epidemics
- Notifications suggest ethnic-specific rates
Europeans>Maori>Pacific
- However, these relative risks are reversed among hospitalisations
- Highest rates in children <1 year

Auckland pertussis notifications

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By month since 2011

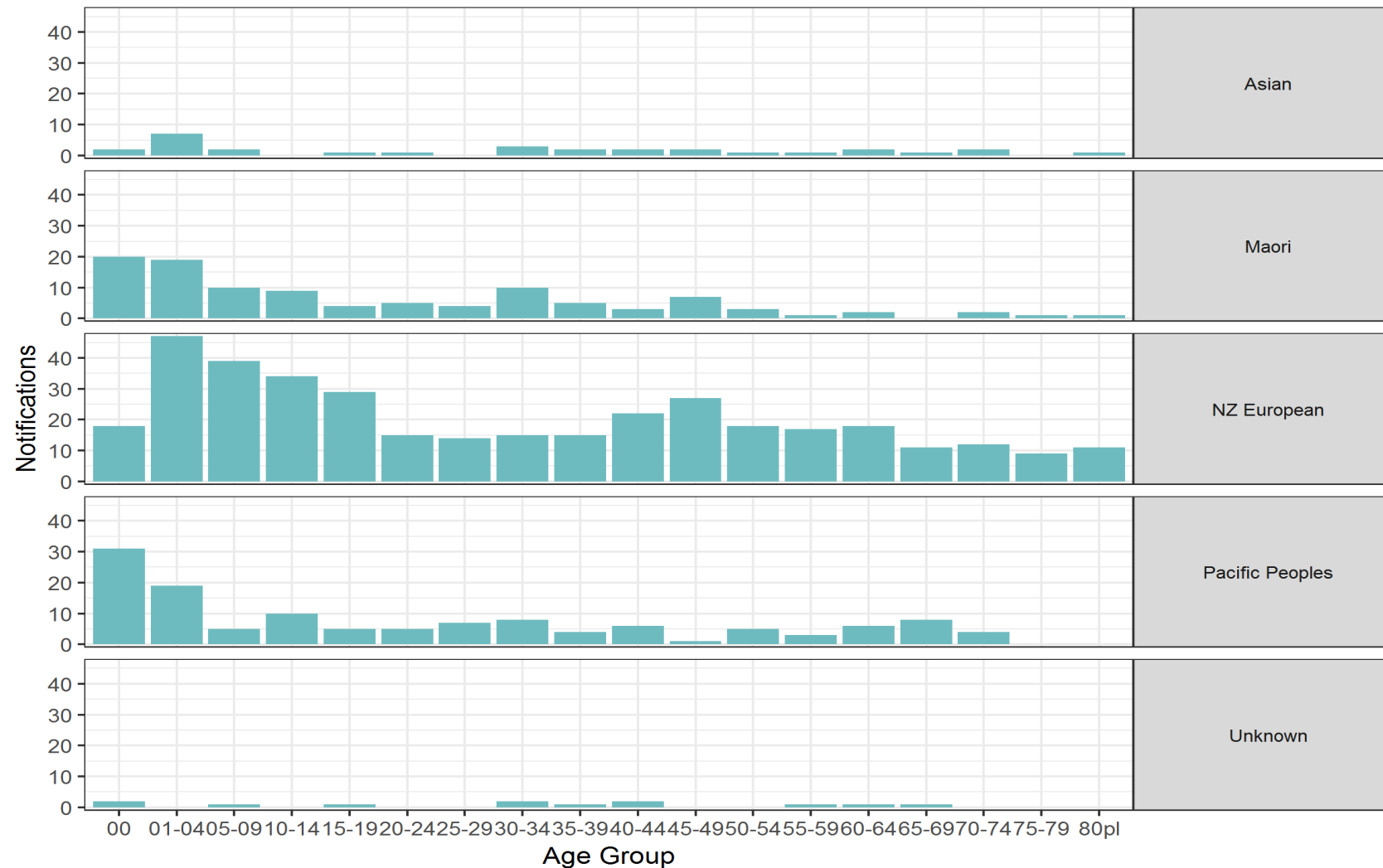


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Age distribution by ethnicity (Auckland)

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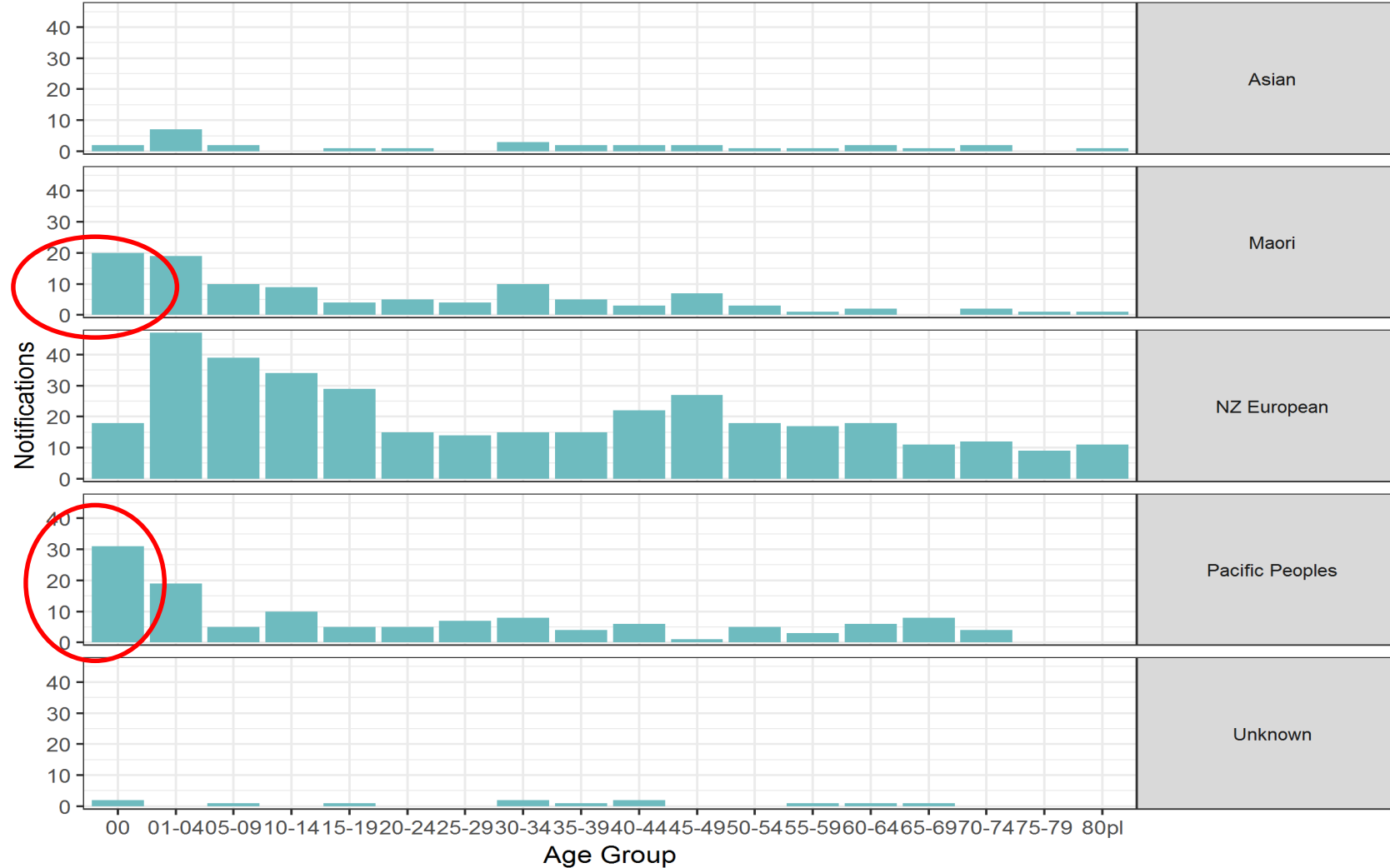


Only includes groups with 10 or more cases

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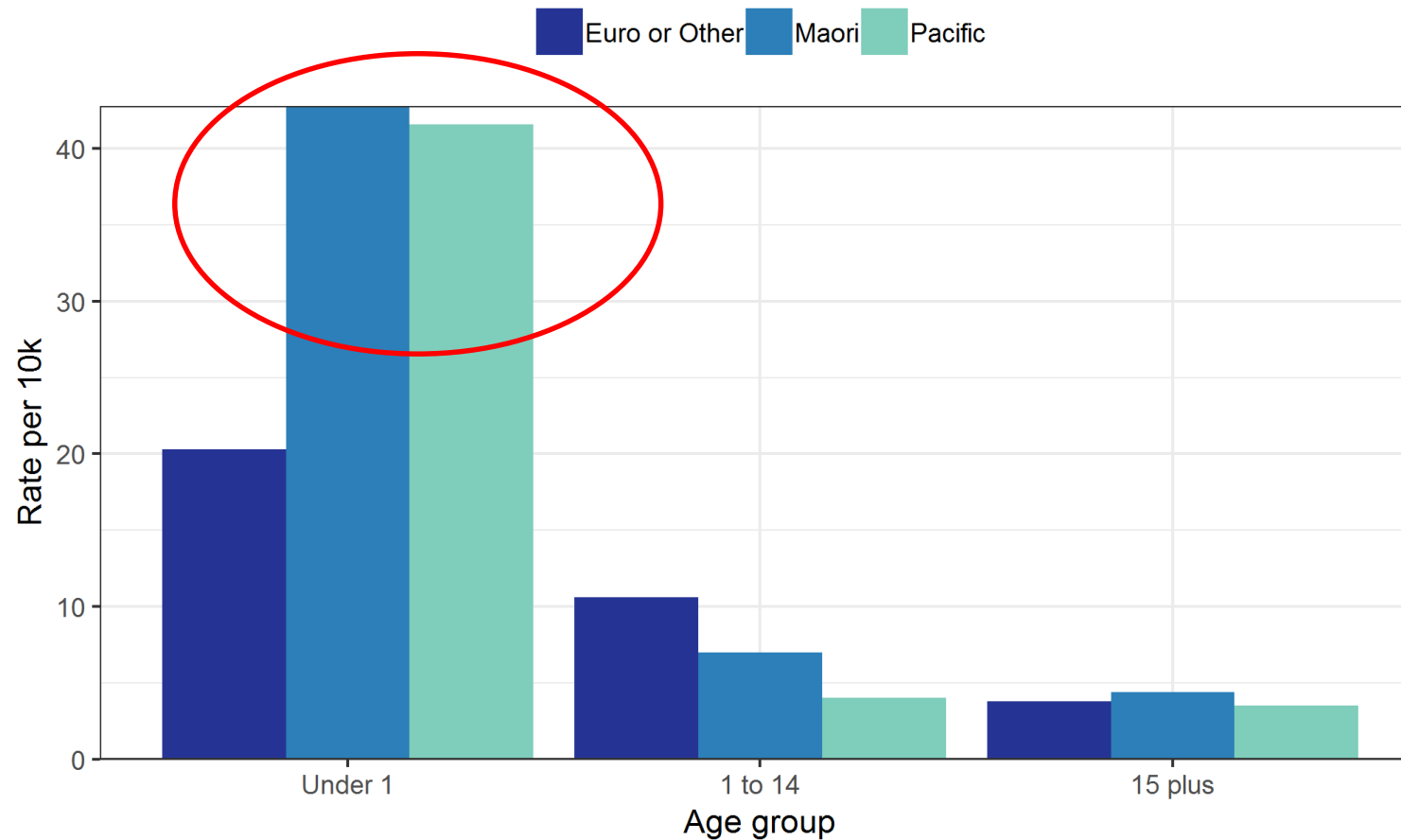
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Pertussis Rates by Ethnicity

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Notifications by Ethnicity and Age Group, Auckland Sep 2017-



- **Best option for prevention**
- **Key Messages**
 - On time every time - 6wk, 3 mth, 5 mth
 - Boosters funded
 - Pregnancy – last trimester, every pregnancy
 - Children 4yrs (DTap-IPV) and 11 yrs (Tdap)
 - 45 and 65 years (Tdap)
 - Boosters recommended, not funded
 - Healthcare and ECEC workers
 - Household members with <12 months and pregnancy

- Recommend treatment if case has vulnerable close contacts:
 - Under 1 year old
 - Chronic illness (asthma, congenital heart disease)
 - Immunocompromised and not vaccinated
 - Pregnant
- No infection control benefit if given ≥ 21 days after onset
- No effect on case if >1 week after onset

- High risk settings = ECEC, school, healthcare, other settings with children <1
- Exclude case from high risk settings until any of the following occur:
 - 3 weeks have elapsed from onset paroxysmal cough
 - Cessation of coughing
 - Completion of 5 days of appropriate antibiotic (2 days for Azithromycin)

Contact Chemoprophylaxis

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- Limited evidence of effectiveness
- Aim: To protect <12 month olds
- Recommend for **close contacts** who have a <12 month old in the home and are:
 - Adults with booster > 5 years ago; or
 - Incompletely immunised kids; or
 - Unimmunised.



Close contact:
someone who has
been < 2 metres from
the case for 1 hour or
more during their
infectious period.

Treatment (same for prophylaxis)

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1st Line: Azithromycin 5 day course (fully funded)

- Infants and Children:

- Day 1: 10mg/kg/day in a single dose (max 500mg)
- Day 2-5: 5mg/kg/day in a single daily dose (max 250mg)

- Adults:

- Day 1: 500mg as a single dose
- Days 2-5: 250mg once daily

*Alternatively: Erythromycin ethyl succinate (EES/E-Mycin) QID for **14** days*

Maternal Vaccination

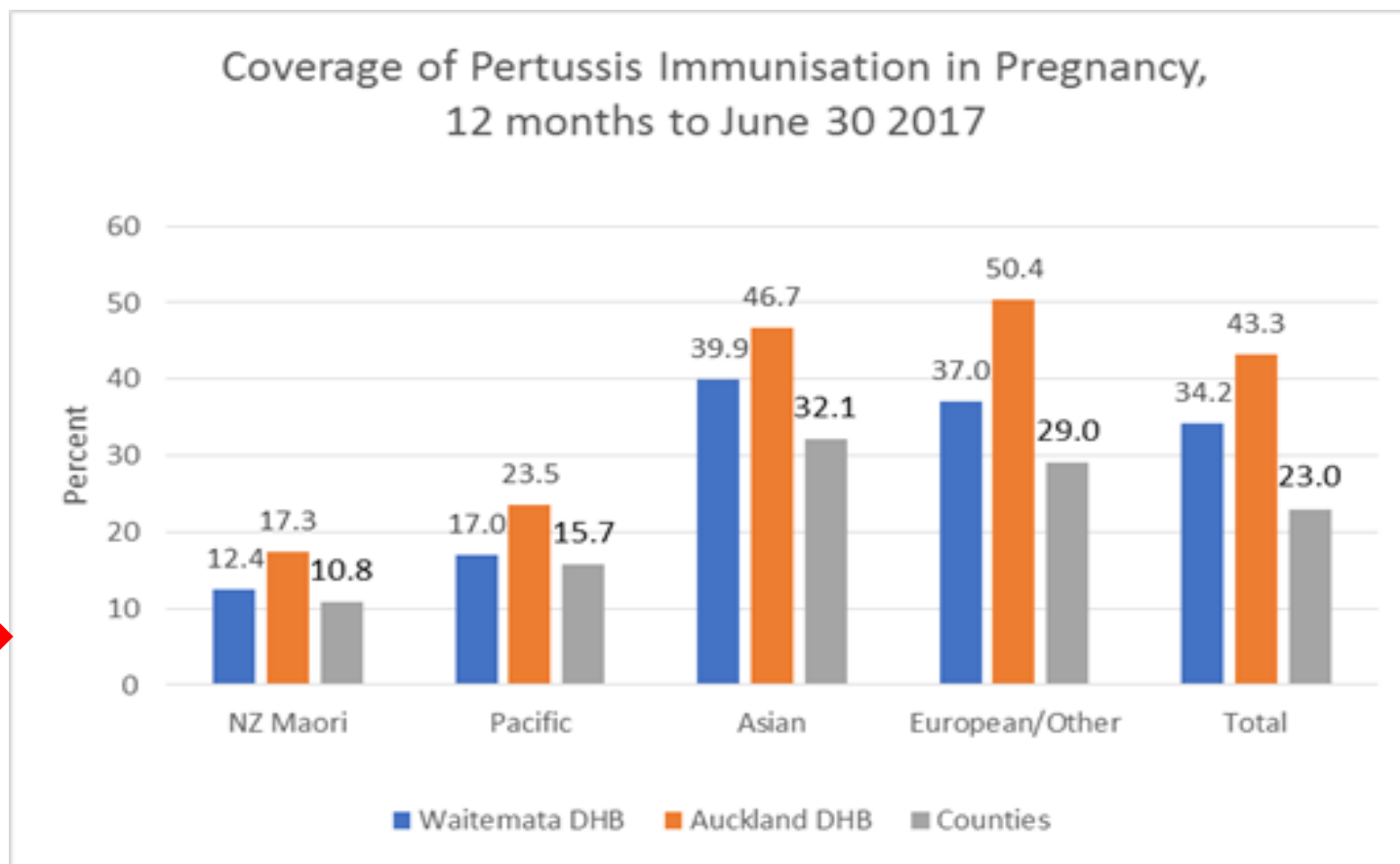
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- Increases maternal antibodies within 7-14 days.
- Transplacental transfer increases protective antibody levels in newborns.
- Timing: 28-30 weeks best, works well from 16 weeks.



- It's safe for mum and baby
- It's effective
 - Large scale studies in the UK and Wales have shown the maternal vaccination strategy to be safe and effective at preventing newborn infants from pertussis (VE of 91-93%)
- Recommended for every pregnancy
- Fully funded from 2nd trimester by Ministry of Health

But, its not (yet) being given much



- A missed opportunity to protect those at most risk
- Suboptimal system of delivery for vaccine to pregnant women
- Call and recall mechanisms in primary care can increase maternal vaccination rates.
- NZ risk factors for not being boosted in pregnancy:
 - Lack of patient awareness of the vaccine¹
 - lack of a clear recommendation from a health professional¹
 - Pregnant woman not being recalled to her GP for vaccination²

1. Hill L. 2015. Factors Influencing Women's Decisions about Having the Pertussis Containing Vaccine during Pregnancy [Masters of Health Science]. Christchurch, New Zealand: University of Otago.

2. Deverall, E. J., Gilmore, B., Illing, S., & Peiris-John, R. (2018). Pertussis vaccination uptake in pregnancy: lessons to be learned from an integrated healthcare approach. *The New Zealand Medical Journal*, 131(1473), 42–47.

1. On time immunisation is still the best protection
2. Don't do serology
3. Our strategy = protecting the vulnerable (< 12 months)
4. Watch out for a spring surge
5. Maternal vaccination is the best new intervention in this area in two decades.