PUBLIC HEALTH SERVICES

Primary Health Tasmania

Immunisation Update

April 2019

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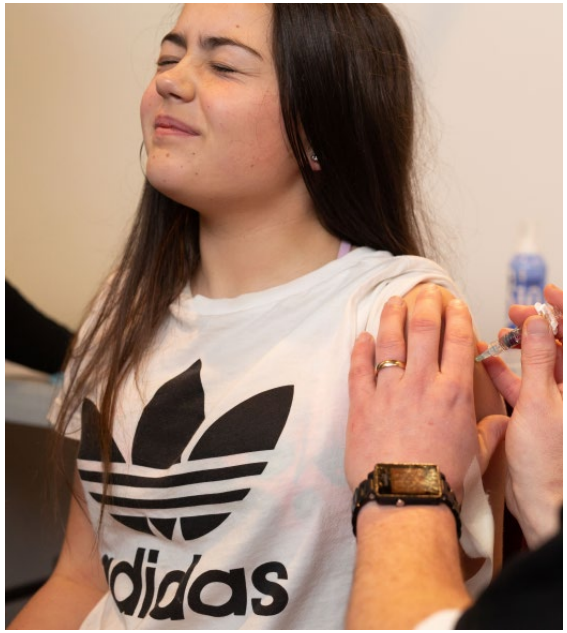
Overview

- Meningococcal ACWY update:
  - Epidemiology and Public Health response
  - Introduction of Year 10 and catch up for 15-19 years on the National Immunisation Program (NIP)

- Immunisation update -
  - Immunisation schedule changes/new look schedule
  - Hepatitis A for MSM
  - Flu 2019
  - Yellow Fever (changes to accreditation/requirements)
  - Australian Immunisation Register (AIR)
  - Vaccine management

- Pertussis update – Epidemiology and Public Health response
- Measles
- Australian Bat Lyssavirus
- Tasmanian Immunisation Strategy
- Questions

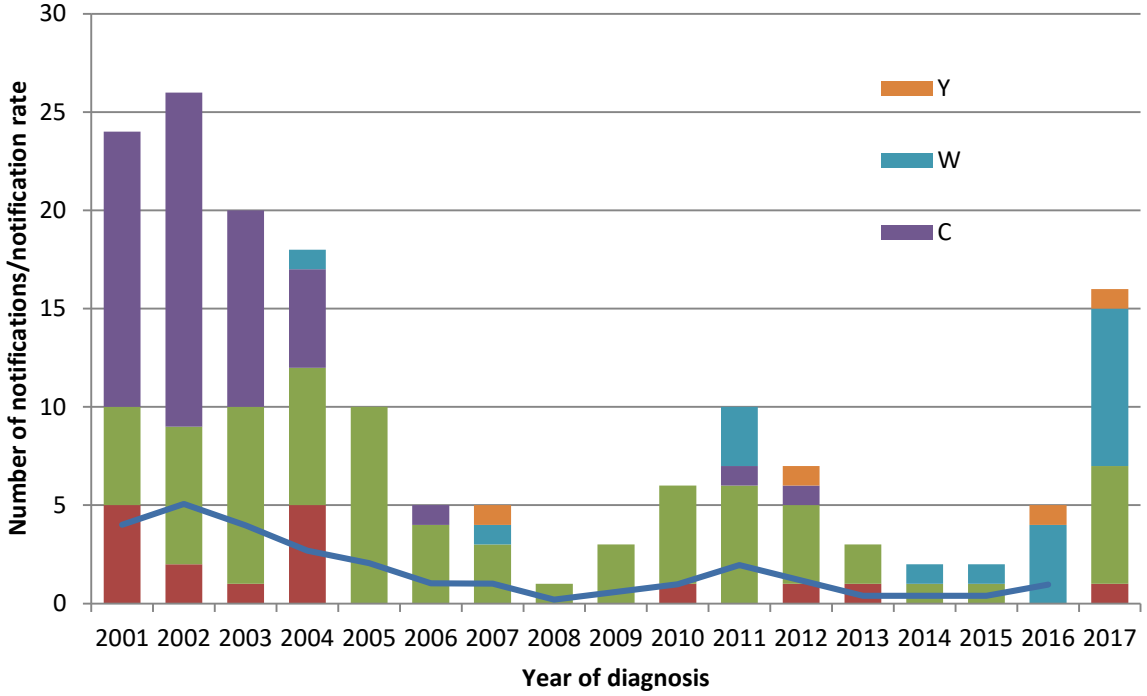


MENINGOCOCCAL DISEASE

Epidemiology and public health response

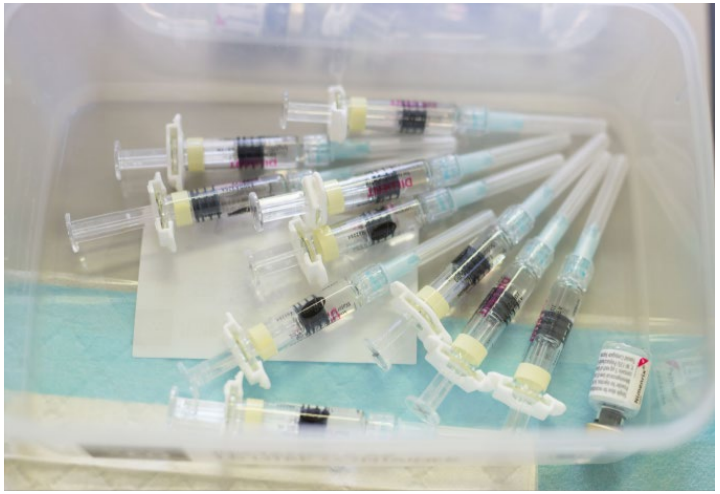
Epidemiology – Tasmania

Notifications of IMD in Tasmania by serogroup, year and notification rate, 2001 to 2017 YTD (25 Sept)



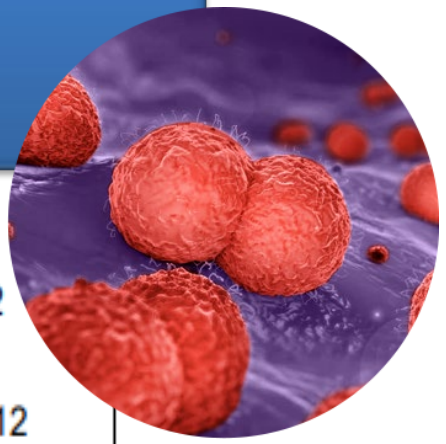
Implications for Tasmania 2017

- Low case numbers
- High population-based rate
- Rapid rise in incidence
- Wide geographical spread
- Wide age range
- No epidemiological links
- No travel



Local transmission of the disease within Tasmania
Vaccination is the only intervention available

Multiple jurisdictions undertook same program in 2017



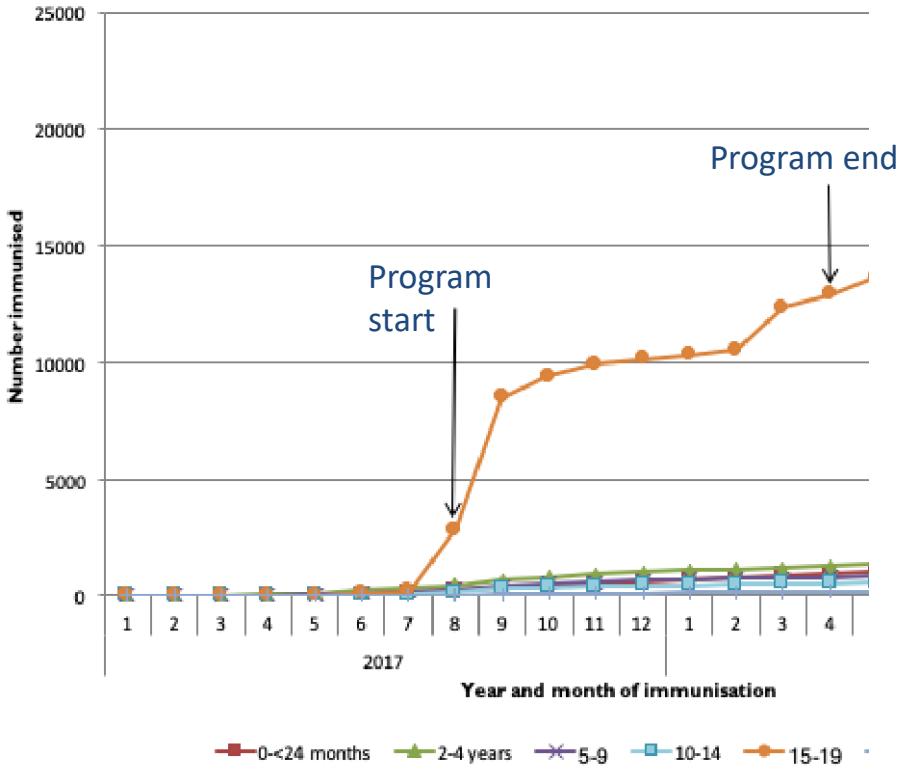
January	Meningococcal A, C, Y, W-135 conjugate vaccine funded by WA for grade 10–12 students and persons aged 15–19 years who no longer attend school
February	Meningococcal A, C, Y, W-135 conjugate vaccine funded by NSW for grade 11–12 students and persons aged 15–19 years who no longer attend school
February	Meningococcal A, C, Y, W-135 conjugate vaccine funded by VIC for grade 10–12 students and persons aged 15–19 years who no longer attend school
February	Meningococcal A, C, Y, W-135 conjugate vaccine funded by QLD for grade 10 students and persons aged 15–19 years who no longer attend school
July	Meningococcal A, C, Y, W-135 conjugate vaccine funded by TAS for grade 10–12 students and persons aged 15–19 years who no longer attend school

Ref: NCIRS. History of immunisation in Australia. Meningococcal. http://www.ncirs.org.au/health-professionals/history-immunisation-australia

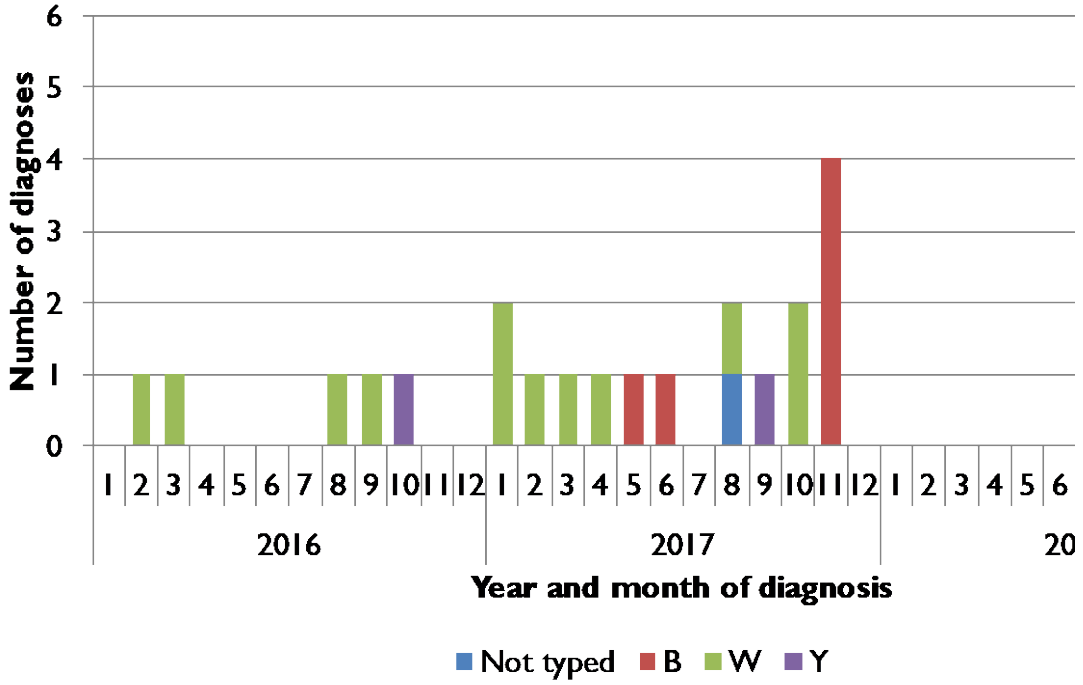
Tasmanian Immunisation Program 2017

- School-based immunisation program
- Year 10, 11 and 12
- Term 3, 2017 – Term 1, 2018
- Also from GP or council vaccination clinic

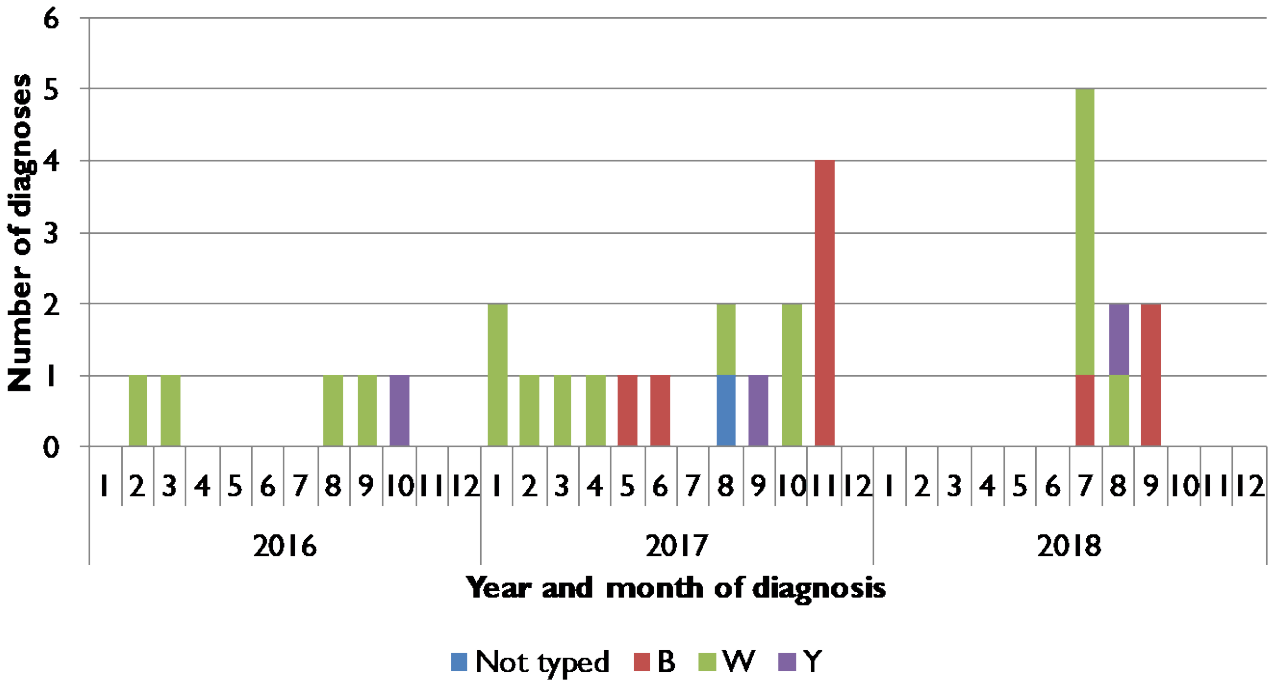
Number of 15-19 yo immunised Aug 2017 to April 2018



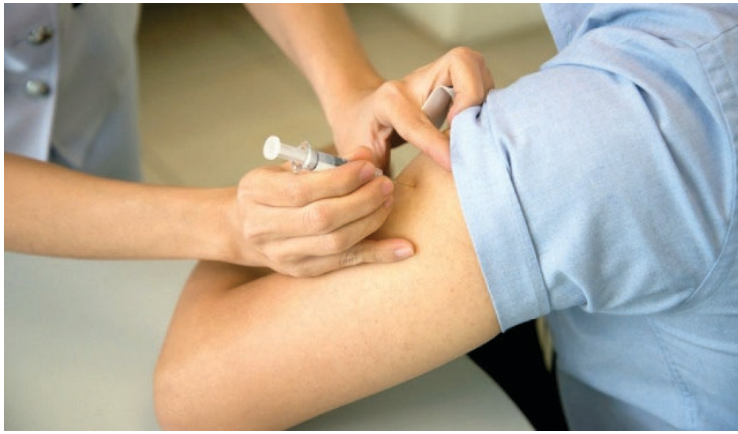
IMD by serotype - 2016 to June 2018



IMD by serotype - 2016 to 2018 YTD



Meningococcal ACWY Immunisation Program 2018



Aim:

Prevent cases of IMD

- Protect individuals
- Protect wider community

Objective:

Immunise 6 weeks to 21 years old

Announced 26 July 2018

Total cohort: 136,289

Progress

- Across Tasmania, vaccination numbers by age group are as follows (as at 29 January 2019):

Age Group (years)	Number vaccinated	Number of Tasmanians in the age group	Percentage vaccinated (%)	Number yet to be vaccinated
0 – under 2	10494	11944	**88%**	1450
2-4	13673	17915	**76%**	4242
5-9	23430	32258	**73%**	8828
10-14	23177	31232	**74%**	8055
15-19	22721	31790	**71%**	9069
20	2273	6338	**36%**	4065
Total	**95 768**	**131 477**	**73%**	35 709

National Immunisation Program Schedule

From 1 July 2018

Australian Government
Department of Health

National Immunisation Program
A joint Australian, State and Territory Government initiative

Age	Disease	Vaccine Brand
Childhood vaccination (also see influenza vaccine)		
Birth	• Hepatitis B (usually offered in hospital)[a]	H-B-Vax® II Paediatric or Engerix B® Paediatric
2 months Can be given from 6 weeks of age	• Diphtheria, tetanus, pertussis (whooping cough), hepatitis B, polio, *Haemophilus influenzae* type b (Hib) • Pneumococcal • Rotavirus[b]	Infanrix® hexa Prevenar 13® Rotarix®
4 months	• Diphtheria, tetanus, pertussis (whooping cough), hepatitis B, polio, *Haemophilus influenzae* type b (Hib) • Pneumococcal • Rotavirus[b]	Infanrix® hexa Prevenar 13® Rotarix®
6 months	• Diphtheria, tetanus, pertussis (whooping cough), hepatitis B, polio, *Haemophilus influenzae* type b (Hib)	Infanrix® hexa
Additional vaccines for Aboriginal and Torres Strait Islander children (QLD, NT, WA and SA) and medically at-risk children[c]	• Pneumococcal	Prevenar 13®
12 months	• Meningococcal ACWY • Measles, mumps, rubella • Pneumococcal	Nimenrix® M-M-R® II or Priorix® Prevenar 13®

April 2019 National Immunisation Program schedule changes

What are the changes?

Meningococcal ACWY vaccine - Nimenrix

- Given at 12 months of age (introduced July 2018)
- 1 April 2019 – All year 10 students and catch up for 15 - 19 year olds

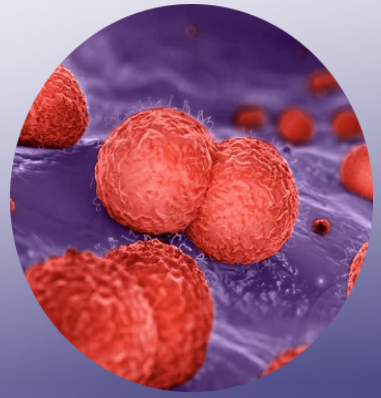
State-funded Program Meningococcal Program

State funded program will continue while there is still vaccine available to anyone from age 6 weeks to 20 years

- Children under 12 months will need more than one dose

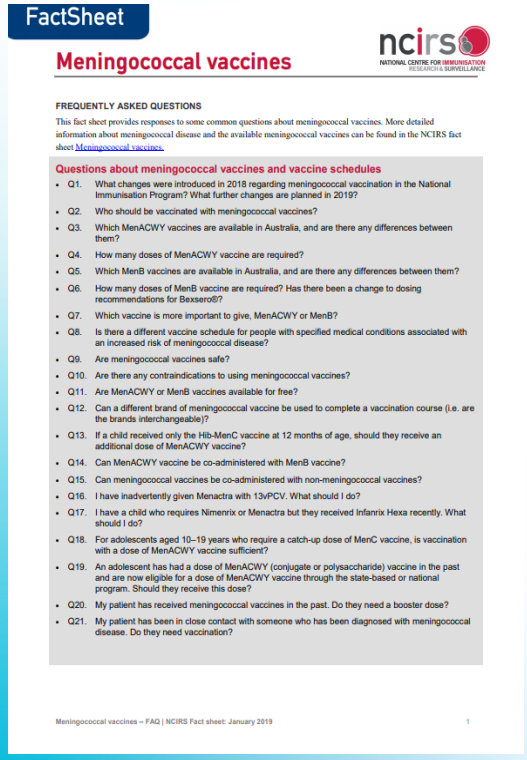
Pertussis in Pregnancy

- Vaccine now recommended from 20 to 32 weeks gestation
- Videos available for pregnant women on the Aust Gov Immunisation website



Meningococcal Fact Sheet

- National Centre for Immunisation Research and Surveillance (NCIRS) – www.ncirs.org.au



FactSheet

ncirs NATIONAL CENTRE FOR IMMUNISATION RESEARCH & SURVEILLANCE

Meningococcal vaccines

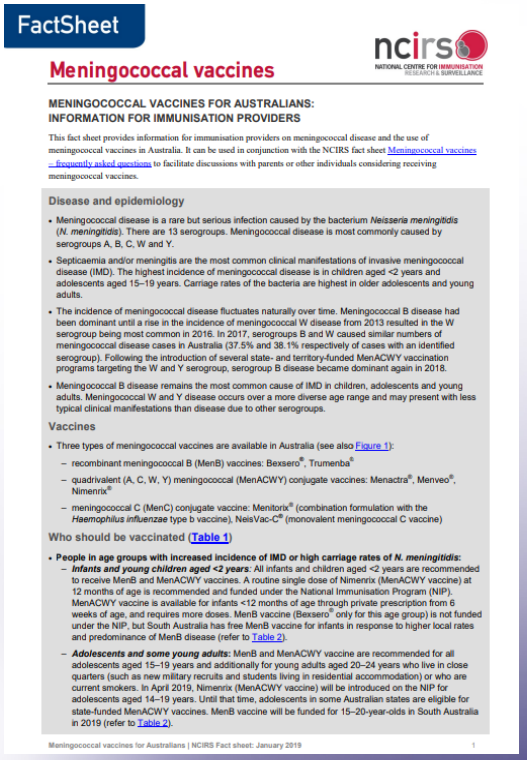
FREQUENTLY ASKED QUESTIONS

This fact sheet provides responses to some common questions about meningococcal vaccines. More detailed information about meningococcal disease and the available meningococcal vaccines can be found in the NCIRS fact sheet Meningococcal vaccines.

Questions about meningococcal vaccines and vaccine schedules

- Q1. What changes were introduced in 2018 regarding meningococcal vaccination in the National Immunisation Program? What further changes are planned in 2019?
- Q2. Who should be vaccinated with meningococcal vaccines?
- Q3. Which MenACWY vaccines are available in Australia, and are there any differences between them?
- Q4. How many doses of MenACWY vaccine are required?
- Q5. Which MenB vaccines are available in Australia, and are there any differences between them?
- Q6. How many doses of MenB vaccine are required? Has there been a change to dosing recommendations for Bexsero®?
- Q7. Which vaccine is more important to give, MenACWY or MenB?
- Q8. Is there a different vaccine schedule for people with specified medical conditions associated with an increased risk of meningococcal disease?
- Q9. Are meningococcal vaccines safe?
- Q10. Are there any contraindications to using meningococcal vaccines?
- Q11. Are MenACWY or MenB vaccines available for free?
- Q12. Can a different brand of meningococcal vaccine be used to complete a vaccination course (i.e. are the brands interchangeable)?
- Q13. If a child received only the Hib-MenC vaccine at 12 months of age, should they receive an additional dose of MenACWY vaccine?
- Q14. Can MenACWY vaccine be co-administered with MenB vaccine?
- Q15. Can meningococcal vaccines be co-administered with non-meningococcal vaccines?
- Q16. I have inadvertently given Menactra with 13vPCV. What should I do?
- Q17. I have a child who requires Nimenrix or Menactra but they received Infanrix Hexa recently. What should I do?
- Q18. For adolescents aged 10–19 years who require a catch-up dose of MenC vaccine, is vaccination with a dose of MenACWY vaccine sufficient?
- Q19. An adolescent has had a dose of MenACWY (conjugate or polysaccharide) vaccine in the past and are now eligible for a dose of MenACWY vaccine through the state-based or national program. Should they receive this dose?
- Q20. My patient has received meningococcal vaccines in the past. Do they need a booster dose?
- Q21. My patient has been in close contact with someone who has been diagnosed with meningococcal disease. Do they need vaccination?

Meningococcal vaccines – FAQ | NCIRS Fact sheet: January 2019 1



FactSheet

ncirs NATIONAL CENTRE FOR IMMUNISATION RESEARCH & SURVEILLANCE

Meningococcal vaccines

MENINGOCOCCAL VACCINES FOR AUSTRALIANS: INFORMATION FOR IMMUNISATION PROVIDERS

This fact sheet provides information for immunisation providers on meningococcal disease and the use of meningococcal vaccines in Australia. It can be used in conjunction with the NCIRS fact sheet Meningococcal vaccines – frequently asked questions to facilitate discussions with parents or other individuals considering receiving meningococcal vaccines.

Disease and epidemiology

- Meningococcal disease is a rare but serious infection caused by the bacterium *Neisseria meningitidis* (*N. meningitidis*). There are 13 serogroups. Meningococcal disease is most commonly caused by serogroups A, B, C, W and Y.
- Septicaemia and/or meningitis are the most common clinical manifestations of invasive meningococcal disease (IMD). The highest incidence of meningococcal disease is in children aged <2 years and adolescents aged 15–19 years. Carriage rates of the bacteria are highest in older adolescents and young adults.
- The incidence of meningococcal disease fluctuates naturally over time. Meningococcal B disease had been dominant until a rise in the incidence of meningococcal W disease from 2013 resulted in the W serogroup being most common in 2016. In 2017, serogroups B and W caused similar numbers of meningococcal disease cases in Australia (37.5% and 38.1% respectively of cases with an identified serogroup). Following the introduction of several state- and territory-funded MenACWY vaccination programs targeting the W and Y serogroup, serogroup B disease became dominant again in 2018.
- Meningococcal B disease remains the most common cause of IMD in children, adolescents and young adults. Meningococcal W and Y disease occurs over a more diverse age range and may present with less typical clinical manifestations than disease due to other serogroups.

Vaccines

- Three types of meningococcal vaccines are available in Australia (see also Figure 1):
  - recombinant meningococcal B (MenB) vaccines: Bexsero®, Trumenba®
  - quadrivalent (A, C, W, Y) meningococcal (MenACWY) conjugate vaccines: Menactra®, Menveo®, Nimenrix®
  - meningococcal C (MenC) conjugate vaccine: Menitorix® (combination formulation with the *Haemophilus influenzae* type b vaccine), NeisVac-C® (monovalent meningococcal C vaccine)

Who should be vaccinated (Table 1)

- **People in age groups with increased incidence of IMD or high carriage rates of *N. meningitidis*:**
  - ***Infants and young children aged <2 years***: All infants and children aged <2 years are recommended to receive MenB and MenACWY vaccines. A routine single dose of Nimenrix (MenACWY vaccine) at 12 months of age is recommended and funded under the National Immunisation Program (NIP). MenACWY vaccine is available for infants <12 months of age through private prescription from 6 weeks of age, and requires more doses. MenB vaccine (Bexsero® only for this age group) is not funded under the NIP, but South Australia has free MenB vaccine for infants in response to higher local rates and predominance of MenB disease (refer to Table 2).
  - ***Adolescents and some young adults***: MenB and MenACWY vaccine are recommended for all adolescents aged 15–19 years and additionally for young adults aged 20–24 years who live in close quarters (such as new military recruits and students living in residential accommodation) or who are current smokers. In April 2019, Nimenrix (MenACWY vaccine) will be introduced on the NIP for adolescents aged 14–19 years. Until that time, adolescents in some Australian states are eligible for state-funded MenACWY vaccines. MenB vaccine will be funded for 15–20-year-olds in South Australia in 2019 (refer to Table 2).

Meningococcal vaccines for Australians | NCIRS Fact sheet: January 2019 1

Meningococcal dose schedule recommendations

MenACWY

Table 3: Dose schedule recommendations for immunisation using MenACWY vaccines, by age and vaccine brand, the number of doses required and minimum intervals

Age at commencement of vaccine course	MenACWY vaccine brand	Healthy individuals, including Aboriginal and Torres Strait Islander people, travellers and laboratory personnel	With any specified medical conditions associated with increased risk of meningococcal disease (see footnote Table 1)
6 weeks–5 months	Menveo*	3 doses (8 weeks between 1st and 2nd doses; 3rd dose at 12 months of age)	4 doses (8 weeks between doses; 4th dose at 12 months of age or 8 weeks after 3rd dose, whichever is later)
	Nimenrix		
6–8 months	Menveo*	2 doses (2nd dose at 12 months of age)	3 doses (8 weeks between 1st and 2nd doses; 3rd dose at 12 months or 8 weeks after 2nd dose, whichever is later)
	Nimenrix		
9–11 months	Menveo	2 doses (2nd dose at 12 months of age or 8 weeks after 1st dose, whichever is later)	3 doses (8 weeks between each dose)
	Nimenrix		
	Menactra#		
12–23 months	Menveo	2 doses (8 weeks between doses)	2 doses (8 weeks between doses)
	Menactra#	2 doses (8 weeks between doses)	
	Nimenrix	1 dose	
≥2 years‡	Menveo	1 dose	2 doses (8 weeks between doses)
	Menactra#‡		
	Nimenrix		
Booster doses for all ages	Any brand	Required only for travellers and laboratory personnel facing ongoing risks, who completed the primary series at: a) ≤6 years of age: 3 years after completion of primary immunisation schedule, then every 5 years thereafter b) ≥7 years of age: every 5 years after completion of the primary immunisation schedule	For those with ongoing increased risk for IMD who completed the primary series at: a) ≤6 years of age: 3 years after completion of primary immunisation schedule, then every 5 years thereafter b) ≥7 years of age: every 5 years after completion of the primary immunisation schedule

* The product information for Menveo states that infants aged 2–6 months should receive 3 primary doses and a booster dose at age 12 months. However, ATAGI recommends that healthy infants aged 6 weeks–5 months should receive 2 primary doses (8 weeks apart) and a booster dose at age 12 months. ATAGI also recommends that healthy infants aged 6–11 months should receive 1 primary dose and a booster dose at age 12 months

Do not co-administer Menactra with 13vPCV (Prevenar 13). Ideally Menveo or Nimenrix should be used instead. If only Menactra is available, 13vPCV should be given first followed by Menactra, with a minimum interval of 4 weeks between the dose of 13vPCV and Menactra . If Menactra is inadvertently co-administered, a repeat of the 13vPCV dose ≥8 weeks after the first 13vPCV dose may be required.

‡ Menveo and Nimenrix are preferred, if available, in individuals aged ≥2 years. If unavailable, use Menactra.

§ There is no registered upper age limit for use of Menveo or Nimenrix. Although Menactra is registered for use up to 55 years of age only, it can be given to people older than 55 years, as per *The Australian Immunisation Handbook*.

MenB

Table 4: Recommended brands and doses of MenB vaccine by age group in healthy individuals or those with any specified medical conditions associated with increased risk of meningococcal disease

Age at commencement of vaccine course	Brands registered for use in Australia	Number of doses required	Recommended interval between doses	Notes
6 weeks–5 months	Bexsero®	3 (healthy) 4 (increased risk)	8 weeks	8 weeks between doses; last dose at 12 months Refer to footnote in Table 1 for conditions with increased IMD risk
6–11 months	Bexsero®	3	8 weeks	8 weeks between 1st and 2nd doses; 3rd dose at 12 months or 8 weeks after 2nd dose, whichever is later
12–23 months	Bexsero®	2	8 weeks	
2–9 years	Bexsero®	2	8 weeks	The recommended interval is 8 weeks. The minimum interval is 4 weeks.
≥10 years*	Bexsero®	2	8 weeks	The recommended interval is 8 weeks. The minimum interval is 4 weeks.
	Trumenba®	2 (healthy) 3 (increased risk, see note)	6 months (2 doses); see note for 3 dose schedule	For those with specified medical conditions (refer to footnote in Table 1), 3 doses are required (at least 4 weeks between 1st and 2nd doses; 3rd dose at least 4 months after 2nd dose and at least 6 months after 1st dose)

* Bexsero® and Trumenba® are not interchangeable. The same vaccine should be used to complete the vaccination course.
Note: The requirement for booster doses with MenB vaccine has not yet been determined, and at present booster doses are not recommended.

Hepatitis A Vaccine for MSM

Hepatitis A vaccine for MSM

- Program initiated May 2018 as a result of a national outbreak of Hep A in Men who have sex with men (MSM)
- No reported cases in Tasmania
- Program will run until 30 April 2020
- Vaccine distributed to SHS and GP's (order through normal process) – continue to promote

Who is eligible?

All MSM aged 16 to 69 years of age

Seropositivity more likely in those born before 1950

Fact sheet available on DoH website

Hepatitis A vaccine for MSM

Which vaccine is being used?

Avaxim® (Sanofi Pasteur**)**

2 x funded doses

Administer at least 6 months apart

Single dose protects for up to 3 years before a booster is required

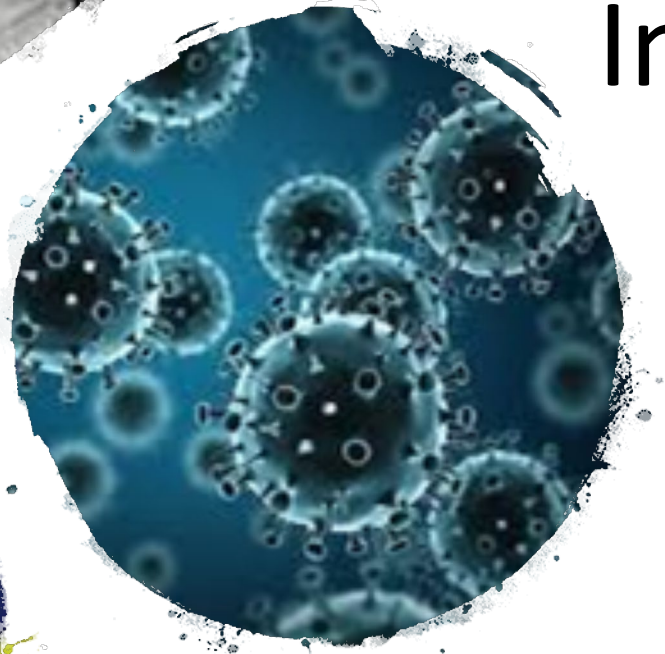
Seroprotection by day 14

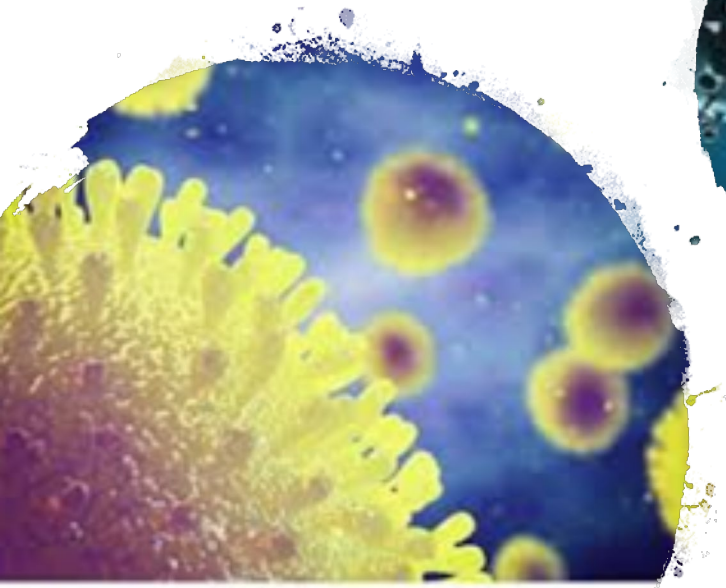
Hepatitis B vaccine for High Risk Groups

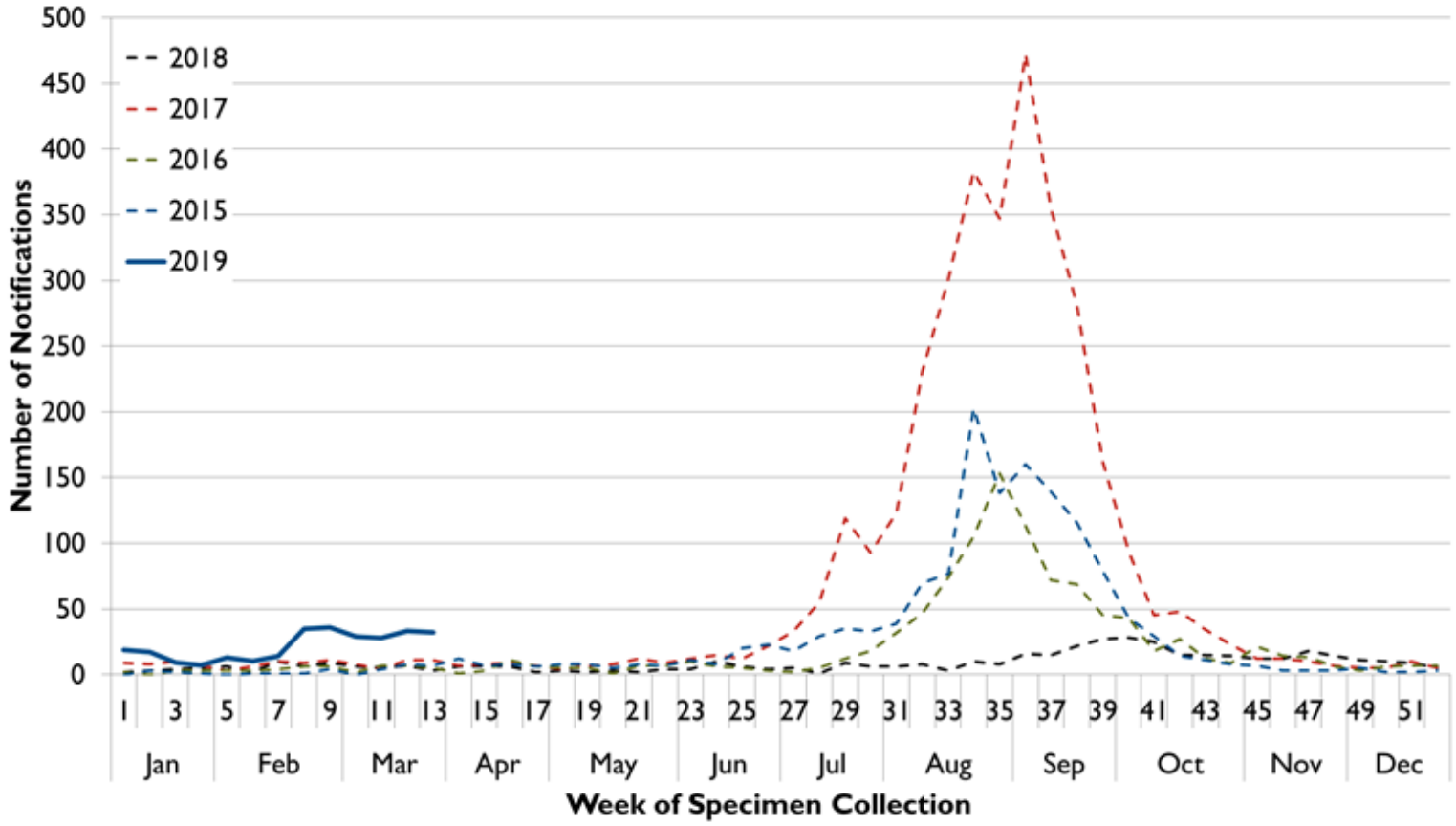
Continue to offer Hep B state-funded vaccine to high risk groups (Engerix B)

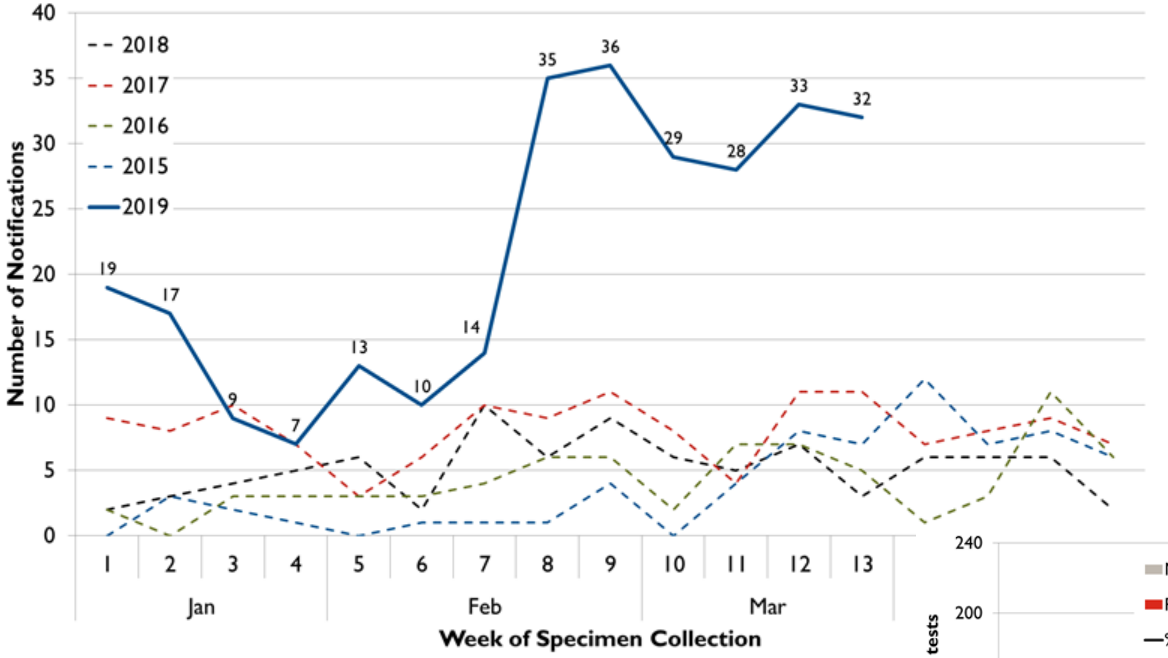
- Household contacts of people with HBV
- Sexual contacts of people with HBV
- Migrants and refugees from these high HBV endemic regions:
- Sub-Saharan Africa
- Pacific Islands
- East and South-East Asia (excluding Japan)
- Men who have sex with men
- Sex industry workers
- People who have HIV infection
- People who have hepatitis C infection
- People who inject drugs

Influenza






500
450
400
350
300
250
200
150
100
50
0
Number of Notifications
2018
2017
2016
2015
2019
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Week of Specimen Collection



Months in 2019:

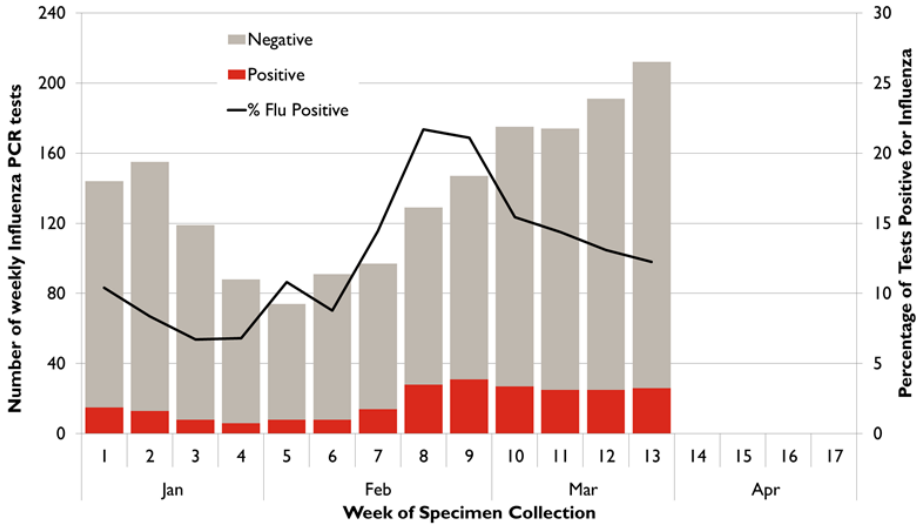
Jan	60
Feb	88
March	132

Weekly activity chart:

- activity plateaued during March

Statewide influenza PCR testing:

- testing activity increasing,
- detections stable (decreasing % positive)



Influenza vaccine 2019

- A (H1N1): an A/Michigan/45/2015 (H1N1)pdm09 like virus
- A (H3N2): an A/Switzerland/8060/2017 (H3N2) like virus
- B: a B/Colorado/06/2017 like virus (not included in the trivalent vaccine)
- B: a B/Phuket/3073/2013 like virus

- New A strain (H3N2) and a new strain for the B Victoria lineage.
- The trivalent influenza vaccines (TIV) cover the same two influenza A viruses in the QIVs; and one influenza B virus: B/Colorado/06/2017-like virus.

Influenza A – subtypes	Influenza B – lineages
A/H1N1pdm09	Victoria
A/H3N2	Yamagata

Influenza Vaccines

2019 INFLUENZA VACCINES AVAILABLE UNDER THE NIP, BY AGE

Before administering an influenza vaccine, CHECK you have the correct vaccine for the person's age

	Quadrivalent Vaccines				Trivalent vaccine (for age ≥65 years only)
Registered age group	**FluQuadri Junior 0.25mL (Sanofi)**	**Fluarix Tetra 0.50mL (GSK)**	**FluQuadri 0.50mL (Sanofi)**	**Afluria Quad 0.50mL (Seqirus)**	**Fluad 0.50mL (Seqirus)**
<6 months	X	X	X	X	X
6 to 35 months (<3 years)	✓	✓*	X	X	X
≥3 years to <5 years	X	✓	✓	X	X
≥5 years to <65 years	X	✓	✓	✓	X
≥65 years	X	✓	✓	✓	✓ (recommended)

*Note that Fluarix Tetra is a 0.50mL dose for children aged 6 to 35 months

2019 Seasonal Influenza Vaccines

Quadrivalent influenza vaccines for 6 months to under 3 years:

- FluQuadri Junior® (Sanofi Pasteur) – 0.25 ml dose
- Fluarix®Tetra (GSK) – 0.5 ml dose (previously from 3 years of age)

2019 Seasonal Influenza Vaccines

Quadrivalent influenza vaccines for under 65 years:

- FluQuadri® (Sanofi Pasteur) – from 3 years
- Fluarix® Tetra (GSK) – from 6 months
- Afluria Quad® (Seqirus) – from 5 years (previously from 18 years)

2019 Seasonal Influenza Vaccines

Trivalent influenza vaccine for people 65 years and older:

- Fluad® (Seqirus)

- Always check the barrel of the vaccine before each vaccination to ensure you administer the correct vaccine for the patient's age.

- As at today we have sent out nearly 50 000 doses

Influenza Vaccines

Points to note:

- Influenza vaccines are also available on the private market.
- In 2019 Fluad is the only NIP funded vaccine for those aged 65 years and over
- Fluzone High dose vaccine, which is also registered for people aged 65 years and over is only available on private purchase
- All Aboriginal and Torres Strait Islander people from 6 months are eligible for free vaccine

Timing of Flu vaccination

- Period of peak season for influenza circulation is typically June to September
- Optimal protection occurs within the first 3 to 4 months following immunisation
- Never too late to have a flu vaccine, however revaccination later in the same year for those who may have already received a vaccine is not routinely recommended, although not contraindicated
- Flu vaccine can be given to pregnant women at any stage of pregnancy and can be given with pertussis vaccine
- If a pregnant woman received a flu vaccine in late 2018, revaccinate with the 2019 influenza vaccine before the end of the pregnancy

6 month to less than five years flu

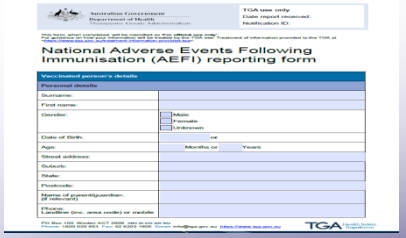
- Tasmanian State Government are funding free flu vaccine for all children 6months to <5years of age
- Two doses (if first year of ever receiving flu vaccine) are funded given at least a month apart <9yrs
- If only one vaccine was received in the first year of ever receiving the vaccine and missed second dose, they only require one in subsequent years
- Children receiving their first lifetime dose should be vaccinated as soon as possible to ensure they get their second dose before the influenza season commences
- Please remember vaccines are light sensitive – keep in original packaging

Adverse Events Following Immunisation (AEFI)

- Contact Public Health Services for all AEFI's relating to Influenza vaccine received by Infants and children 6months - <5years (PHS 1800 671 738)

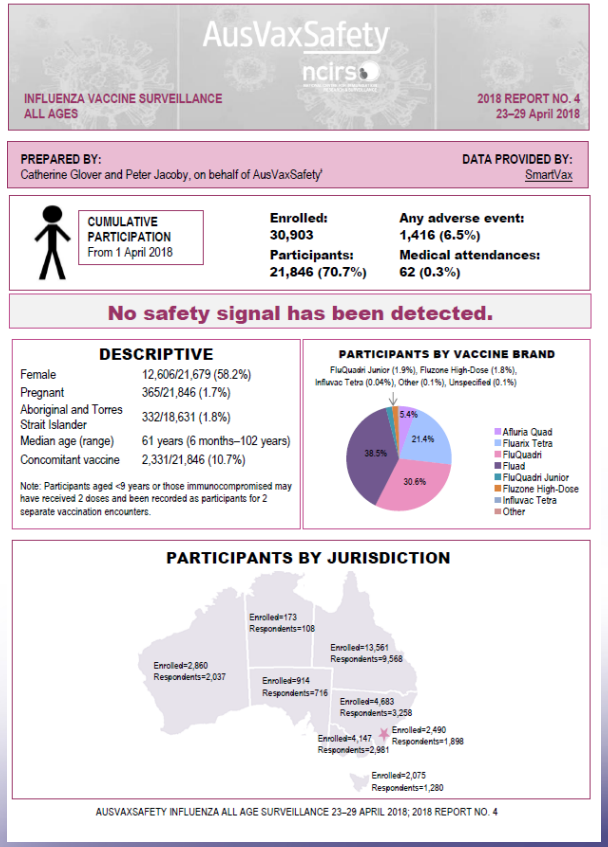
- AEFI surveillance – TGA and AusVax Safety monitoring incorrect administration of influenza vaccine given to children

- All other events should be reported directly to the Therapeutic Goods Administration
- https://www.tga.gov.au/form/national-adverse-events-following-immunisation-aefi-reporting-form


National Adverse Events Following Immunisation (AEFI) reporting form

Is the vaccine safe?

- Vaccines are registered and monitored by the TGA
- Adverse events are reported to the TGA
- AusVaxSafety – national program monitors unexpected events following immunisation and ensures prompt public health actions.



AusVaxSafety
ncirs

INFLUENZA VACCINE SURVEILLANCE
ALL AGES

2018 REPORT NO. 4
23–29 April 2018

PREPARED BY:
Catherine Glover and Peter Jacoby, on behalf of AusVaxSafety

DATA PROVIDED BY:
SmartVax

CUMULATIVE PARTICIPATION
From 1 April 2018

Enrolled: 30,903
Participants: 21,846 (70.7%)

Any adverse event: 1,416 (6.5%)
Medical attendances: 62 (0.3%)

No safety signal has been detected.

DESCRIPTIVE

Female	12,606/21,679 (58.2%)
Pregnant	365/21,846 (1.7%)
Aboriginal and Torres Strait Islander	332/18,631 (1.8%)
Median age (range)	61 years (6 months–102 years)
Concomitant vaccine	2,331/21,846 (10.7%)

Note: Participants aged <9 years or those immunocompromised may have received 2 doses and been recorded as participants for 2 separate vaccination encounters.

PARTICIPANTS BY VACCINE BRAND

FluQuadri Junior (1.9%), Fluzone High-Dose (1.8%), Influvac Tetra (0.04%), Other (0.1%), Unspecified (0.1%)

5.4%
21.4%
38.5%
30.6%

Afluria Quad
Fluarix Tetra
FluQuadri
Fluad
FluQuadri Junior
Fluzone High-Dose
Influvac Tetra
Other

PARTICIPANTS BY JURISDICTION

Enrolled=173
Respondents=108
Enrolled=13,561
Respondents=9,568
Enrolled=2,860
Respondents=2,037
Enrolled=914
Respondents=716
Enrolled=4,683
Respondents=3,258
Enrolled=2,490
Respondents=1,898
Enrolled=4,147
Respondents=2,981
Enrolled=2,075
Respondents=1,280

AUSVAXSAFETY INFLUENZA ALL AGE SURVEILLANCE 23–29 APRIL 2018; 2018 REPORT NO. 4

Influenza Vaccines

Influenza Vaccination Provider Toolkit – permission to reproduce from NSW Health.

- Assist with roll-out and implementation of flu program

What does the Toolkit contain?

Information regarding NIP vaccines

Getting Prepared for 2019 Flu season:

- How to order
- Vaccine Delivery
- Which patients to target for funded vaccine
- Flu outbreaks in Aged Care Facilities
- Optimum time for immunisation
- Reporting to the AIR
- Flu vaccine effectiveness and safety
- Reporting AEFI
- Cold chain management
- Flu Immunisation Decision Aid

Preparing for influenza outbreaks in RCF - CDPU perspective

Facilities with a management plan:

- quick response, antiviral stock on hand, orders in place, immunisation registers up to date

Facilities without a management plan:

- delayed recognition and testing, late implementation of infection control, poor documentation, low staff immunisation rates, poor communication

Communicable Diseases network AUSTRALIA

Guidelines for the Prevention, Control and Public Health Management of Influenza Outbreaks in Residential Care Facilities in Australia

http://www.health.gov.au/internet/main/publishing.nsf/Content/cdna-flu-guidelines.htm

Preparing for influenza outbreaks in RCF

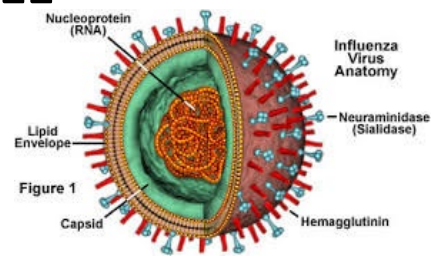
- Develop an **outbreak management plan**
- Include a medical practitioner in the development
- Acquire adequate stocks of personal protective equipment (PPE) and cleaning materials
- Ensure *at least 95%* of staff and residents are immunised
- Encourage staff, family members and regular visitors such as hairdressers etc to be immunised
- Keep immunisation records for staff and residents up-to-date

Antiviral medications for treatment

- Residents' GPs are responsible for prescribing antiviral medications
- Early initiation (within 48 hours of symptom onset) reduces the risk of secondary complications requiring antibiotic therapy, and hospitalisation
- In the context of an influenza outbreak, consider treatment on syndromic grounds, particularly for individuals with underlying chronic conditions

Antiviral use for prophylaxis

- Widespread use in institutions supported by cohort studies and one RCT
- Only use in addition to other outbreak control measures
- Provide to ALL *asymptomatic* residents and ALL *unimmunised* staff
- Commence **within 24 hours**
- Consider medication safety
- RCF staff - aware of the most common side effects



Note: Antiviral medications are generally costly and may not be readily available, especially in bulk quantities, from community pharmacies.

Is the vaccine effective?

Influenza Season†	Reference	No. of Patients‡	Adjusted Overall VE (%)	95% CI
2004-05	Belongia 2009	762	10	-36, 40
2005-06	Belongia 2009	346	21	-52, 59
2006-07	Belongia 2009	871	52	22 ,70
2007-08	Belongia 2011	1914	37	22, 49
2008-09	Unpublished	6713	41	30, 50
2009-10	Griffin 2011	6757	56	23, 75
2010-11	Treanor 2011	4757	60	53, 66
2011-12	Ohmit 2014	4771	47	36, 56
2012-13	McLean 2014	6452	49	43, 55
2013-14	Gaglani 2016	5999	52	44, 59
2014-15	Zimmerman 2016	9311	19	10, 27
2015-16*	Jackson 2017	6879	48*	41, 55*

*Estimate from Nov 2, 2015–April 15, 2016. **As presented at June 21, 2017 ACIP meeting

INFECTIOUS DISEASE

Why is the flu vaccine so mediocre?

The complex factors behind failure are coming into sharper focus

By **Jon Cohen**

The influenza virus has yet to hit the Northern Hemisphere, but flu vaccine season is already in full swing, with banners outside pharmacies urging: "Get Your Flu Shot Now." What's not advertised, however, is just how lackluster the vaccine is. The most commonly used flu shots protect no more than 60% of people who receive them; some years, effectiveness plunges to as low as 10%. Given that a bad flu season can kill 50,000 people in the United States alone, "10% to 60% protection is better than nothing," says Michael Osterholm, an epidemiologist at the University of Minnesota in Minneapolis. "But it's a terribly inadequate vaccine for a serious public health threat." Now, researchers are striving to understand why it fails so often—and how to make a markedly better one.

They're questioning what was once received wisdom: that the vaccine fails when manufacturers, working months ahead of flu season, incorrectly guess which strains will end up spreading. And they're learning instead that the vaccine may falter even when the right strains were used to make it, perhaps because of how it is produced or quirks of individual immune systems. "It's much more complicated than we thought," Osterholm says. "I know less about influenza today than I did 10 years ago."

The influenza vaccine teaches the body to produce antibodies against the head of the virus's surface protein, hemagglutinin (HA). Those antibodies ideally prevent HA from attaching to cellular receptors, thwarting infection. But HA's head is highly mutable, which is why vaccinemakers must come up with a new formula every year.

For many decades, researchers believed the flu vaccine offered solid protection if it was a good match to the circulating strains; studies from the 1940s through the 1960s routinely showed an efficacy of 70% to 90%. But those studies relied on a misleading methodology. Without a simple way to detect the virus in the blood, researchers measured antibody levels, looking for a spike that occurs after infection. Then in the 1990s, sensitive polymerase chain reaction tests enabled researchers to actually measure viral levels, and they told a different story. It turned out that some people who did not have the big antibody spike after exposure—and were therefore counted as a vaccine success—actually did show a jump in viral levels, signaling infection. Earlier assessments had exaggerated vaccine efficacy. What's more, efficacy was sometimes low even when the vaccine and circulating strains appeared well matched. Something else was afoot.

The circulating strains continue to mutate after the vaccine is made, and the resulting "escape mutants" are often blamed for vaccine failure. But Arnold Monto, an epidemiologist at the University of Michigan School of Public Health in Ann Arbor, is skeptical that escape mutants play a major role. In a preprint published 15 August on bioRxiv, his team reports sequencing influenza DNA from 249 viral specimens collected from people over five influenza seasons. They found loads of HA mutations, as expected, but most weakened the virus, making it "unfit," meaning it could not transmit human to human. Viable escape mutants, Monto concludes, are too rare to explain the failures seen year after year.

Danuta Skowronski, an epidemiologist at the BC Centre for Disease Control in Vancouver, Canada, instead blames mutations in the vaccine strain itself. The most common influenza vaccine contains an "inactivated" virus, which manufacturers grow in chicken eggs. As Skowronski's team first reported in 2014, the virus can mutate while it is growing in the eggs, resulting in a vaccine unable to block circulating strains.


When flu virus is grown in eggs to make the vaccine, mutations can occur in key places (red) on the viral surface protein hemagglutinin, which undermine the shot's protective powers.

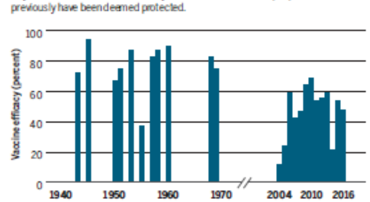
"I think [these mutations] play an enormous role," says viral immunologist Scott Hensley of the University of Pennsylvania. He has preliminary evidence that egg-adapted mutations were behind the weak protection seen with the vaccine used in the 2016–17 season, he says. He also points to a recent study by another group that compared an egg-grown vaccine with one that contained genetically engineered HA, which sidesteps the mutation issue. The engineered vaccine offered more solid protection. That suggests a way to improve current vaccines, Hensley says. "I'd be shocked in 15 years if any of our flu vaccines are grown in eggs."

Hensley notes another way to reduce the odds of failure: improving the techniques for choosing the vaccine strains. Vaccinemakers largely rely on an old technique that exposes ferrets—which differ from humans—to candidate vaccine strains and then assesses whether they can stop viral isolates from people naturally infected with the circulating strains. Genetic comparisons, he says, would yield a better match.

Understanding the immune responses that correlate with protection could also help refine vaccines. Immune responses to targets other than HA's head, including HA's stem and a second viral surface protein, neuraminidase, receive scant attention. Further complicating the picture is the immunologic legacy of multiple exposures to influenza each

Loss of confidence

For decades, tests suggested the flu vaccine worked extremely well, but in the past 15 years a better test revealed many infections in vaccinated people who would previously have been deemed protected.



Published by AAAS

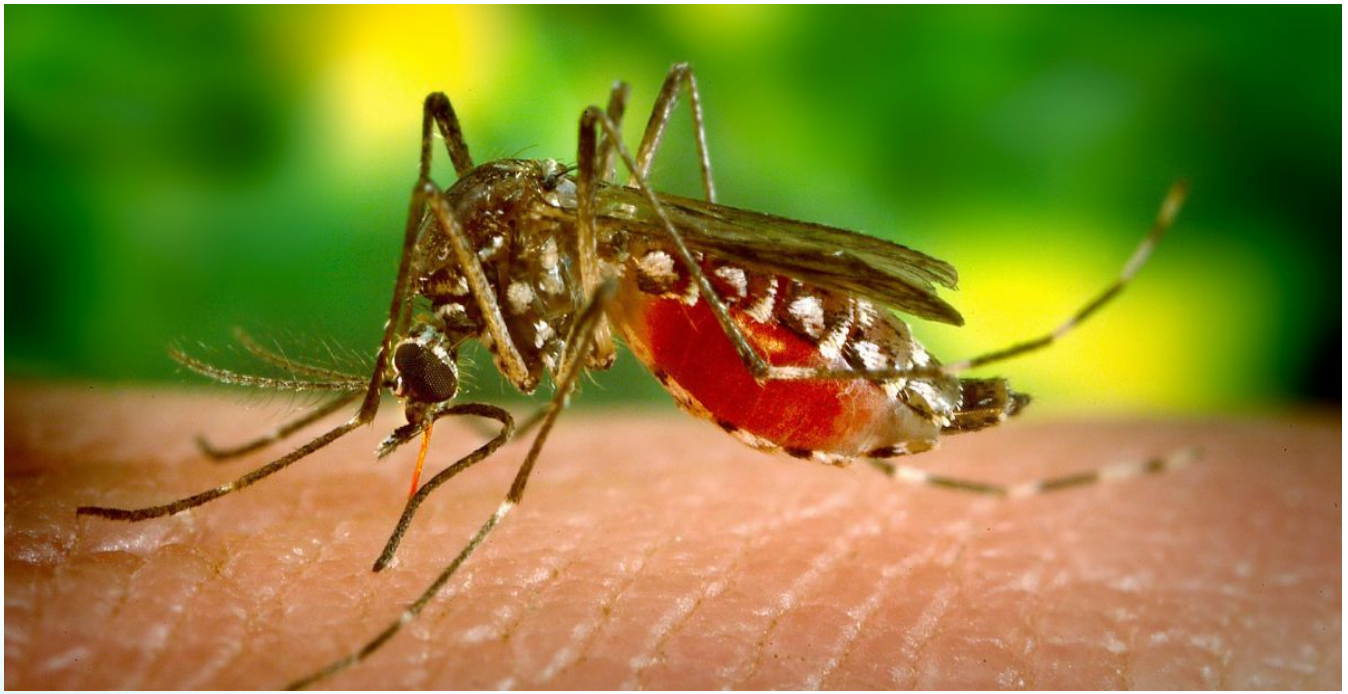
Influenza

www.flu.tas.gov.au

New look Tasmanian Immunisation Schedule

Arriving to your practice very soon

Yellow Fever Accreditation Changes



Yellow Fever – Accreditation changes

- Effective November 2018 – new training requirement for prescribers of the yellow fever vaccine
- Commonwealth developed *National Guidelines for Yellow Fever Vaccination centres and Providers* – available at www.health.gov.au

Who does this apply to?

- All medical practitioners and nurse practitioners prescribing yellow fever vaccine are required to complete the online Yellow Fever Vaccination Course
- Course is available free to anyone who wished to complete for own learning and development

How long do you have to complete the course?

- Currently prescribing the vaccine – you have three years to complete the course
- If you have never prescribed and intend to practice at a YF Vaccination Centre – you need to complete the course before prescribing the vaccine

Yellow Fever – Accreditation changes

The Course:

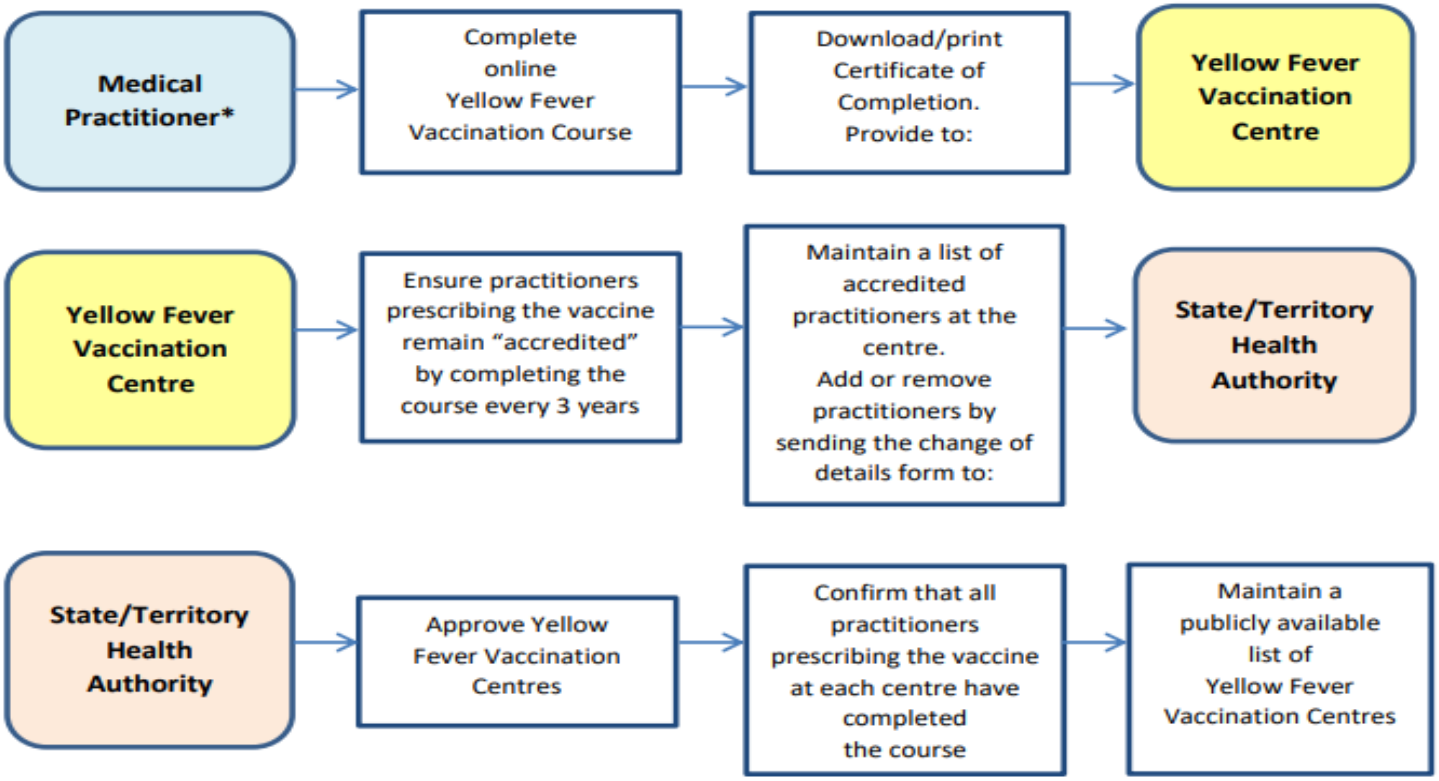
- Hosted on the Australian College of Rural and Remote Medicine online learning platform
- Accreditation is valid for three years, after which you have to complete the course again
- The *National Guidelines for Yellow Fever Vaccination Centres and Providers* provide a nationally consistent approach
- Accreditation of vaccination centres and providers is at the discretion of the relevant state/territory health authority

How to become a Yellow Fever Vaccination Centre

- Applications made to CDPU
- Contact CDPU if you wish to apply – have our own policy/paperwork

YF Administrative Responsibilities

Administrative Responsibilities for Individual Accreditation: Roles of Practitioners, Yellow Fever Vaccination Centres and State/Territory Health Authorities

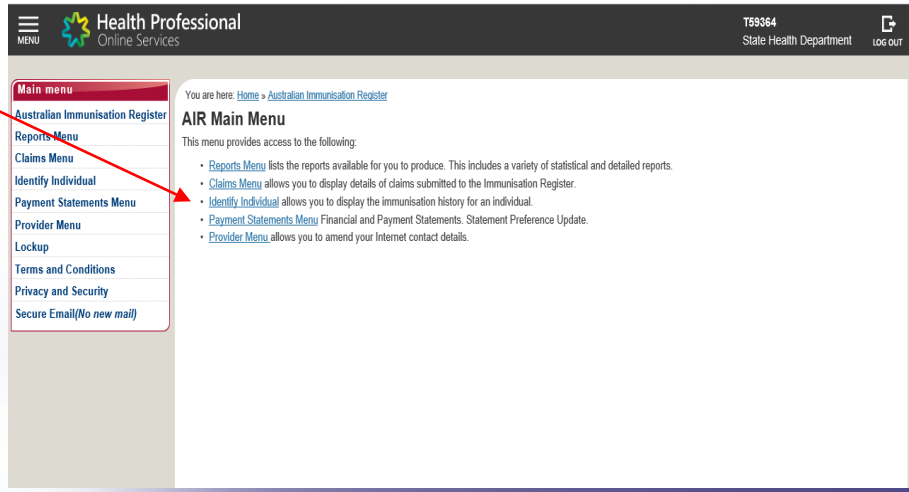


Australian

Immunisation Register

Australian Immunisation Register

- The AIR is now a whole of life register
- 3 ways to record information to AIR:
  - Ensure you are using the latest version of your practice management software to ensure you have up to date vaccine codes-
  - Use the AIR site. Record immunisation details using the identify individual and record encounter functions.
  - Complete an AIR immunisation encounter form
- Providers are reminded to report **all** vaccines given to all people regardless of age to the AIR
- Upload regularly – ensure data sent
- AIR eLearning education modules



Note:

Enter Act-Hib as dose 4

(it is the fourth Hib dose)

Vaccine Management

Vaccine Management

Tasmania is measured on vaccine wastage and leakage –

- Ensure vaccines are not leaked
- Rotate vaccines regularly so they do not expire

Formula for ordering vaccine:

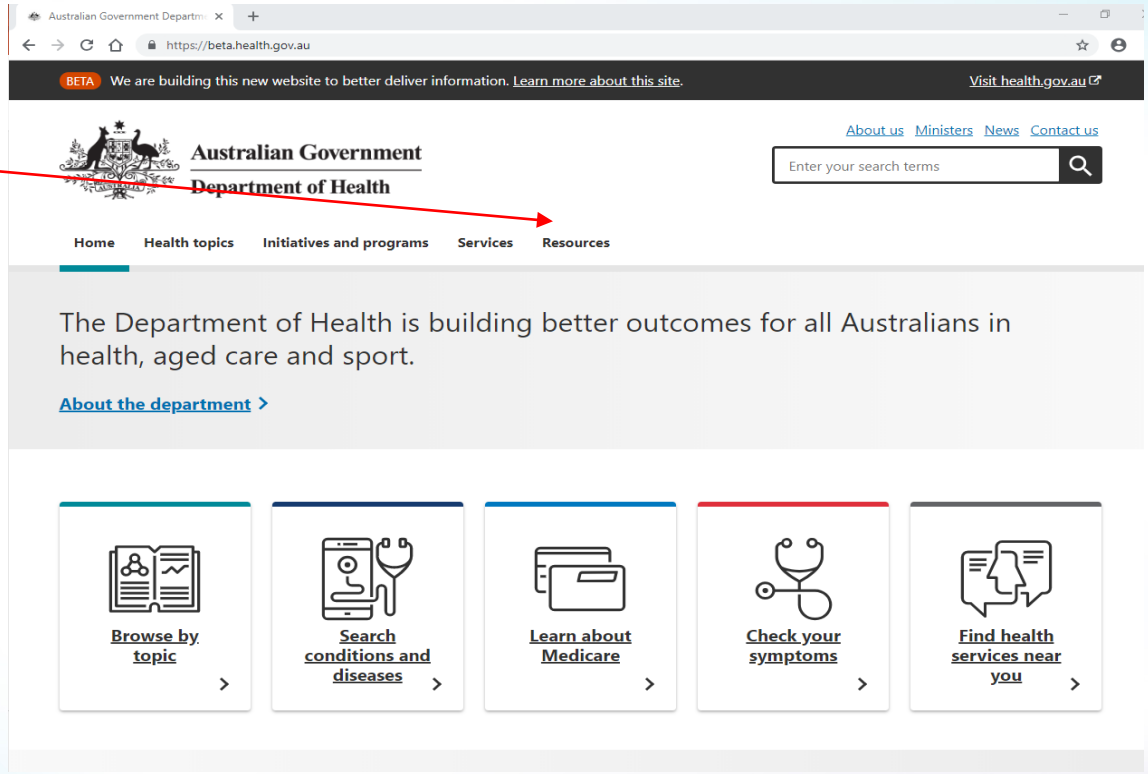
- Base the order on your usage for the previous month, *minus* the amount in your fridge *plus* 10% of the amount used in the previous month
- **20 used, *minus* 5 left in fridge *plus* 2 = 17**

Vaccine Management

- Check fridge temperature x2 per day
- Be careful not to overstock your fridge
- Consider purchasing data loggers for your fridges
- Ensure cold mark indicators are placed on all shelves
- Keep vaccines protected from light
- Rotate stock regularly

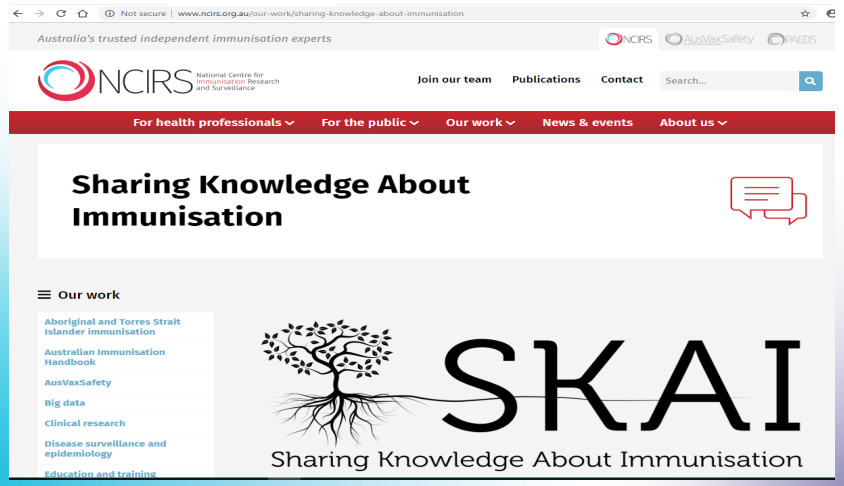
Australian Gov (DoH) Immunisation Website

Ordering resources
www.beta.health.gov.au



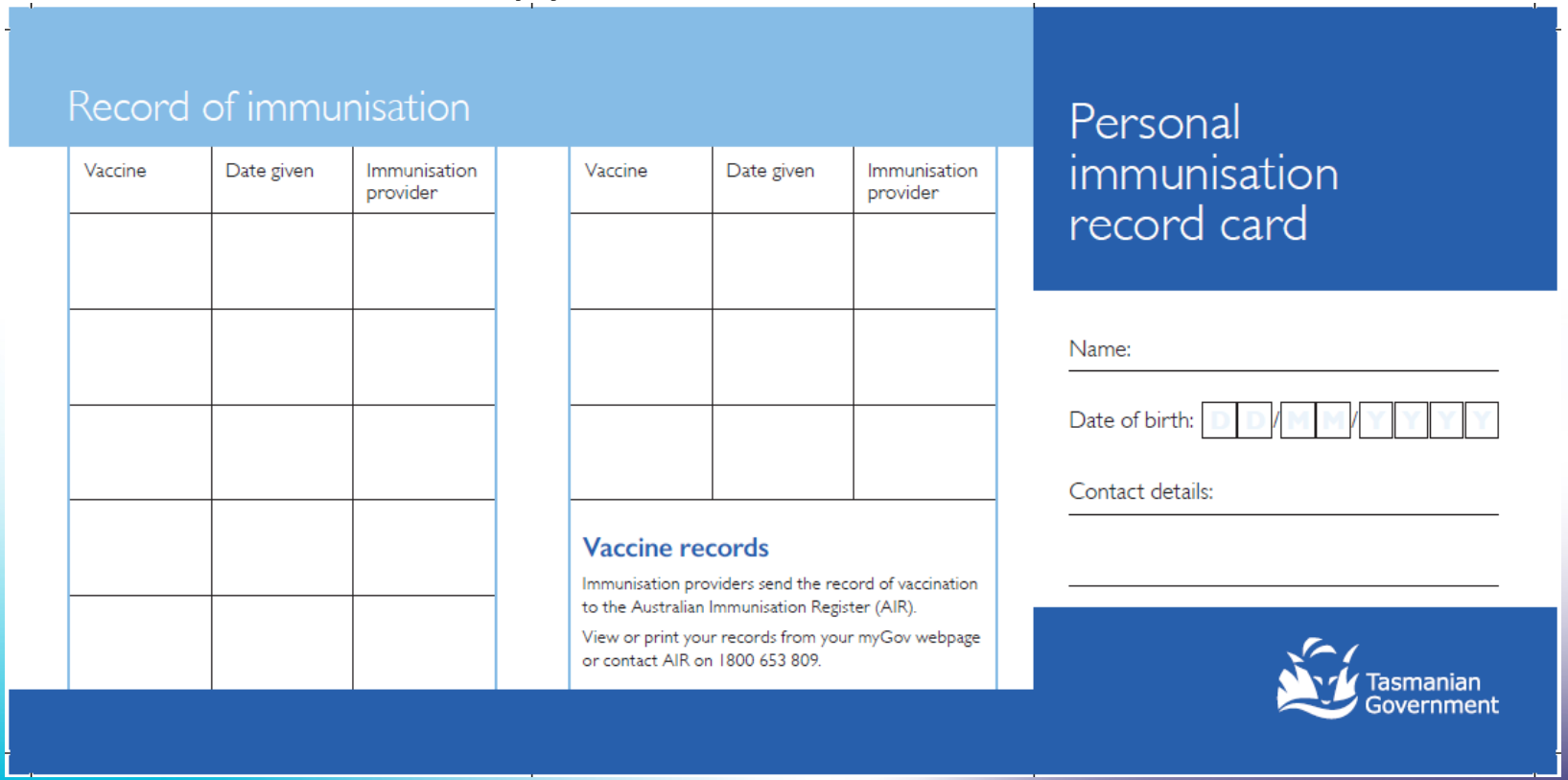
General Information

- Please remember to offer all ACF patients Zostavax and pneumovax
- MMRV is not licensed for use in over 14 years. Give MMR and Varicella separately for those over 14 years
- FAX streams
- PH Hotline 1800 671 738 – manned 24/7
- SKAI



Personal Immunisation Record Card

- Personal Immunisation Record Cards have been developed
- You will receive these in the post with the Immunisation Schedules and a copy of the Influenza Toolkit



Record of immunisation

Vaccine	Date given	Immunisation provider

Vaccine	Date given	Immunisation provider

Vaccine records

Immunisation providers send the record of vaccination to the Australian Immunisation Register (AIR).

View or print your records from your myGov webpage or contact AIR on 1800 653 809.

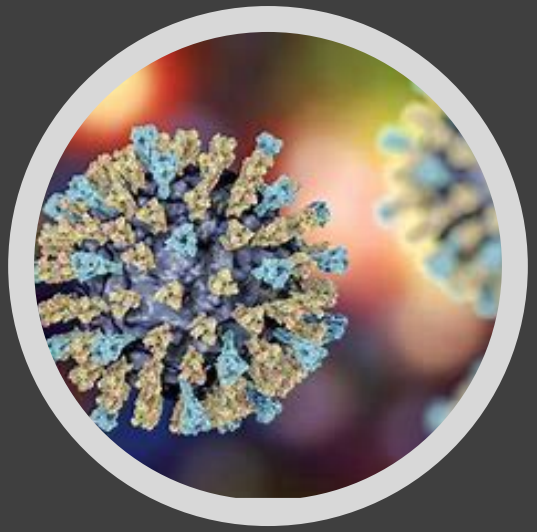
Personal immunisation record card

Name:

Date of birth: D D / M M / Y Y Y Y

Contact details:

Tasmanian Government



Notify Public Health Hotline, 1800 671 738 on clinical suspicion

Measles - one of the most highly communicable infectious diseases

Infectious agent

- Genus Morbillivirus (a paramyxovirus)

Mode of transmission

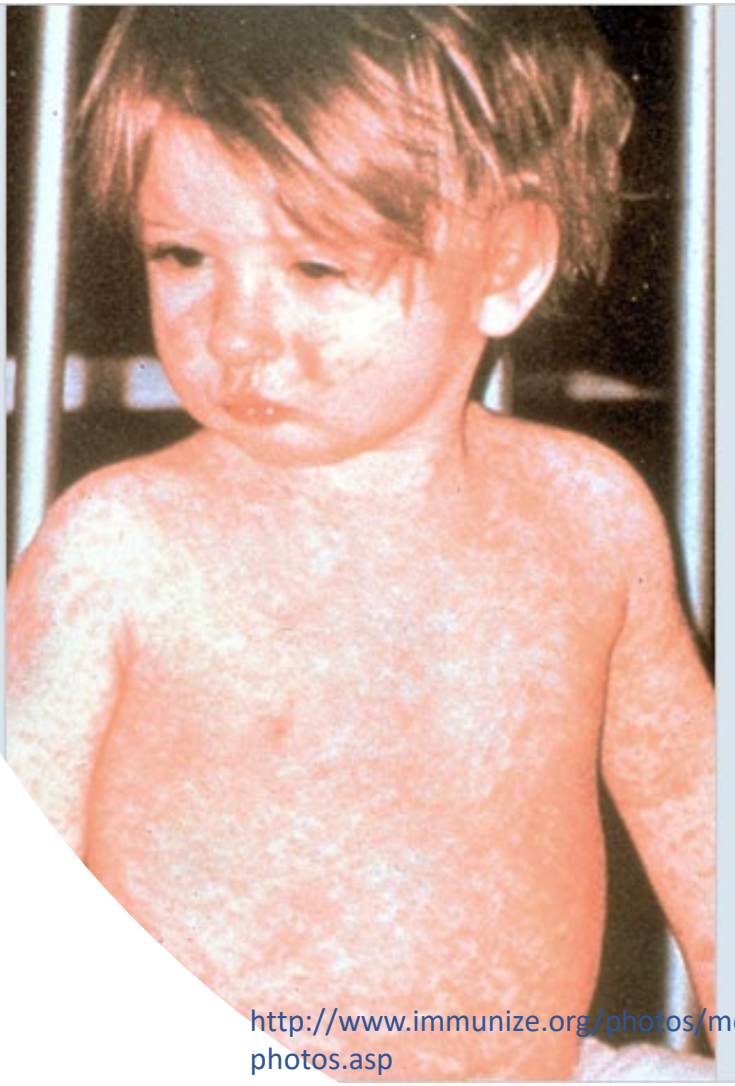
- Airborne droplets
- Direct contact with discharges from respiratory mucous membranes
- Less common - articles freshly soiled with nose and throat secretions

Incubation period

- Average 10 days (range 7 to 18 days)

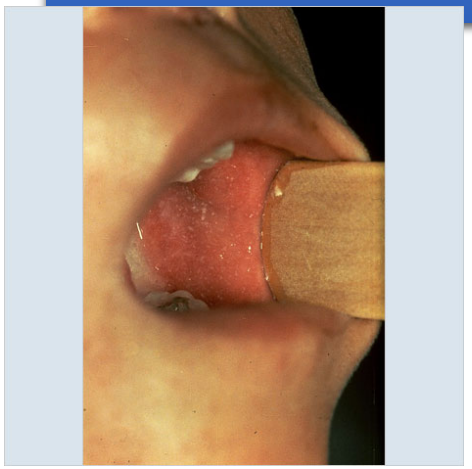
Infectious period

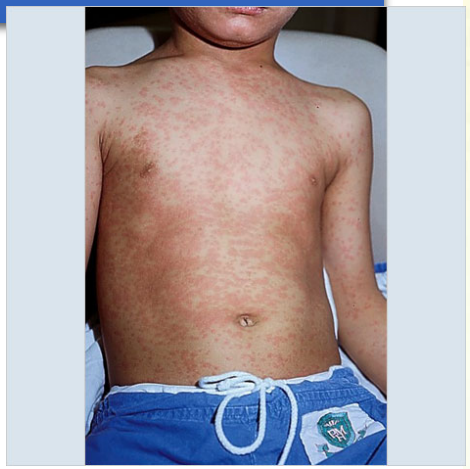
- 4 days before until 4 days after the onset of rash



http://www.immunize.org/photos/measles-photos.asp

Clinical presentation and outcomes



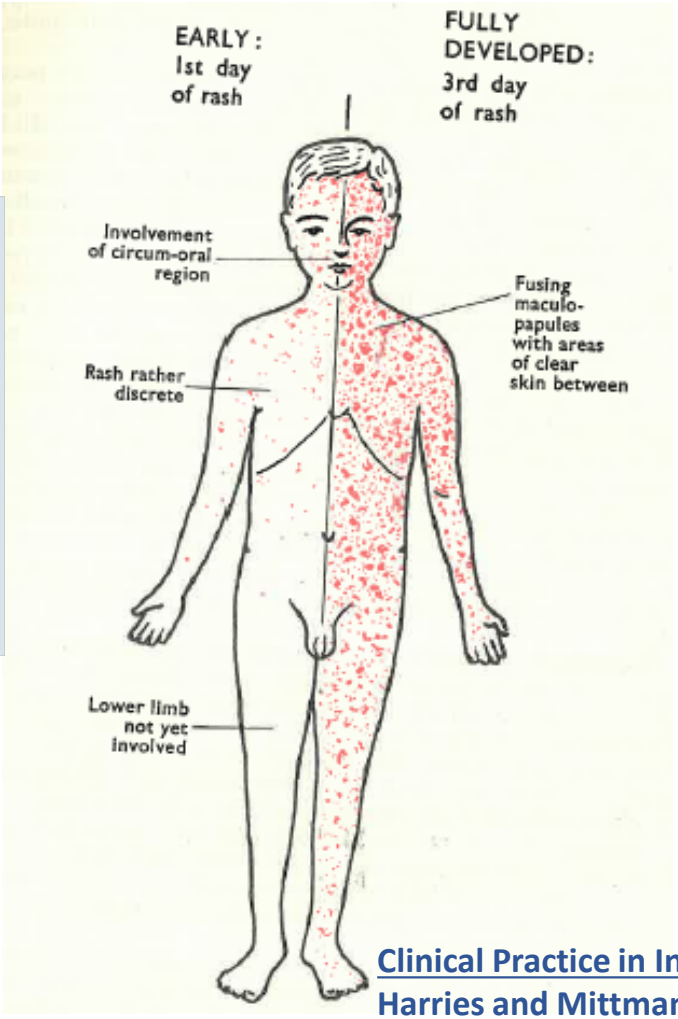


Common complications:

- middle ear infection
- viral or bacterial bronchopneumonia

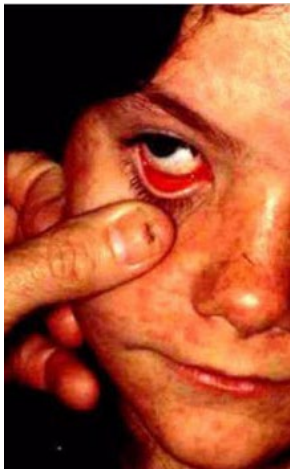
Rare complications:

- acute encephalitis
- subacute sclerosing panencephalitis



Clinical Practice in Infectious Diseases
Harries and Mittman
Fourth Ed, Livingstone, 1951

Persons at increased risk of disease



Unvaccinated or under-vaccinated people

Those at risk of more severe disease include:

- Immunocompromised people
- Malnourished children, particularly vitamin A deficiency
- Less than 5 years and 20 years and older
- Pregnant women

Measles testing

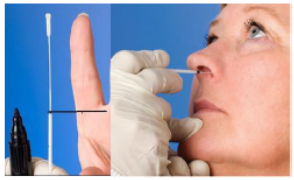
Table 1. Recommended laboratory tests for measles diagnosis based on symptom onset

Time from onset of rash	Recommended specimen collection	Recommended laboratory test
<1 week	Nasopharyngeal aspirate or throat swab, and first catch urine	NAT, culture
	5 ml tube of clotted blood	measles serology
1-3 weeks	Nasopharyngeal or throat aspirate or swab, and first catch urine	NAT
	5 ml tube of clotted blood	measles serology
>3 weeks	5 ml tube of clotted blood	measles serology

HOBART PATHOLOGY | LAUNCESTON PATHOLOGY | NORTH WEST PATHOLOGY

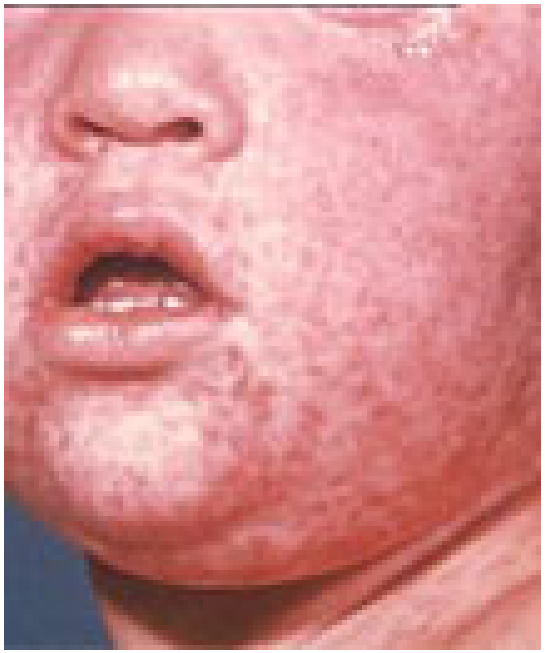
Nasopharyngeal Swab Collection

1. Label the outside of the specimen transport container with the patient's name, date of birth and the time and date of specimen collection.
2. **Don appropriate Personal Protective Equipment (PPE).**
3. Tilt the patients head back slightly and immobilise by holding the chin. Parents and / or carers may need to assist with young children.
4. Gently insert the swab into a nostril until a slight resistance is felt.
   - Insert the swab directly back, not upwards.
     The distance of insertion should equal the length of the patient's index finger. Mark this distance on the swab prior to insertion.
   - If resistance is felt during insertion of the swab, remove it and attempt insertion in the opposite nostril.



5. Once in place, rotate the swab 2 - 3 times and hold for 5 - 10 seconds to ensure maximum absorbance.
6. Slowly remove the swab and place into the vial of liquid transport media.
7. Break the shaft of the swab at the scored point and discard the proximal end, leaving the swab itself in the liquid media.
8. Firmly secure the cap of the transport container and place the container in a bio-hazard bag.
9. **Remove PPE**
10. Place the specimen request form in the outside pocket of the bio-hazard bag and transport to the laboratory as soon as possible. If any delay, refrigerate the specimen prior to transport.

Management



use if the patient all the time is allowed to breathe dirty air. The practice of nursing a measles patient in a warm stuffy room, with all the windows closed, cannot be condemned too strongly. An open balcony facing the east is ideal. In a Melbourne winter the piercing blasts that come from the other three quarters are a little too severe; nevertheless, provided the patient is well sheltered from driving rain, even a western balcony is preferable to a closed room. The open air is not contra-indicated by fever, delirium, or bronchopneumonia.

Of all the hundreds of children suffering from measles who have been nursed at Fairfield on open balconies, the number who have contracted bronchopneumonia from any cause, even of a mild degree, can be counted on the fingers of one hand. As against this, hundreds have been admitted with bronchopneumonia, and it is quite safe to assume that many of them came from badly ventilated homes.

Diphtheria, Measles, Scarlatina
Frank V. G. Scholes
Second ed. Ramsay, 1927

A large measles outbreak in Washington state has prompted officials to declare a state of emergency (March 4 2019): 71 confirmed cases

Rockland county declares state of emergency for measles, bans unvaccinated minors from schools, houses of worship, shopping centers

March 26, 2019: 153 cases since Octobe

Measles rate rises amid global outbreak but Australia's immunity remains high

The Guardian 31 March 2019

2019 on track to have 300 infections, the second-highest year for reports since 1997

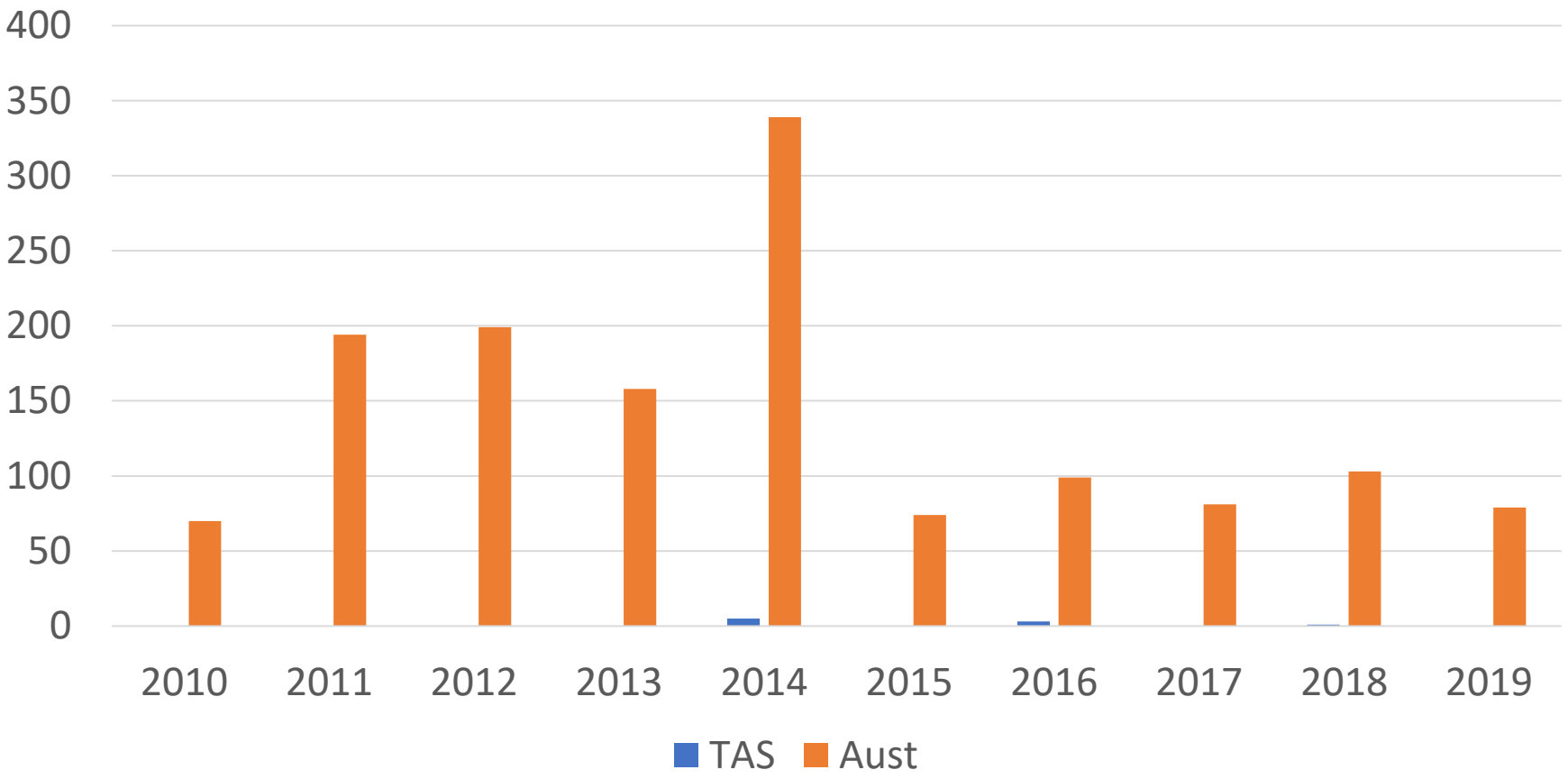
Measles case involving Sydney baby two months away from vaccination 'terrified' parents

ABC news 31 March 2019

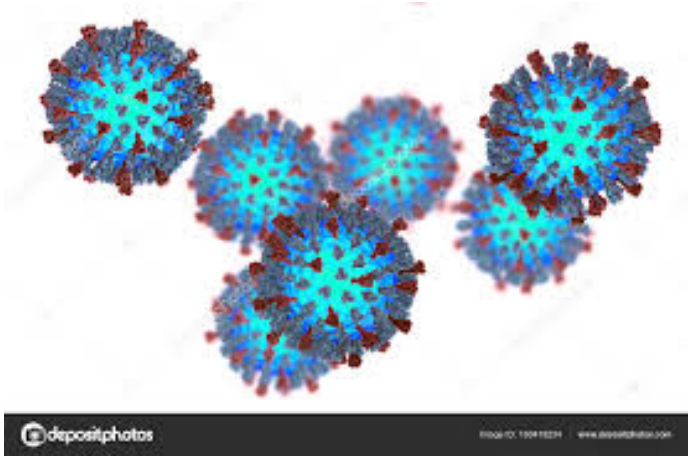
New Zealand measles outbreak sparks delivery of thousands of MMR vaccines to South Island

ABC news 11 March 2019

Number of notifications of Measles, received from State and Territory health authorities in the period of 1991 to 2018 and year-to-date notifications for 2019, Tasmania compared with Australia



Measles SoNG



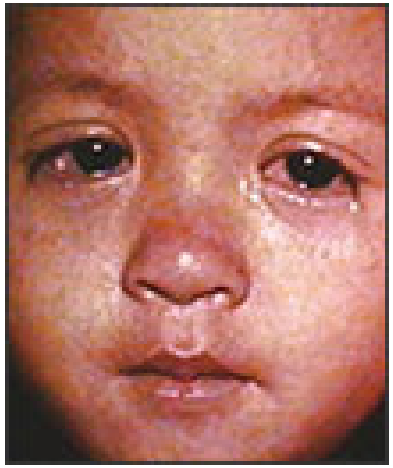
Public health priority

- Urgent
- Notify on clinical suspicion

Case management

- Laboratory confirmation
- Isolation
- Determine source confirmed case

Measles – role of CDPU



Contact management

- Identify all potential contacts
- Target those at particular risk of disease for intervention.
- Individuals considered immune:
  - 2 documented doses of MMR OR
  - documented evidence of measles infection OR
  - born prior to 1966
- PEP: immunisation or normal human immunoglobulin
- Exclude susceptible contacts from settings with high risk contacts

Prevention - maintaining high rates of immunity (95%)

- NIP funded MMR and MMRV at 12 and 18 months
- Two doses, given at least 4 weeks apart
- Healthcare workers and administrative staff
- People working with high risk persons (children <1 year; pregnant and immunocompromised persons)
- High exposure risk areas such as emergency departments
- Early childhood education and care service workers
- Overseas travellers

Australian Bat Lyssavirus (ABL)

dpipwe.tas.gov.au

Tasmanian Field Naturalists Club

Rhabdoviridae family, genus *Lyssavirus*

Infectious agents

- Rabies virus, Australian bat lyssavirus, and others eg European bat lyssavirus

Reservoir

- All mammals
- Dogs principal reservoir in developing countries
- Australia is currently free of rabies in terrestrial mammals.
- ABLV infection documented in several species of flying foxes and insectivorous microbats.
- Assumed that all Australian bat species (and bats anywhere in the world) have the potential to carry and transmit lyssaviruses.

Mode of transmission

- Bite, scratch, or by contamination of mucous membranes or broken skin.
- Three known human cases of ABLV infection – all bitten or scratched by bats.

Incubation period

- Usually 3-8 weeks (rarely few days or several years)

Infectious period

- Not known

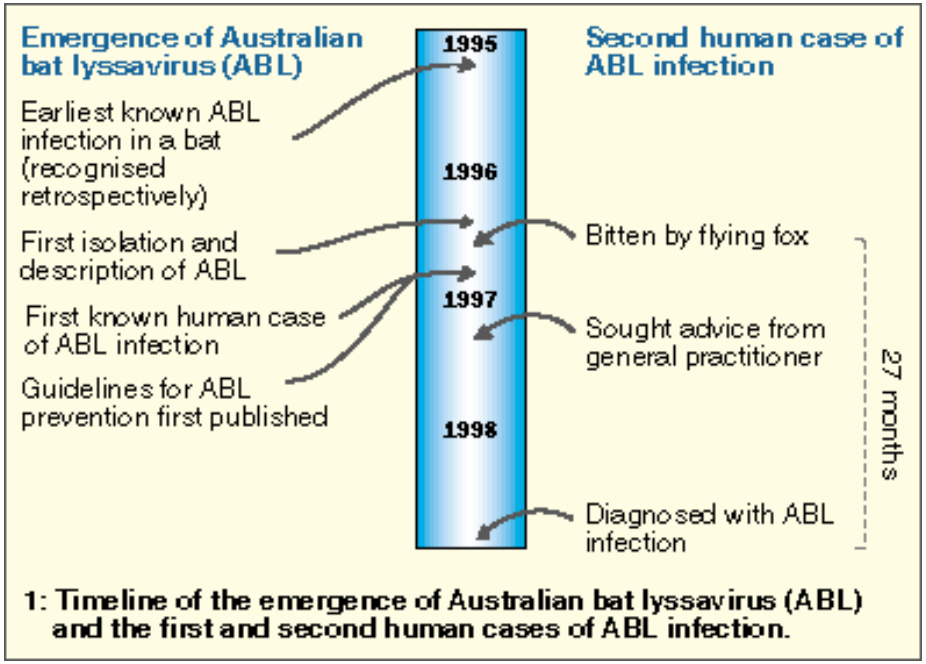
Clinical presentation and outcome

- The term ‘rabies’ refers to disease caused by any of the known lyssaviruses.
- Rabies is an almost invariably fatal, acute viral encephalomyelitis.

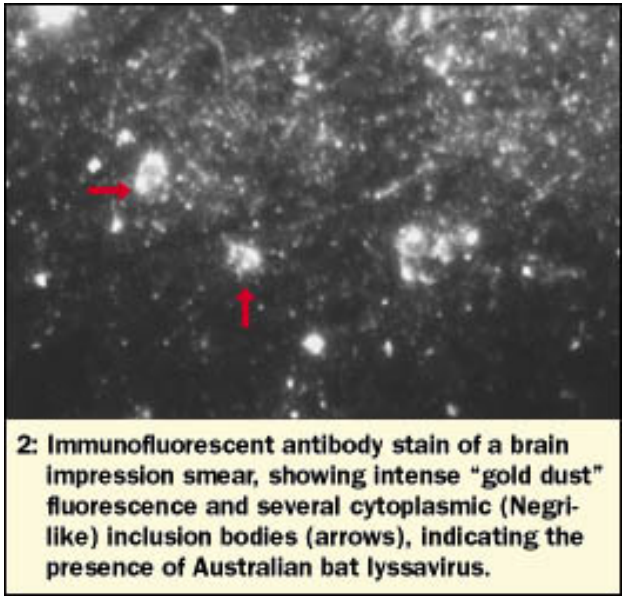
Disease occurrence and public health significance

- Australia - two imported human cases
- Worldwide, rabies virus is responsible for more than 50,000 deaths per year

Australian bat lyssavirus infection: a second human case, with a long incubation period. Hanna, et al. Med J Aust 2000; 172 (12): 597-599.



1: Timeline of the emergence of Australian bat lyssavirus (ABL) and the first and second human cases of ABL infection.



2: Immunofluorescent antibody stain of a brain impression smear, showing intense "gold dust" fluorescence and several cytoplasmic (Negri-like) inclusion bodies (arrows), indicating the presence of Australian bat lyssavirus.

- ABLV is unique to Australia - first identified in 1996 in an encephalitic black flying fox.
- Three human cases have subsequently been reported, in 1996, 1998 and 2013
- All three cases developed fatal encephalitis after being bitten or scratched by bats.

Routine prevention activities

Pre-exposure vaccination

- Bat handlers, veterinarians, wildlife officers; laboratory personnel working with live lyssaviruses; travellers and people working with mammals in rabies-enzootic areas.

Don’t handle bats!!

Travel advice

- Avoid close contact with bats anywhere in the world.
- Avoid close contact with wild or domestic terrestrial mammals (especially dogs, cats and monkeys) in rabies-enzootic regions
- Advice if bitten or scratched by an animal while abroad.

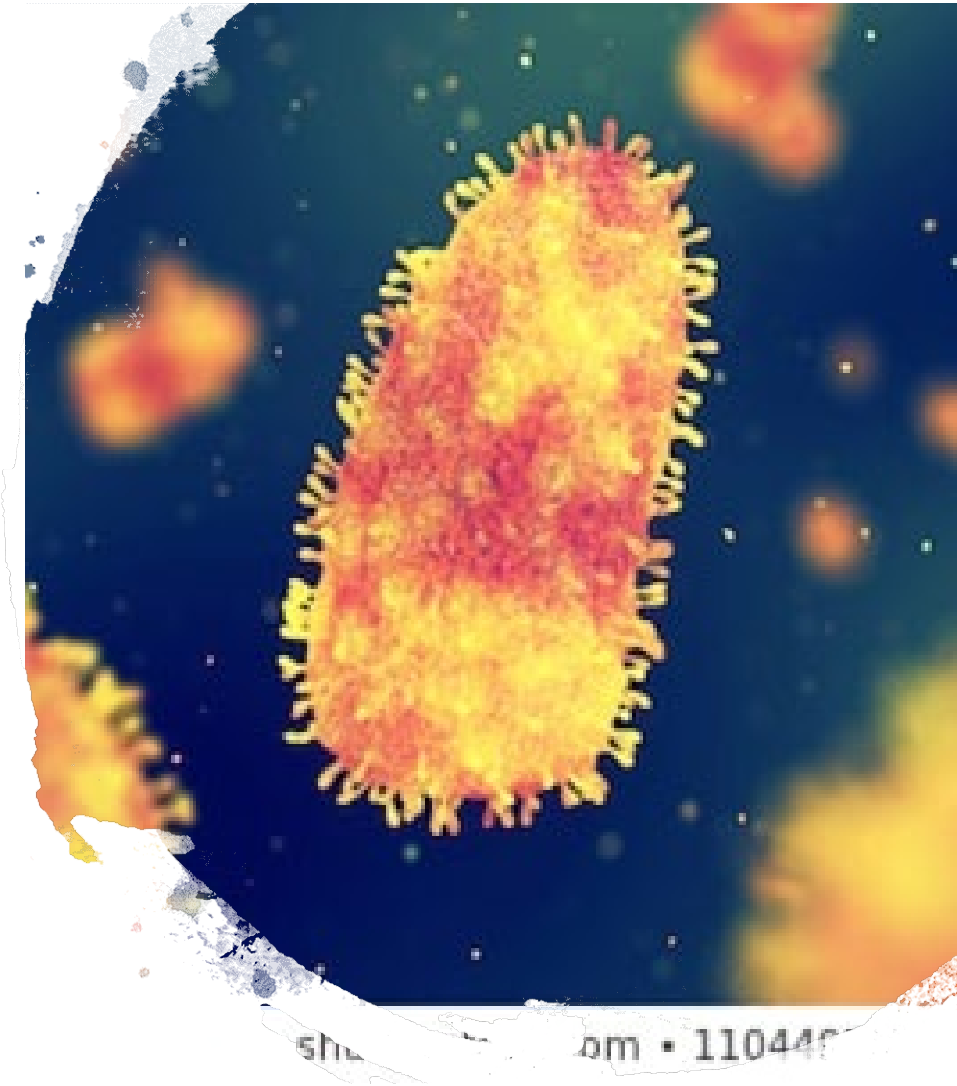
Management of potential human exposure to rabies or ABLV

Principles of post-exposure management

- Recommended for any person with a potential exposure
- Combination of rabies vaccine and human rabies immunoglobulin (HRIG)
- Wound care
- Bats should be tested where possible

Key points

- ABL infection - rare but lethal
- Any bat in Australia must be assumed to have the potential to transmit the virus
- Avoid handling bats
- Anyone bitten or scratched by a bat should immediately wash the wounds thoroughly with soap and water and promptly seek medical advice
- Immediately notify Public Health Hotline: 1800 671 738



Tasmanian Immunisation Strategy

Department of Health

Tasmanian Government

Tasmanian Immunisation Strategy

The guiding document for publicly-funded vaccines in Tasmania.

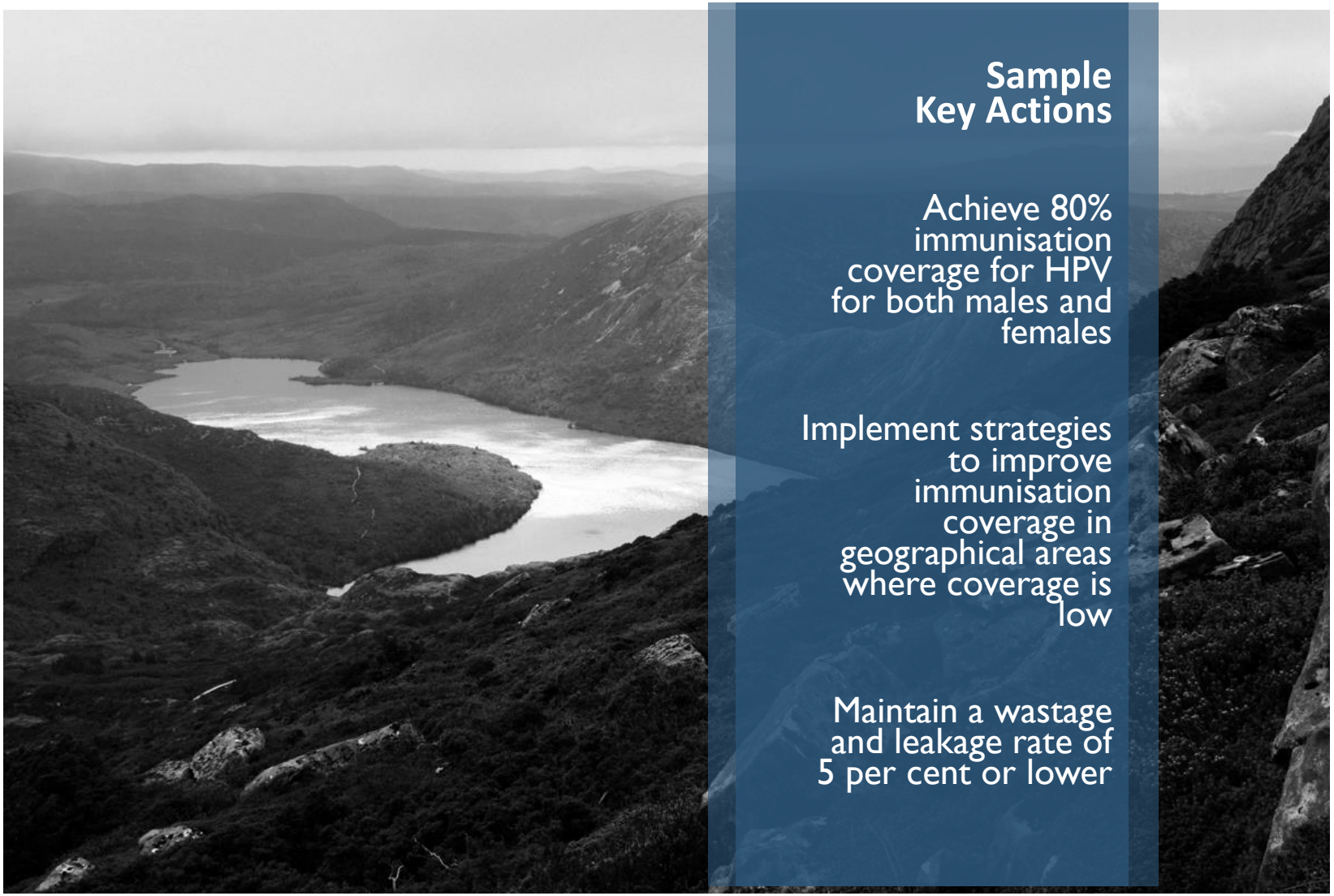
It provides overview and direction for service providers and consumers within the context of the national immunisation policy.

AIM

increase immunisation coverage
for **all Tasmanians** across their **lifespan** and
reduce the incidence of vaccine preventable **diseases**
through **collaborative action**

Priority Areas

1. Improve immunisation coverage
2. Ensure an adequately skilled immunisation workforce
3. Enhance monitoring and evaluation of immunisation programs
4. Strengthen governance and engagement with partners
5. Maintain community confidence in immunisation



Sample Key Actions

Achieve 80% immunisation coverage for HPV for both males and females

Implement strategies to improve immunisation coverage in geographical areas where coverage is low

Maintain a wastage and leakage rate of 5 per cent or lower

Tasmanian Immunisation Strategy

Coming to you soon

Local epidemiology and public health response

PERTUSSIS

ON THE EPIDEMIC DISEASES OF TASMANIA.

By E. SWARBRECK HALL,

LICENTIATE IN THE SCIENCE AND PRACTICE OF MEDICINE; M.R.C.S. OF ENGLAND; HON. MEMBER OF MED. SOC. OF VICTORIA; HON. COR. MEMBER OF THE STATISTICAL SOC. OF LONDON; FORMERLY OF THE IMPERIAL MEDICAL STAFF IN TASMANIA; ETC.

(*Read April 6th*, 1863.)

epidemic in 1842, and at that time spread throughout the island. But I find in the Hobarton Registry a death ascribed to the whooping cough in August, 1840. In the epidemic of 1842 I was living in one of the healthiest country districts, forty miles from Hobarton, and caught the disease from a child I was attending, though I had gone through it in early life. This child had been sent for change of air from a district near to Hobarton. I communicated the disease to every one of my own children, and it spread every where. Isolated cases have ever since this year occurred, and in several years it has assumed an epidemic character. In the last four months of 1855, the Hobarton Registry gave thirty-one deaths from whooping cough, though not a single death had been recorded from this disease under three years of age for the previous four years. As usual, the orphan schools had the lion's share—seven out of the thirty-one deaths. Only one death, it will be observed, took place in 1857, and none in 1861. This year one occurred last month, and the disease is at present assuming a threatening aspect, and no doubt will become epidemic should unfavourable meteorological phenomena arise—1858 was so charactised.

Bordetella pertussis

- Gram-negative bacteria
- Strict human pathogen (no known animal or environmental reservoir)

- Pathogenesis
  - Attachment
  - Evasion of host defences
  - Local damage
  - Systemic manifestations

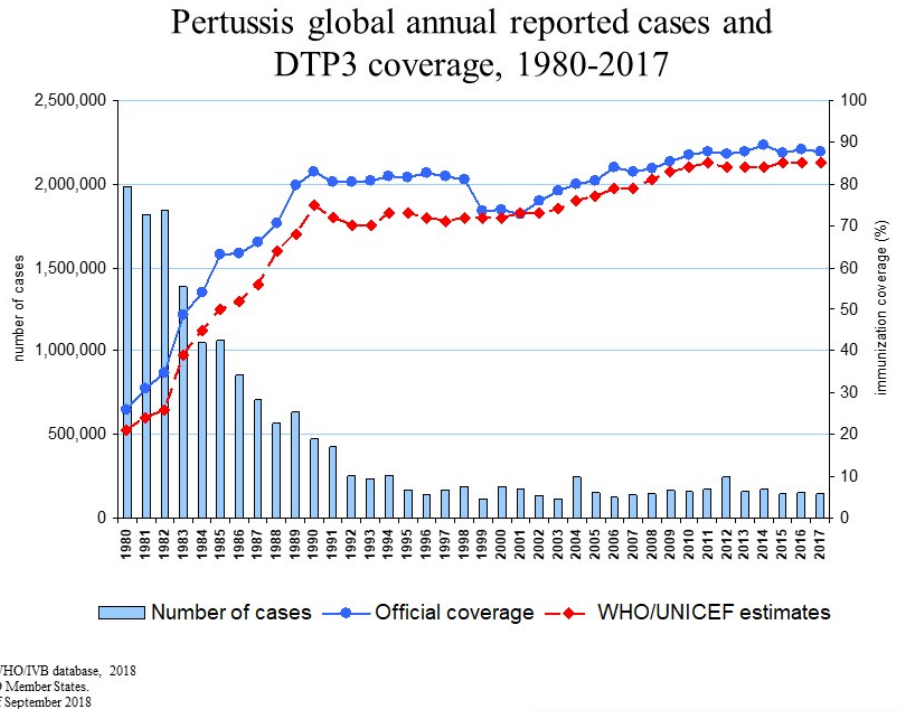
An important cause of morbidity and mortality

Global figures:

2008:

- Estimated 16 million cases
- Estimated 195 000 children deaths

2017 – WHO figure:
85% estimated DTP3 coverage



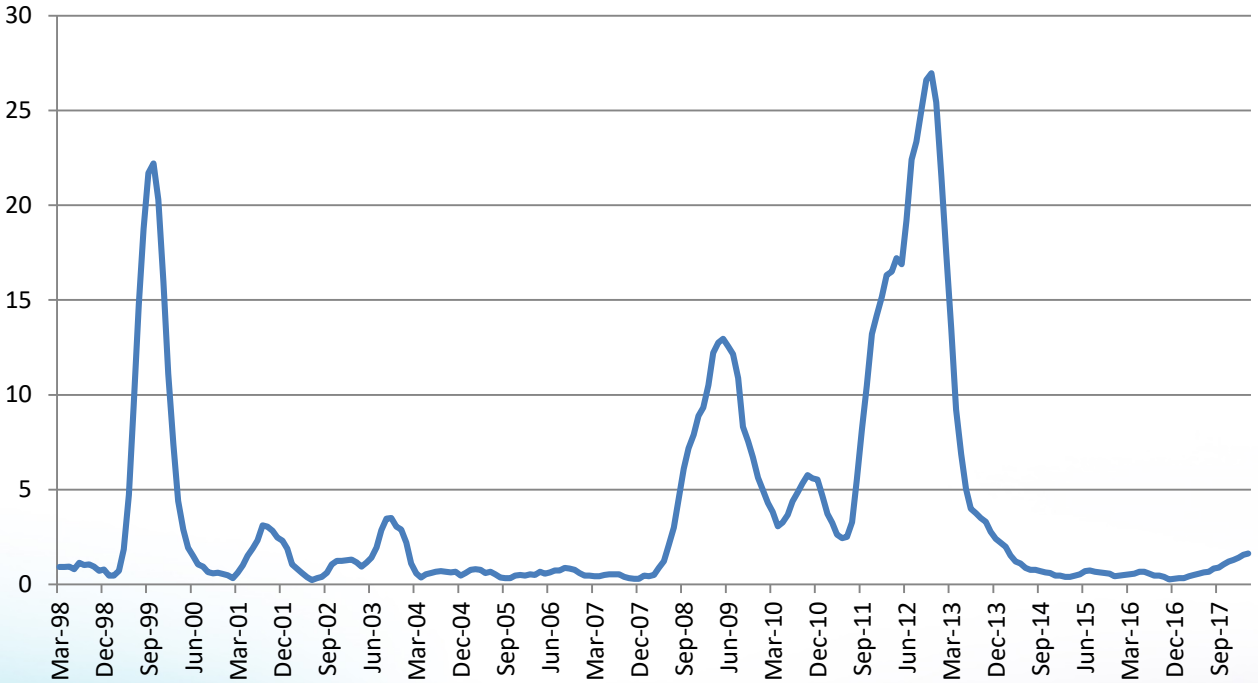
Source: WHO. Wkly epidemiol re. No 40, 2010, 85, 385-400

Source: WHO, Immunization, Vaccines and Biologicals, Pertussis. Accessed only (08/04/2019) at: https://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/passive/pertussis_coverage_2017.jpg?ua=1

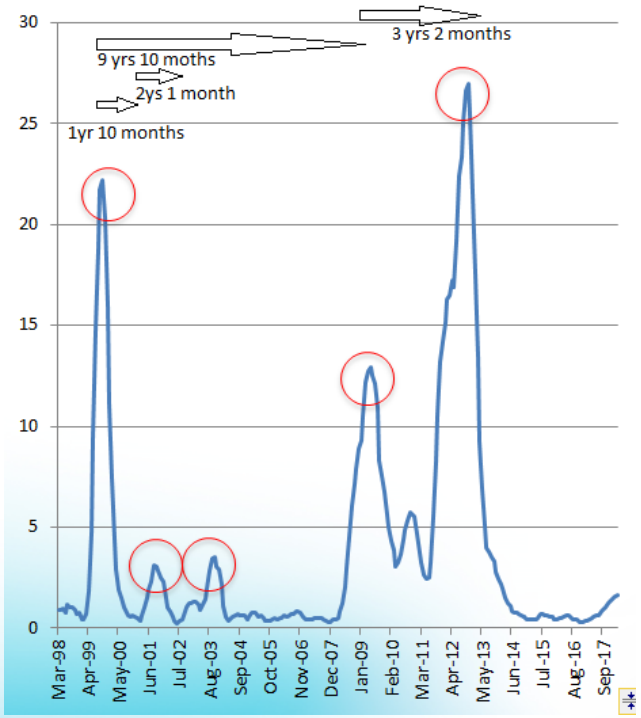
“in the United States during the period 1940-1948, whooping cough killed almost three tiems as many infants less than one year of age as measles, mumps, chicken pox, rubella, scarlet fever, diphtheria, poliomyelitis, and meningitis all together”

(Source: Rohani and Scarpino. Introduction to pertussis transmission and epidemiological dynamics. In: Pertussis: epidemiology, immunology, and evolution. Edited by Pejman Rohani and Samuel Scarpino: Oxford University Press (2019).)

Pertussis notification rate per 100 000 population, Tasmania 1998-2017



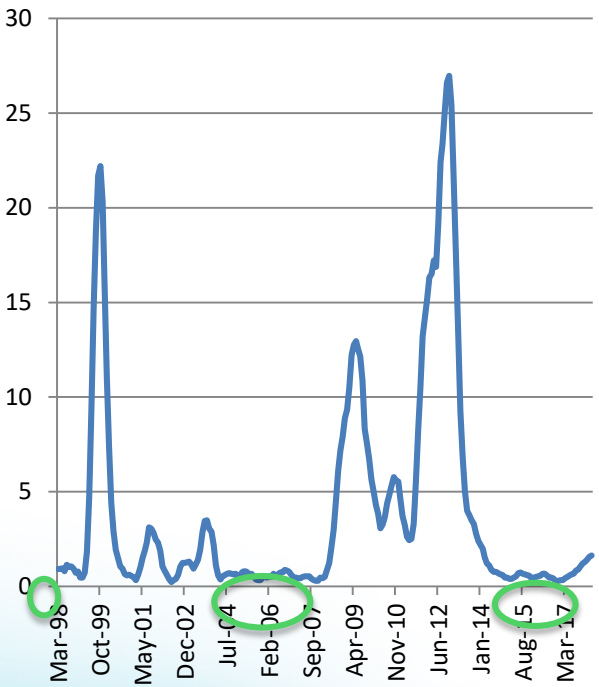
Epidemic cycles



Peaks in:

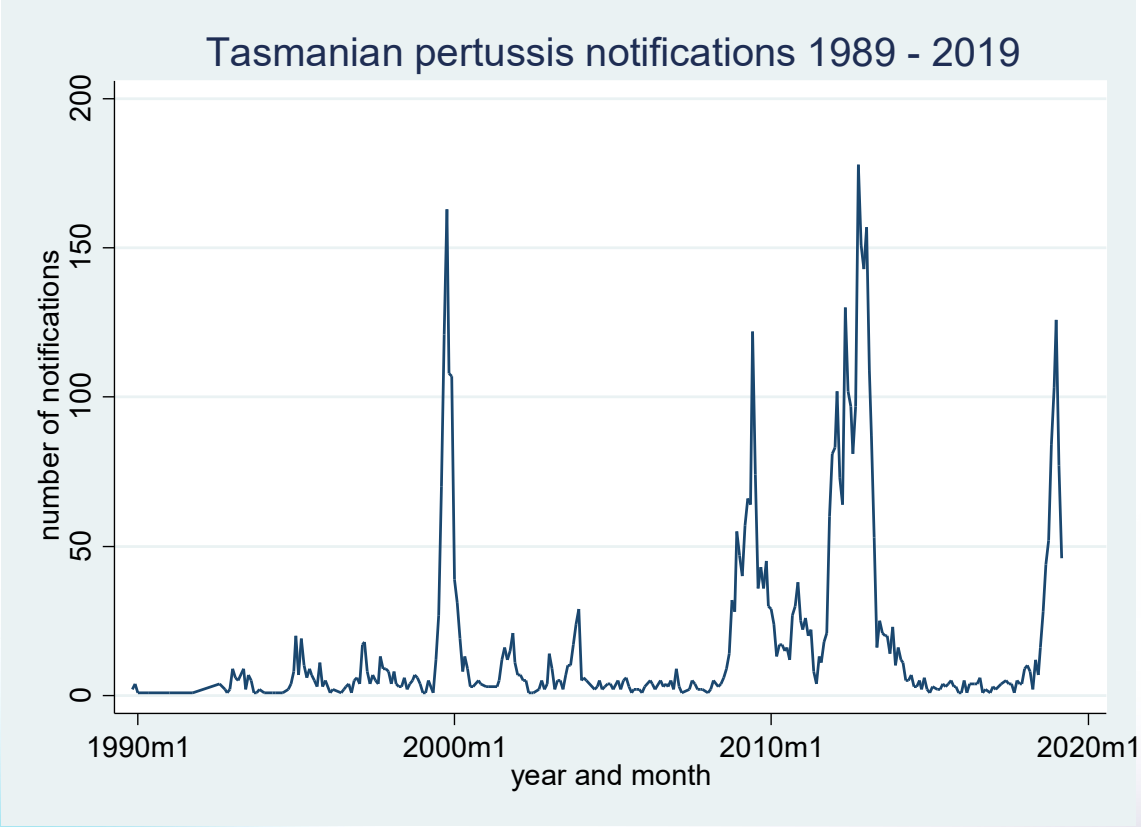
- Oct ’99 (22.2)
- Aug ’01 (3.12)
- Oct ‘03 (3.5)
- Aug ‘09 (10.88)
- Nov ‘12 (26.97)

Baseline activity

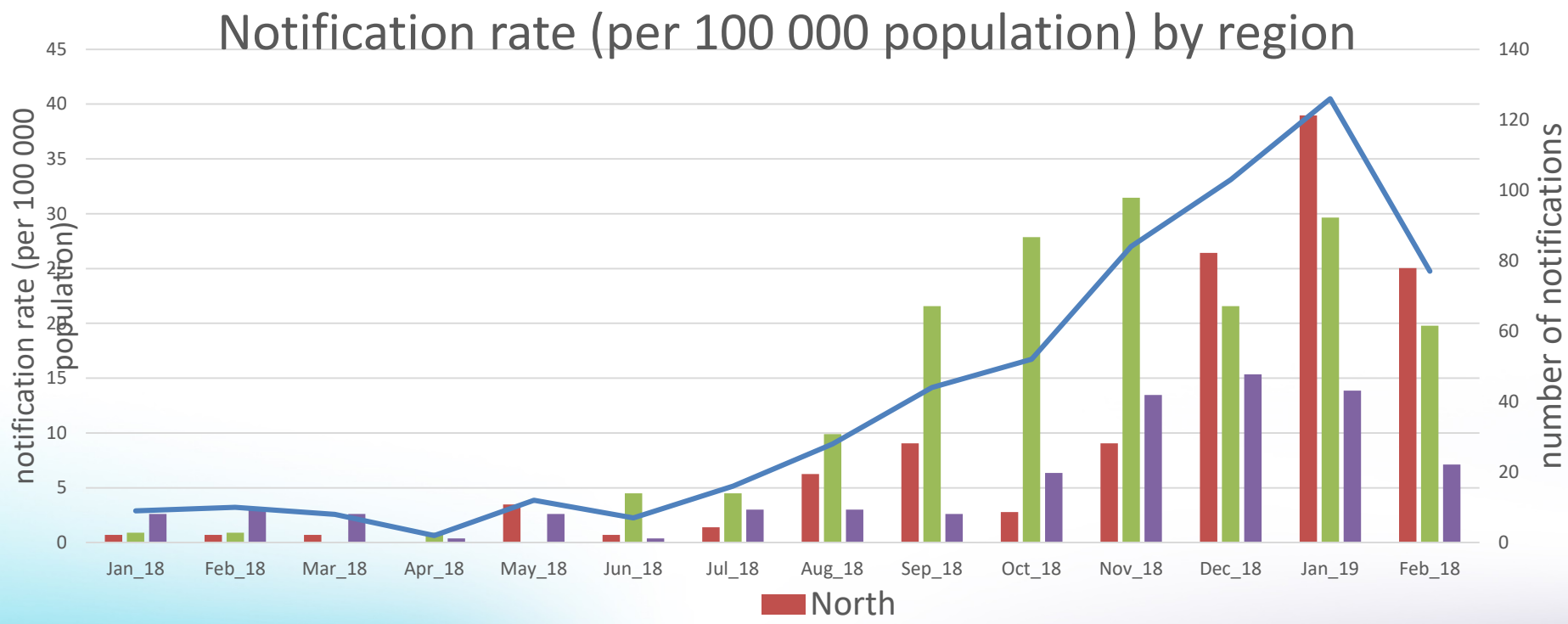


- Median monthly rate outside of "epidemic" periods:
  - 0.68 notifications per 100 000 population per month
  - Standard deviation 0.27
  - Range 0.23 – 1.42

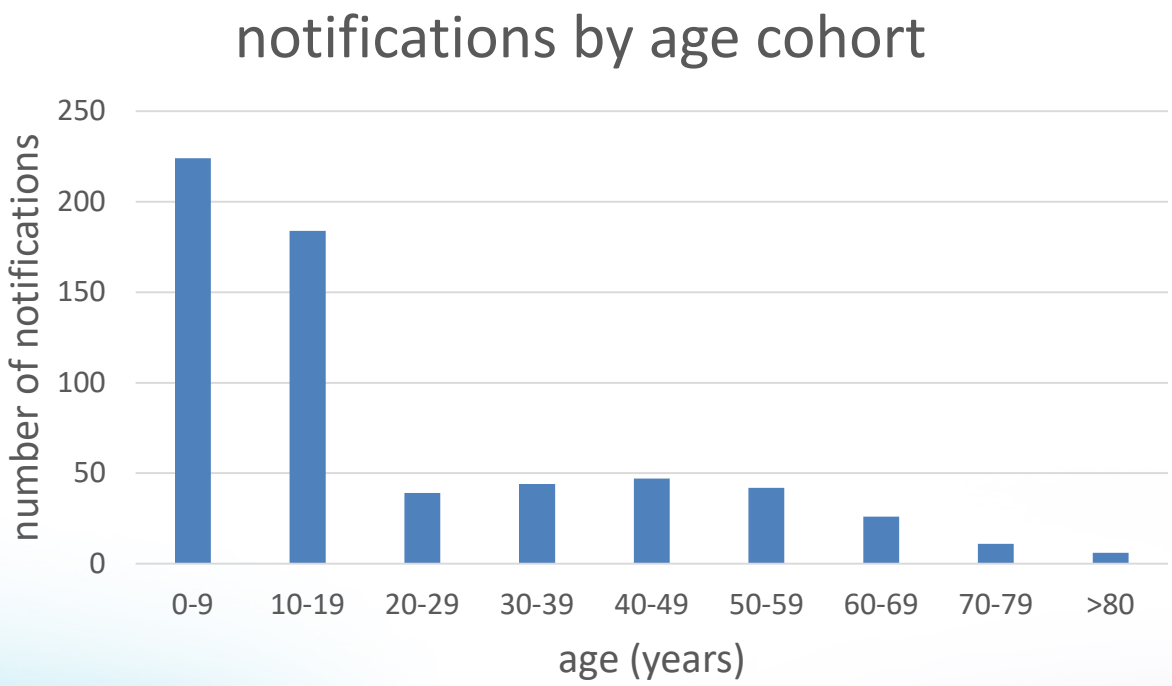
2019 progress:

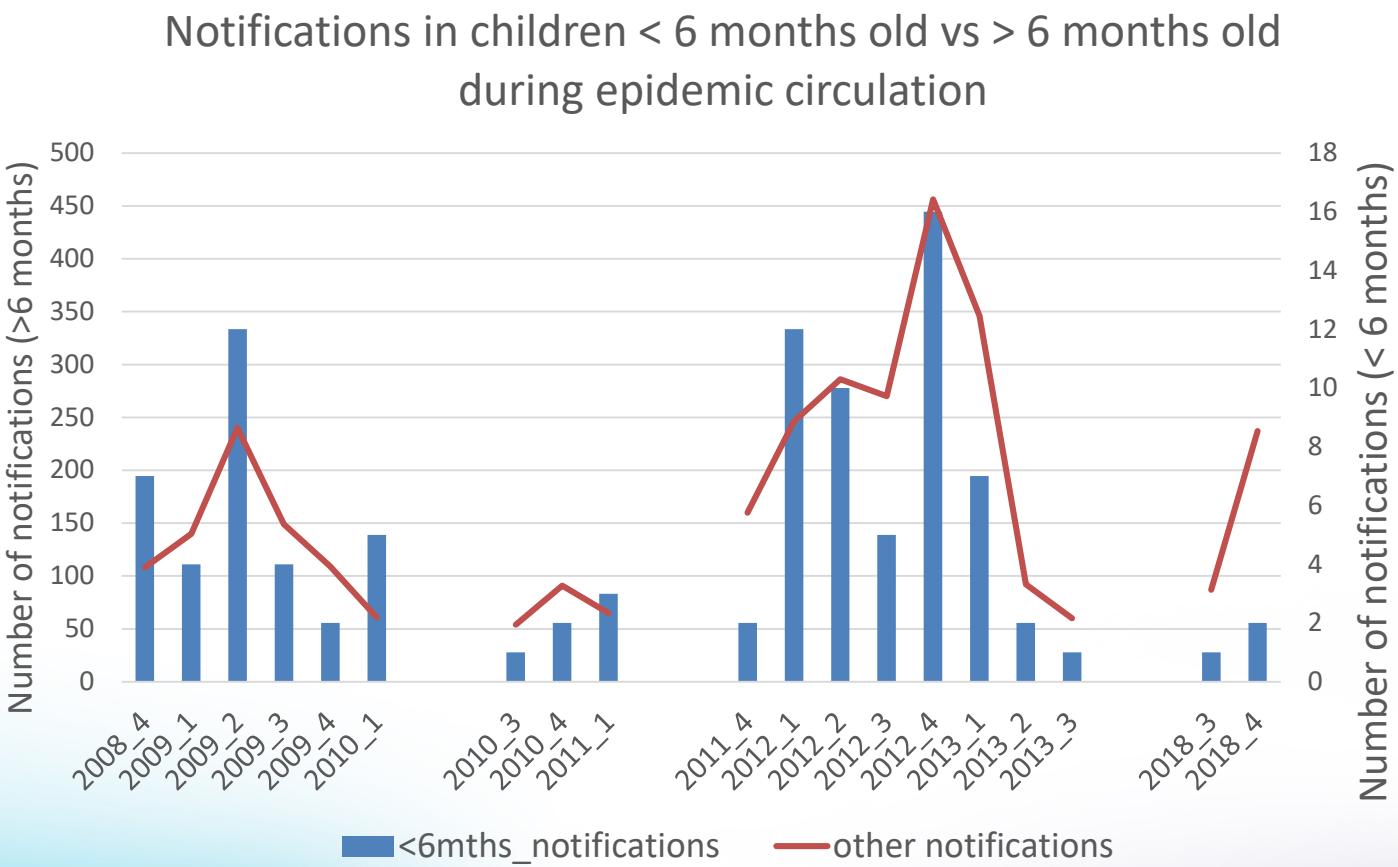


Current State-wide Outbreak



Since 01 Jan, 2018:




Notifications in children < 6 months old vs > 6 months old during epidemic circulation
Number of notifications (>6 months)
Number of notifications (< 6 months)
500
450
400
350
300
250
200
150
100
50
0
18
16
14
12
10
8
6
4
2
0
2008_4
2009_1
2009_2
2009_3
2009_4
2010_1
2010_3
2010_4
2011_1
2011_4
2012_1
2012_2
2012_3
2012_4
2013_1
2013_2
2013_3
2018_3
2018_4
<6mths_notifications
other notifications

Key points for public health management - transmission

Incubation:

- 9-10 days (range 6-20 days)

Transmission:

- Airborne transmission via respiratory droplets
  - Demonstrated in laboratory conditions in 2012
    (source: Warfel J, Beren J, Merkel, T. Airborne Transmission of Bordetella pertussis. JID 2012:206 (15 September)
  - Dilution of aerosolised droplets as a function of distance "expected" to be important factor in transmission risk
- Contact definition
  - Face-to-face exposure (i.e within 1 metre) for a single period of at least 1 hour
  - Family and household members or other people who have stayed overnight in the same room as the case
    (source: CDNA. Pertussis Guidelines for Public Health Units. Accessed online at:
    http://www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-pertussis.htm)

Key points for public health management - Communicability

Communicability:

- Highly infectious in catarrhal and early paroxysmal stages
  - Household contact study (Deen et al, Household Contact Study of Bordetella pertussis Infections. CID 1995; 21):
    - 39 households examined associated with 40 index cases
    - Total of 255 exposed subjects in the 39 households
    - 114 subjects remained well, 53 had mild respiratory disease and 88 had clinical pertussis.
    - Laboratory evidence of infection in 46% of the subjects in the well group
    - 90% of inadequately vaccinated children developed disease
- Infectiousness wanes thereafter to negligible by about three weeks
- Non-communicable after 5 days of appropriate antibiotics

Key points for public health management - Immunity

Immunity:

- Wanes approximate 4-20 years after natural infection
- Wanes approximately 4-12 years after vaccination

  (source: Wendelboe et al, Duration of Immunity Against Pertussis After Natural Infection or Vaccination, Ped Inf Dis J, 2005, 24 (5))
- Maternal antibodies actively transported across the placenta

High risk:

- Highest risk of severe morbidity and mortality is in infants

Key points for public health management - Immunity

- Maternal antibodies actively transported across the placenta
  - Naidu et al. The optimal gestation for pertussis vaccination during pregnancy: a prospective cohort study. American Journal of Obstetrics & Gynaecology. August 2016:
    - Cord blood antibody levels significantly higher in vaccinated vs unvaccinated controls
    - Vaccination between 28-32 weeks significantly higher antibody levels then vaccinated at 33-36 wks
  - Eberhardt et al. Maternal Immunization Earlier in Pregnancy Maximizes Antibody Transfer and Expected Infant Seropositivity Against Pertussis. CID 2016:62 (1 April)
    - Anti-PT and anti-FHA GMCs higher following 2nd vs 3rd trimester immunisation
    - Expected infeant seropostivity rates higher following second vs third trimester immunisation (OR 3.7 (2.1-6.5)

Timing of maternal immunisation – AIH updated

The optimal time for pertussis vaccination in pregnancy is between mid 2nd trimester and early 3rd trimester (between 20 and 32 weeks gestation). This is because:

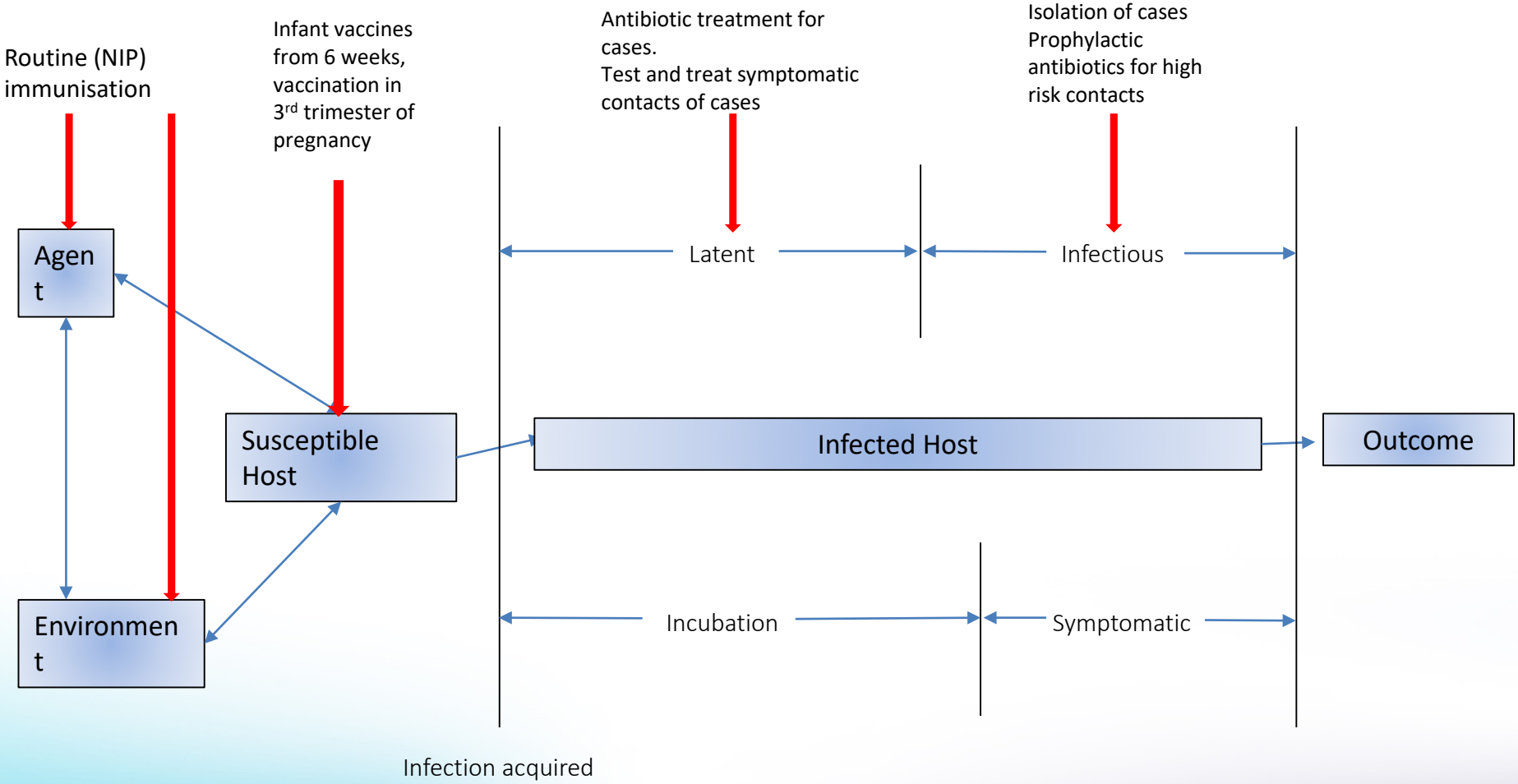
levels of pertussis antibodies that are likely to be protective are detected in infants born to mothers vaccinated in the 2nd and 3rd trimesters

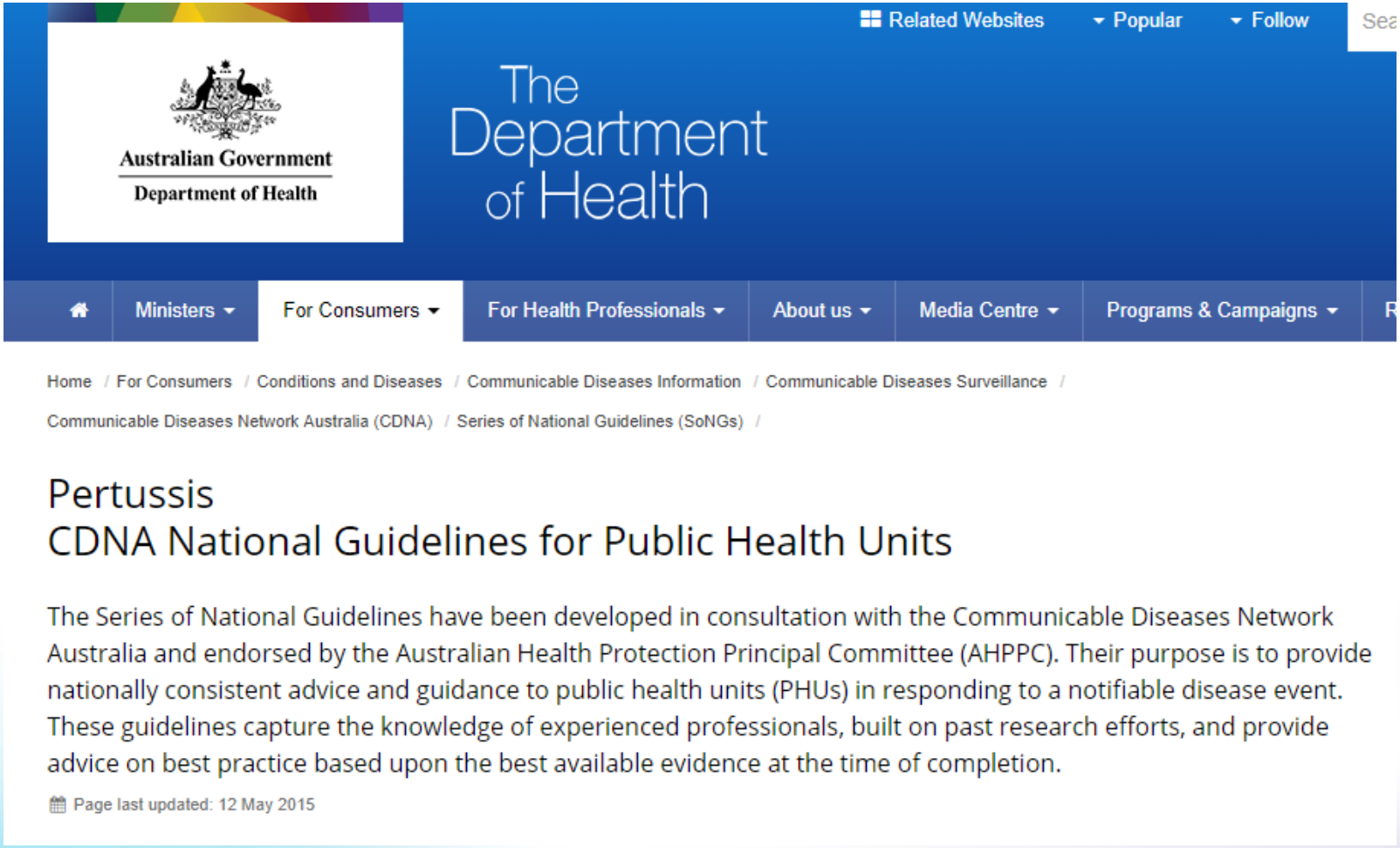
maternal antibodies are actively transported to the fetus from 13 weeks,[20] with maximum transfer 30 weeks gestation onwards[21] pertussis antibody levels do not peak until about 2 weeks after vaccination[19]

Pregnant women typically have a routine morphology scan by ultrasound at around 20 weeks gestation and present to a maternity care provider in relation to this scan. Providers may use the 20 week scan as a prompt to provide pertussis vaccine or schedule a vaccination visit. There are no safety concerns if a pregnant woman receives pertussis vaccine before 20 weeks gestation.

*If pregnant women are **not** vaccinated between 20 and 32 weeks, they should receive pertussis-containing vaccine as soon as possible **and** at any time up to delivery. If given within 2 weeks of delivery, the newborn may not be adequately protected.[22]*

*If pregnant women receive the vaccine earlier than 20 weeks, they **do not** need a repeat dose during the same pregnancy. Evidence shows transfer of pertussis antibodies to the infant in women who received dTpa vaccine as early as 13 weeks gestation.[22]*


Routine (NIP) immunisation
Infant vaccines from 6 weeks, vaccination in 3rd trimester of pregnancy
Antibiotic treatment for cases.
Test and treat symptomatic contacts of cases
Isolation of cases
Prophylactic antibiotics for high risk contacts
Agent
Environment
Susceptible Host
Latent
Infectious
Infected Host
Outcome
Incubation
Symptomatic
Infection acquired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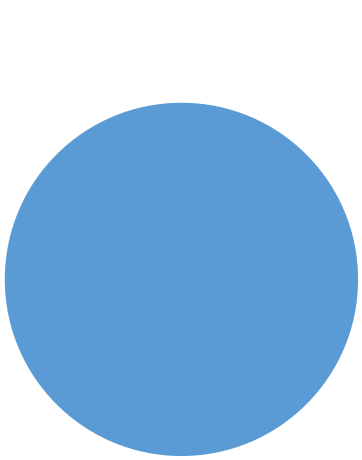
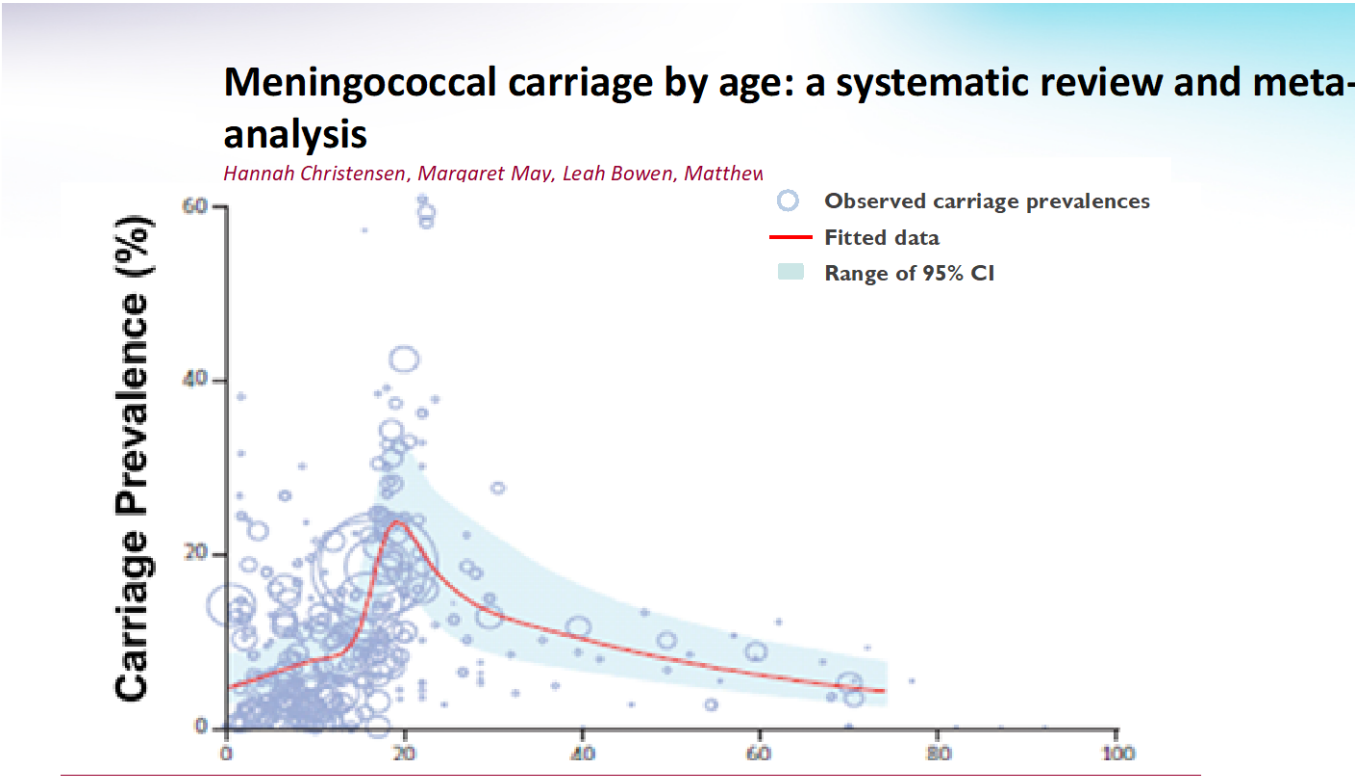
Communicable Diseases Network Australia (CDNA) / Series of National Guidelines (SoNGs) /
Pertussis
CDNA National Guidelines for Public Health Units
The Series of National Guidelines have been developed in consultation with the Communicable Diseases Network Australia and endorsed by the Australian Health Protection Principal Committee (AHPPC). Their purpose is to provide nationally consistent advice and guidance to public health units (PHUs) in responding to a notifiable disease event. These guidelines capture the knowledge of experienced professionals, built on past research efforts, and provide advice on best practice based upon the best available evidence at the time of completion.
Page last updated: 12 May 2015

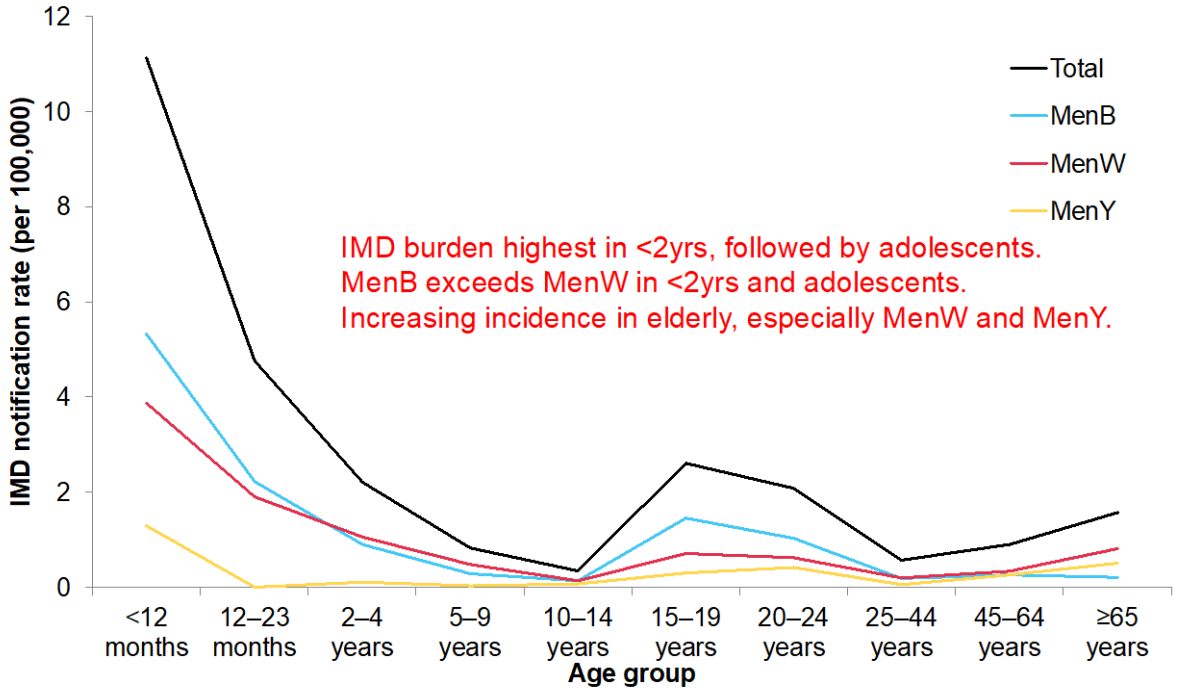



Thank-you

Why 6 weeks to 21 years?

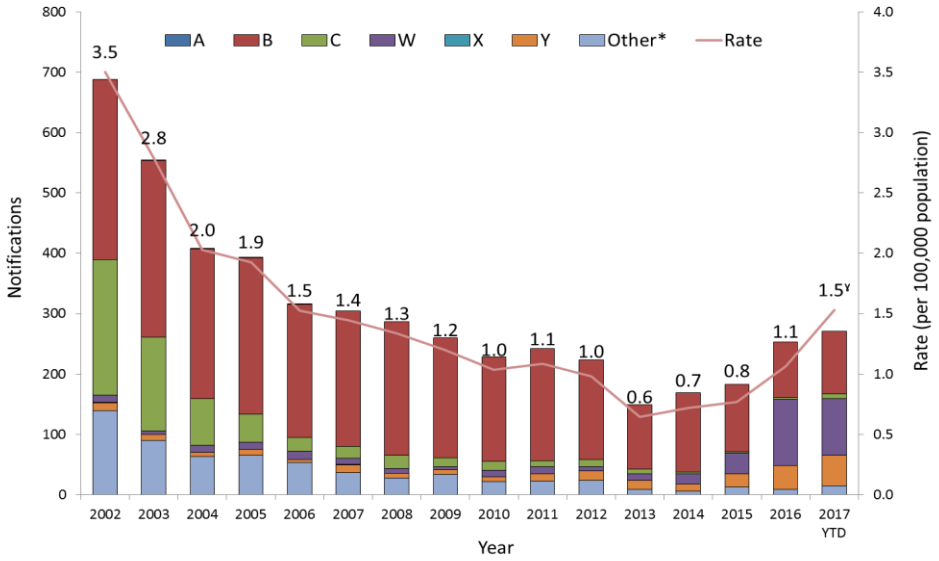


IMD notification rate by serogroup and age group, 2016–2017



Epidemiology - National

Notifications and rates of Invasive Meningococcal Disease (IMD), Australia, 2002 to 2017 YTD*, by serogroup



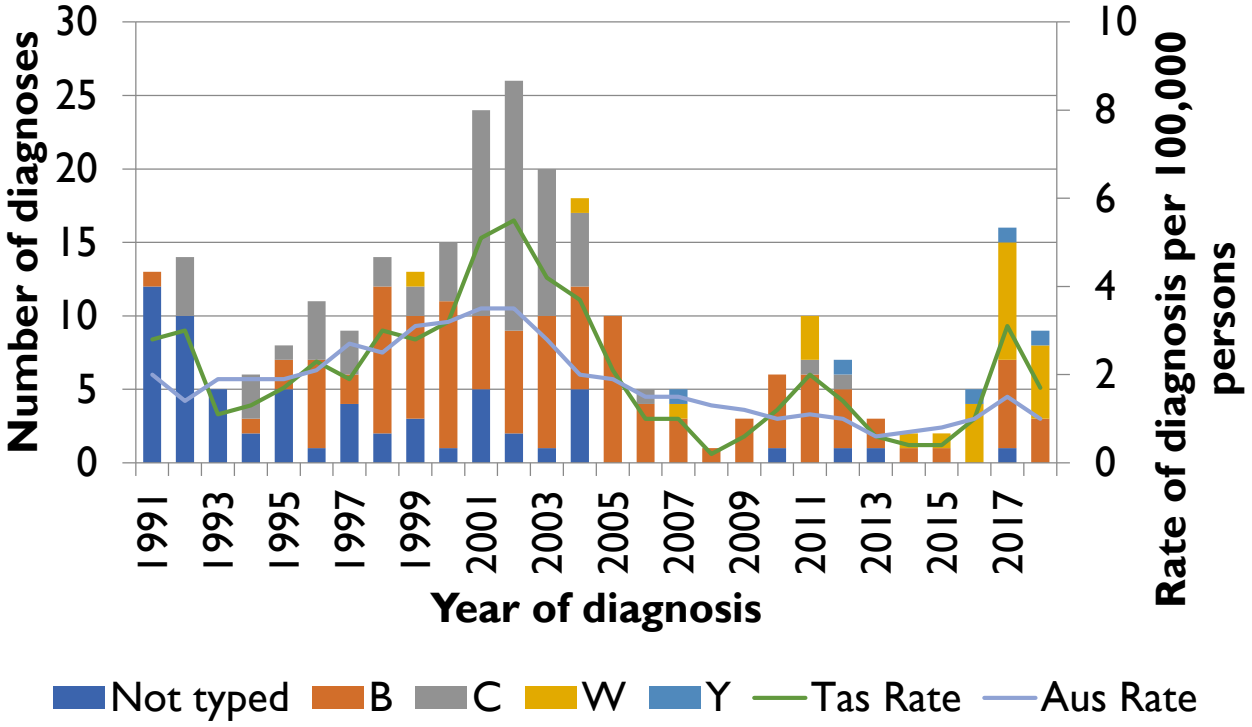
#Data extracted from the National Notifiable Diseases Surveillance System on 30 Sept 2017.

ˠ The rate for 2017 YTD has been annualised

Why not vaccinate against Men B disease?

- Epidemiology of serotypes
- Age groups with greatest burden
- Severity of disease
- Clinical presentation

Notifications of IMD in Tasmania



Cases admitted to ICU, Jan 2016 to Sep 2017

Serogroup	Total no. of cases	No. of cases admitted to ICU	% of cases admitted to ICU
B	196	86	43.9%
C	11	4	36.4%
W	208	82	39.4%
Y	92	26	28.3%
Total	526	200	38.0%

Total includes 3 non-groupable cases (1 admitted) and 16 'not grouped' cases (1 admitted).

Complications resulting from IMD, Jan 2016 to Sep 2017

Serogroup	Total number of cases	No. of cases with 1 or more complications	% of cases with 1 or more complications	No. of cases with 2 or more complications
B	196	16	8.2%	0
C	11	2	16.7%	0
W	208	31	14.9%	3
Y	92	7	7.4%	1
Total	526	57	10.8%	4

Total includes 3 non-groupable cases (0 with complications) and 16 'not grouped' cases (1 with a complication).

MenW similar in severity to MenC; MenY similar to MenB (mirroring CFR trends)

Clinical presentation of IMD cases

Serogroup	Typical, n	Atypical, n	Typical, %	Atypical, %
B	192	4	98.0%	2.0%
C	11	1	91.7%	8.3%
W	163	45	78.4%	21.6%
Y	75	19	79.8%	20.2%
Not grouped	14	2	87.5%	12.5%
Total	458	71	86.6%	13.4%

Total includes 3 non-groupable cases (all with typical presentation)

Higher proportion of MenW and MenY cases presenting with atypical clinical symptoms – consistent with cases seen overseas