Recent and current epidemiology of invasive meningococcal disease – vaccines & vaccine policy

Prof Robert Booy, June 2018

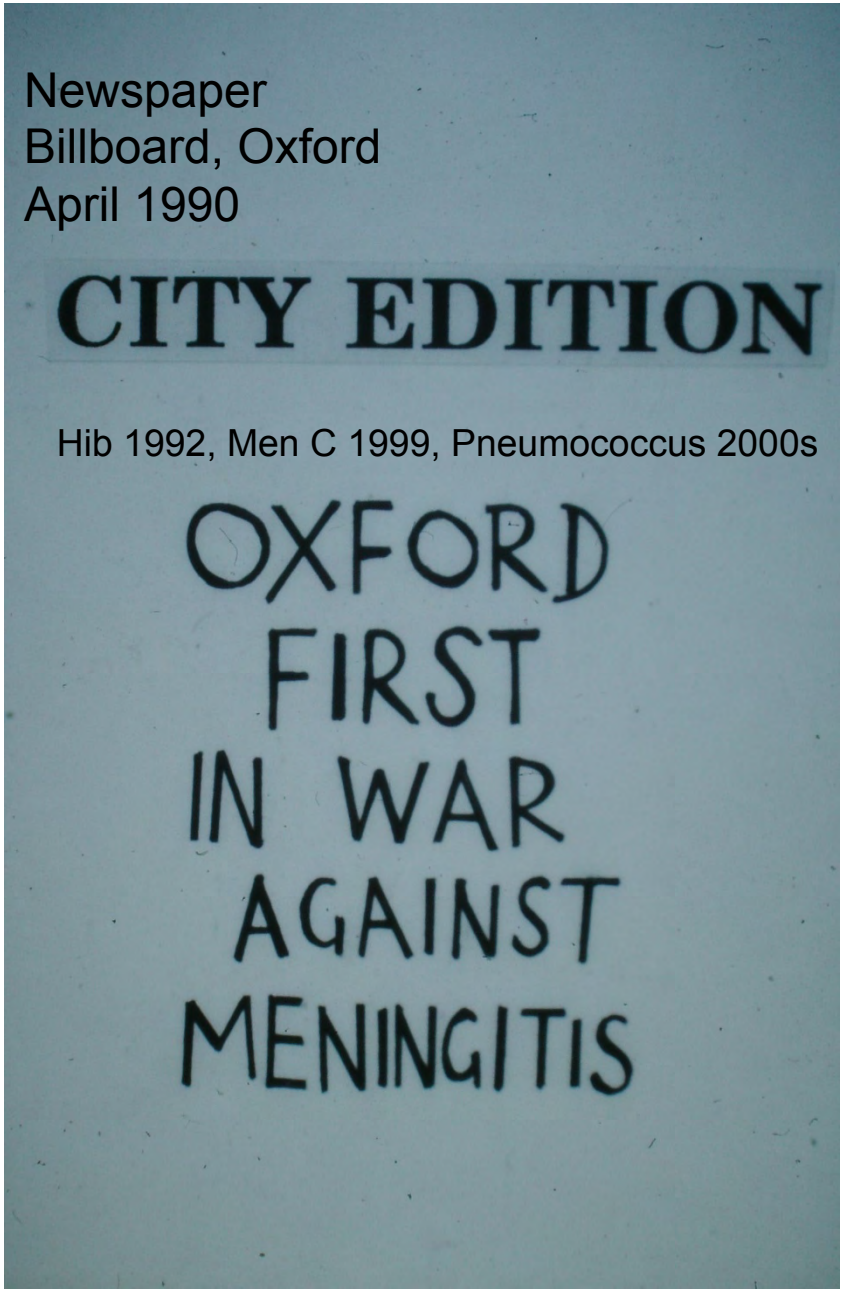
Many thanks to Peter Richmond, Cyra Patel, Clayton Chiu, Kevin Yin, Peter McIntyre, Nigel Crawford

Conflict of interest statement

NCIRS
National Centre for Immunisation Research and Surveillance

It can take 10 years or more for an important vaccine to be introduced;
Men C was super fast

Developing a Men B vaccine was super slow, a holy grail for decades



Meningococcal B vaccine for babies finally licensed in Oz in 2013..
Only SA about to pay to implement!

Outline

- Overview of meningococcal disease
- Epidemiology of meningococcal disease
- Meningococcal vaccines available
- Current recommendations and programs

Background

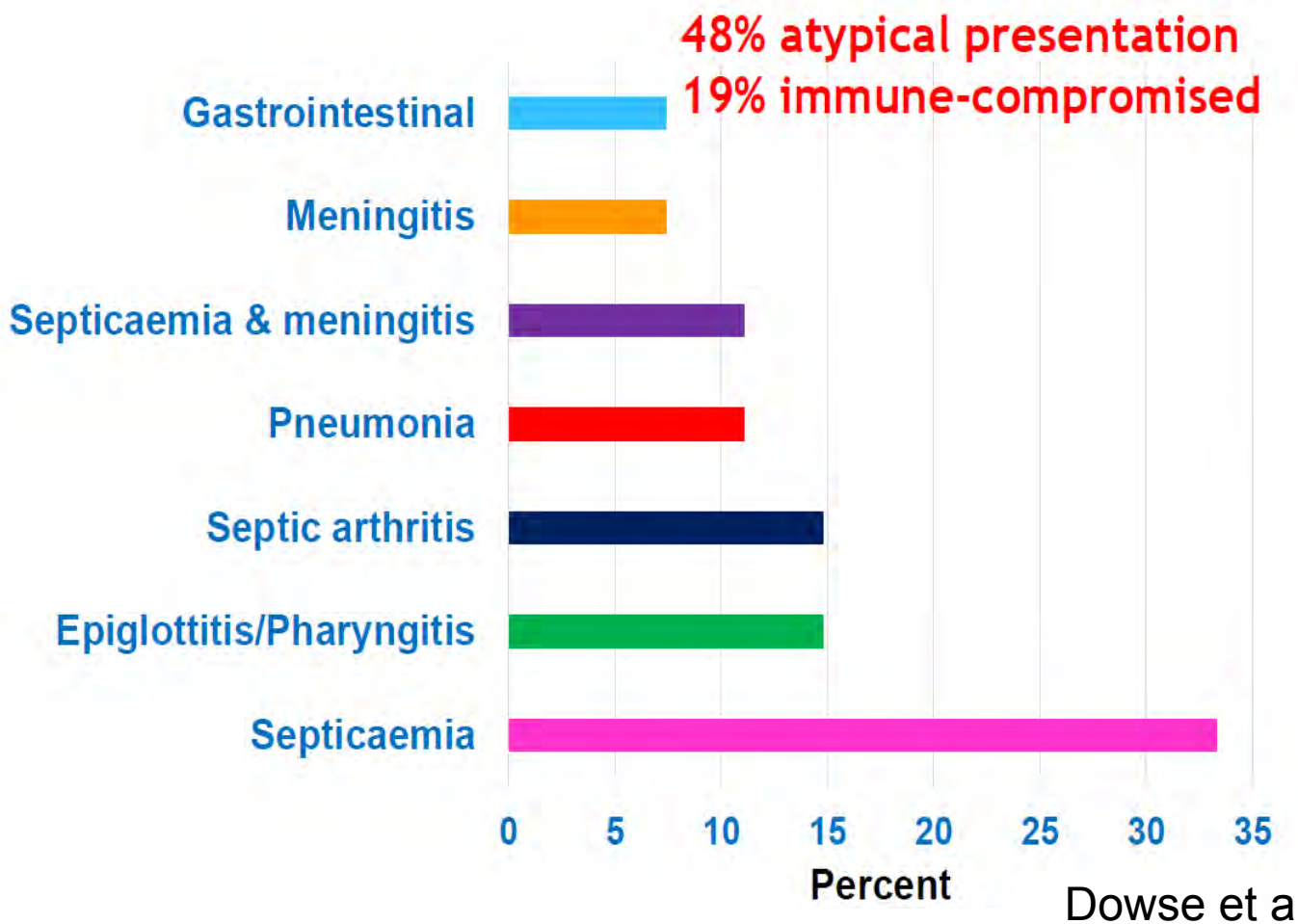
- Invasive Men disease (IMD) rare but serious
- 6 capsular types cause disease, A B C W Y X

- **Carriage in nasopharynx**

  Rate varies by age, setting; 5–35%

- **Requires close and prolonged contact to transmit**
- **Presentation: Meningitis, sepsis**
  Symptoms non-specific in infants
- **Older adults; (Y,W) pneumonia, epiglottitis, septic arthritis**

Meningococcal W presentations in West Australia 2013-7



Dowse et al CDNA 2017

Vaccination against IMD

- One dose **Men C** conjugate vaccine at 12 mths on NIP, 2003
- Catch-up program: to 19 yr olds; eventually to 24 yr olds
- ***MenACWY conjugate replaces Men C in July 2018 in Oz***
- MenACWY-TT (Nimenrix™; Pfizer) : approved as single dose, age 12 mths on NIP
- MenACWY-CRM_{197} (Menveo™; GSK)
- MenACWY-DT (Menactra™; Sanofi)

- ***No MenB vaccine on NIP yet***
  private only, but SA has a taskforce

PBAC: Bexsero did not meet the grade 3 times
Especially cost-effectiveness criteria;
UK data: effective & safe; Carriage? Cost-effective?
SA: high school-based carriage trial Men B; infant taskforce

Meningococcal ACYW vaccination

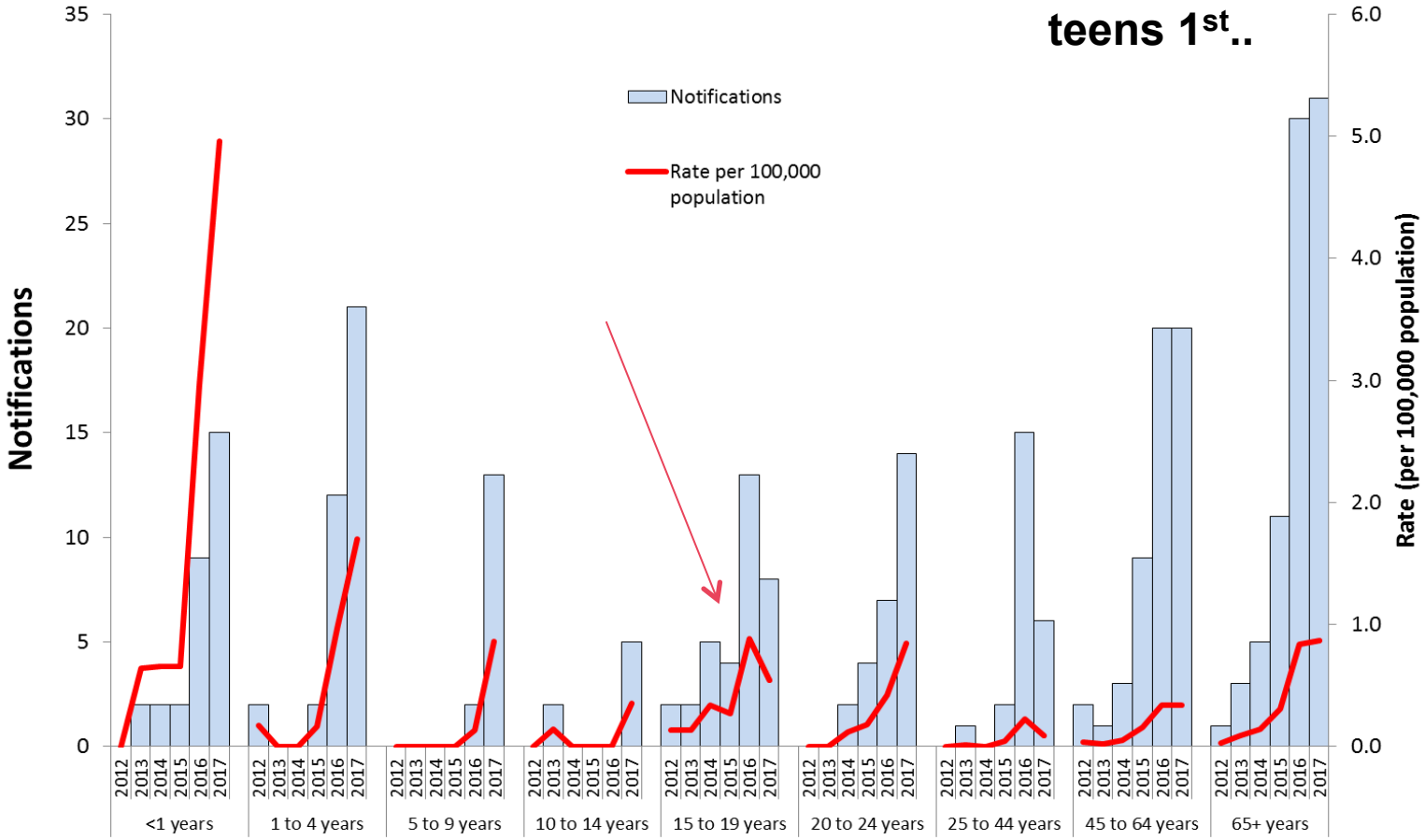
– Adolescent programs for meningococcal vaccination implemented in all states, *bar SA*, since 2017

– Expected to impact disease, carriage and transmission;
Also useful in outbreak control:
NT : W surge, 2017, is now over

– *Positive PBAC recommendation: adolescent MenACWY program (price dependent)*

Age-specific notifications and rates of Men W, Australia, 2012 to 2017#

cf: surges in late 1990s, Men B in NZ, ST-11 Men C Aust; **teens 1st..**



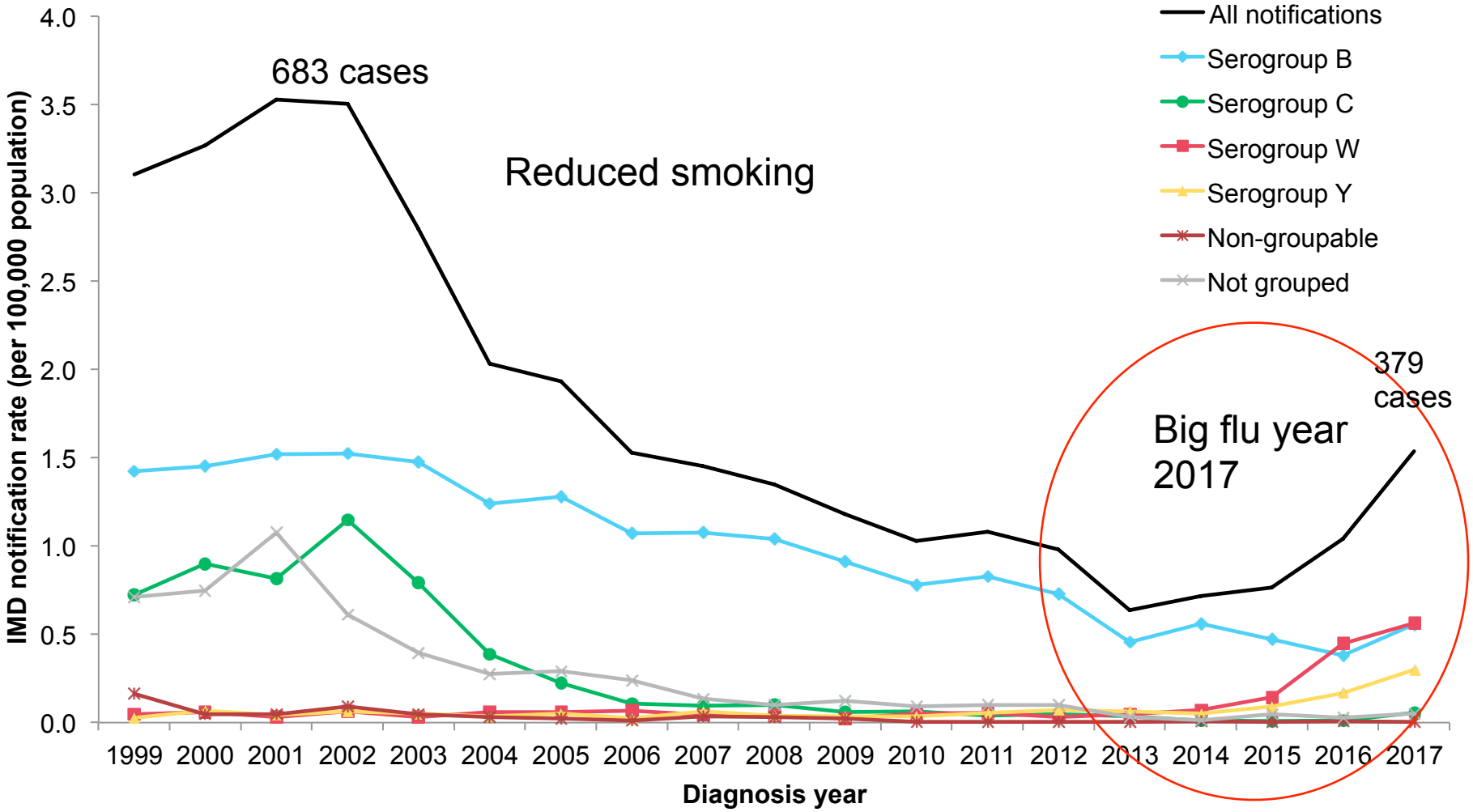
#Data from the NNDSS with a diagnosis date up until of 31 December 2017

Methods

- NNDSS: probable and confirmed cases of IMD
  - 1 January 1999 to 31 December 2017
    - Data extracted 28 March 2018
  - Detailed examination of calendar years 2016 and 2017

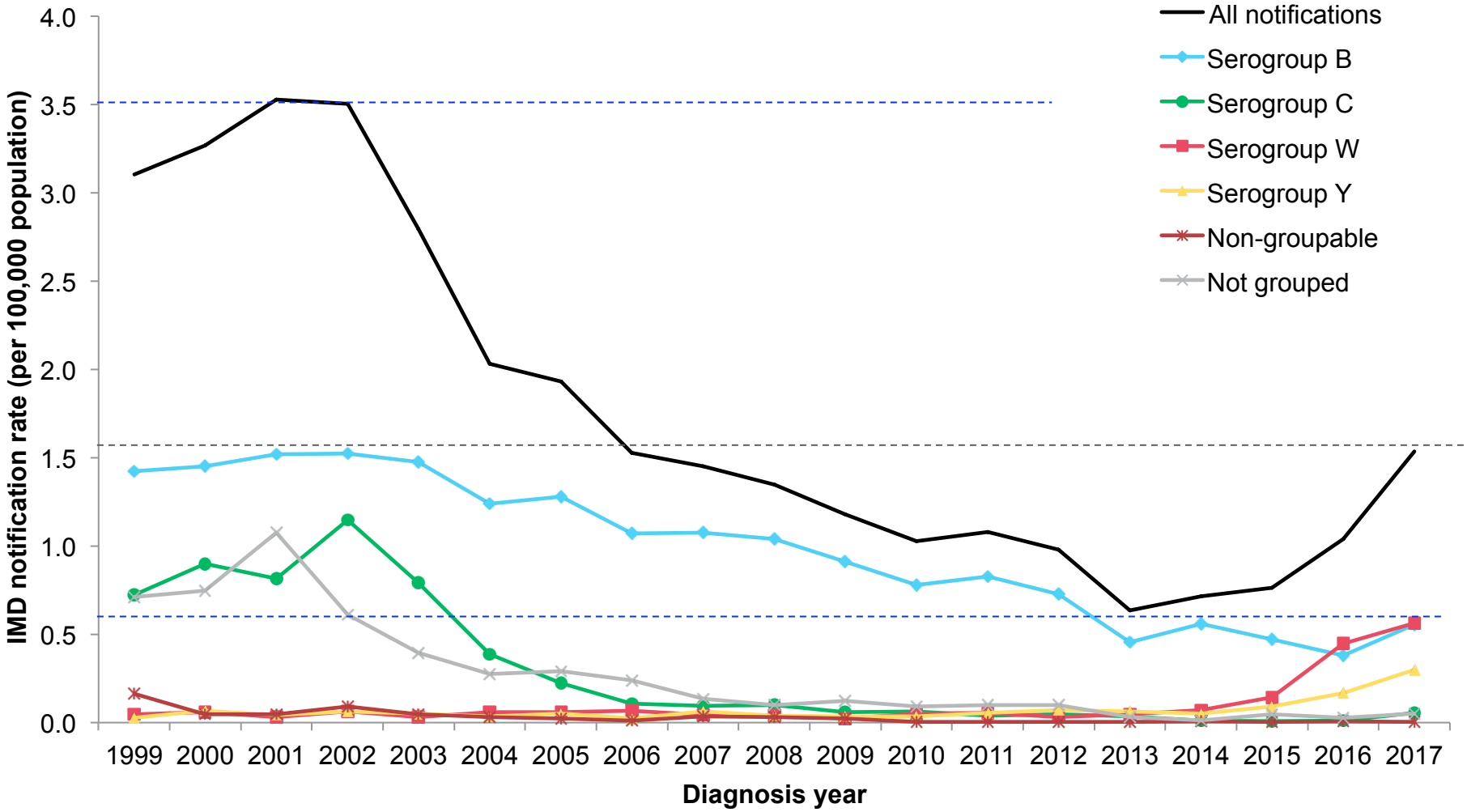
- Calculation of IMD (invasive meningococcal disease) notification and case-fatality rate by:
  - Serogroup
  - Age group
  - Aboriginal and/or Torres Strait Islander status

IMD notification rate by serogroup and year, 1999–2017



Trends are not shown for serogroups A (n=6) and X (n=2)

IMD notification rate by serogroup and year, 1999–2017



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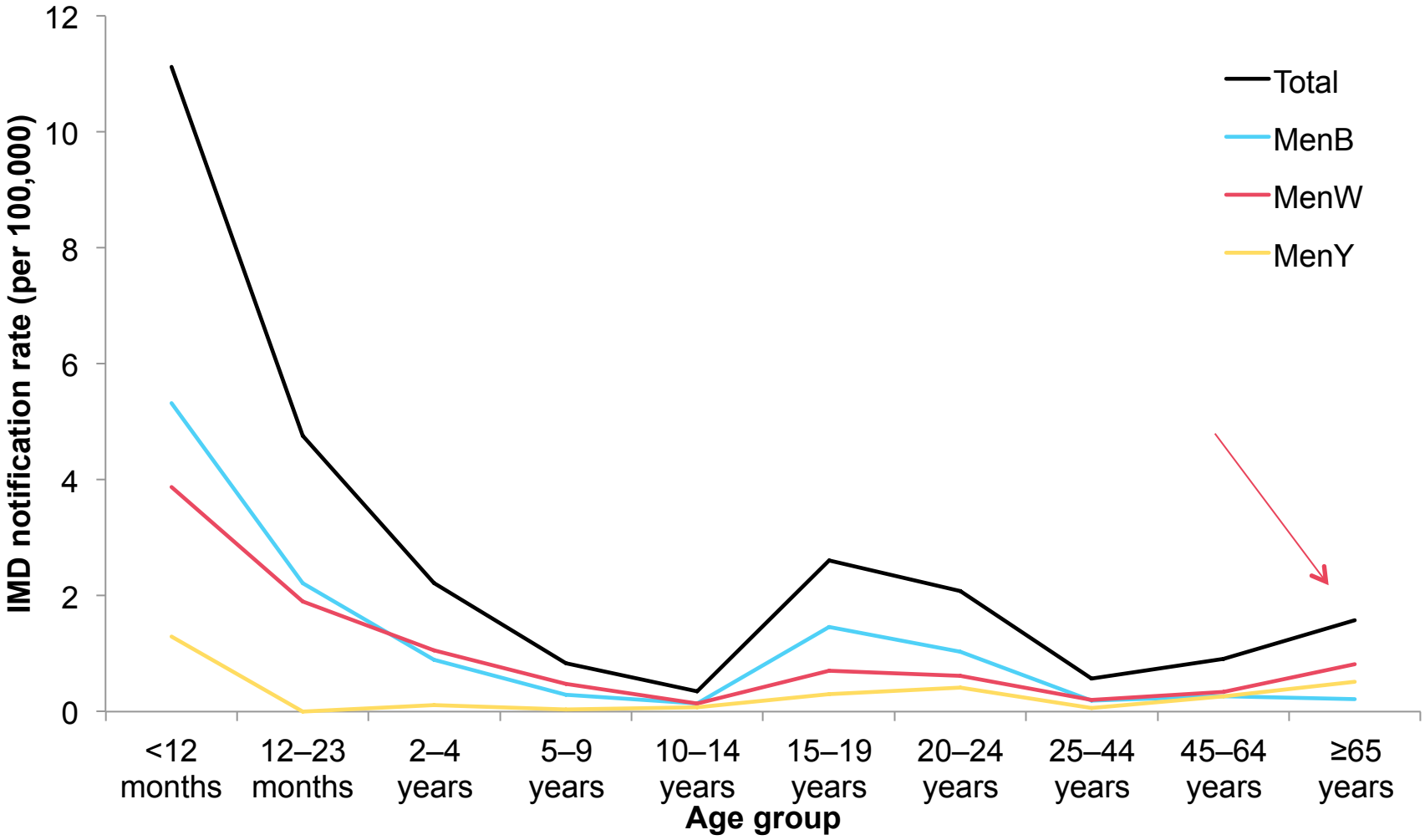
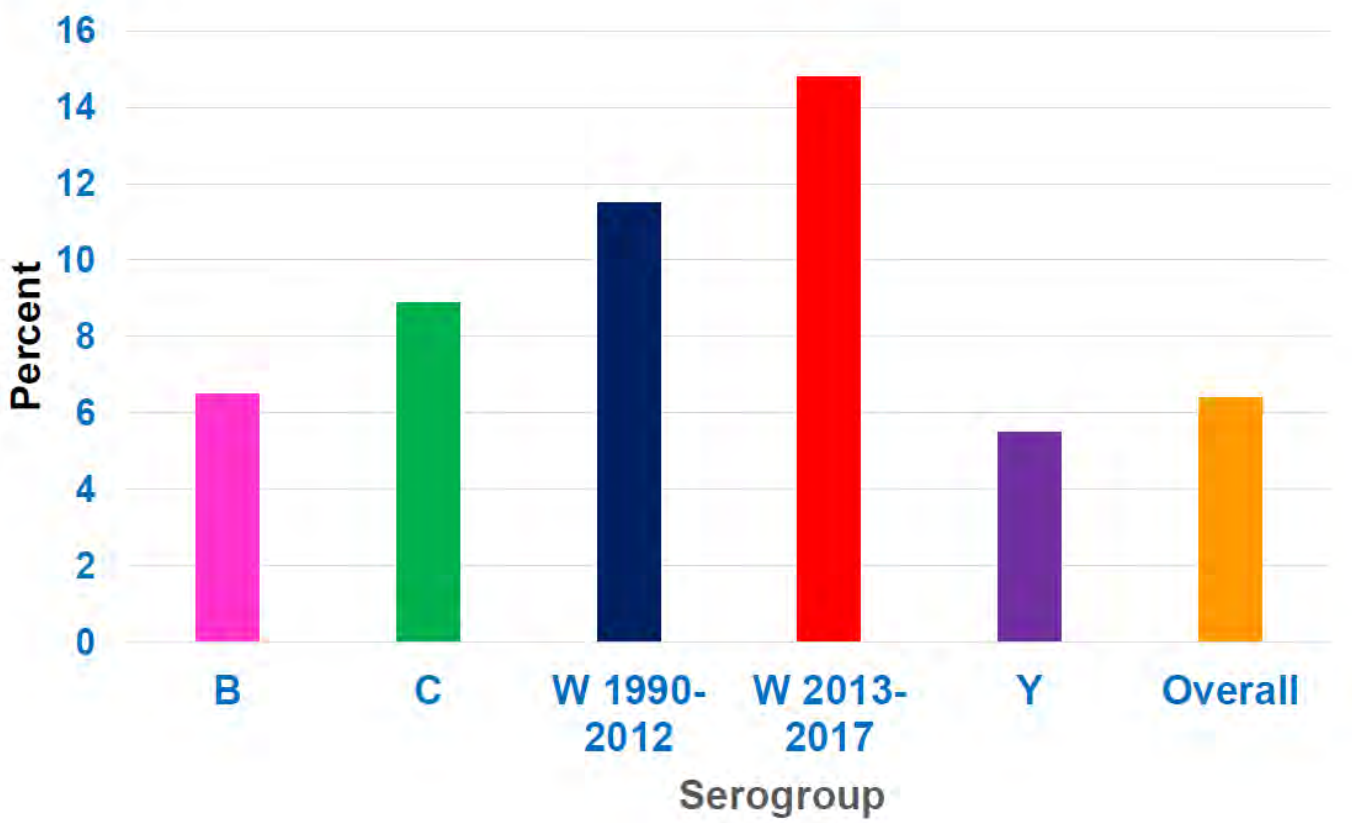
IMD notification rate by serogroup and age group, 2016–2017



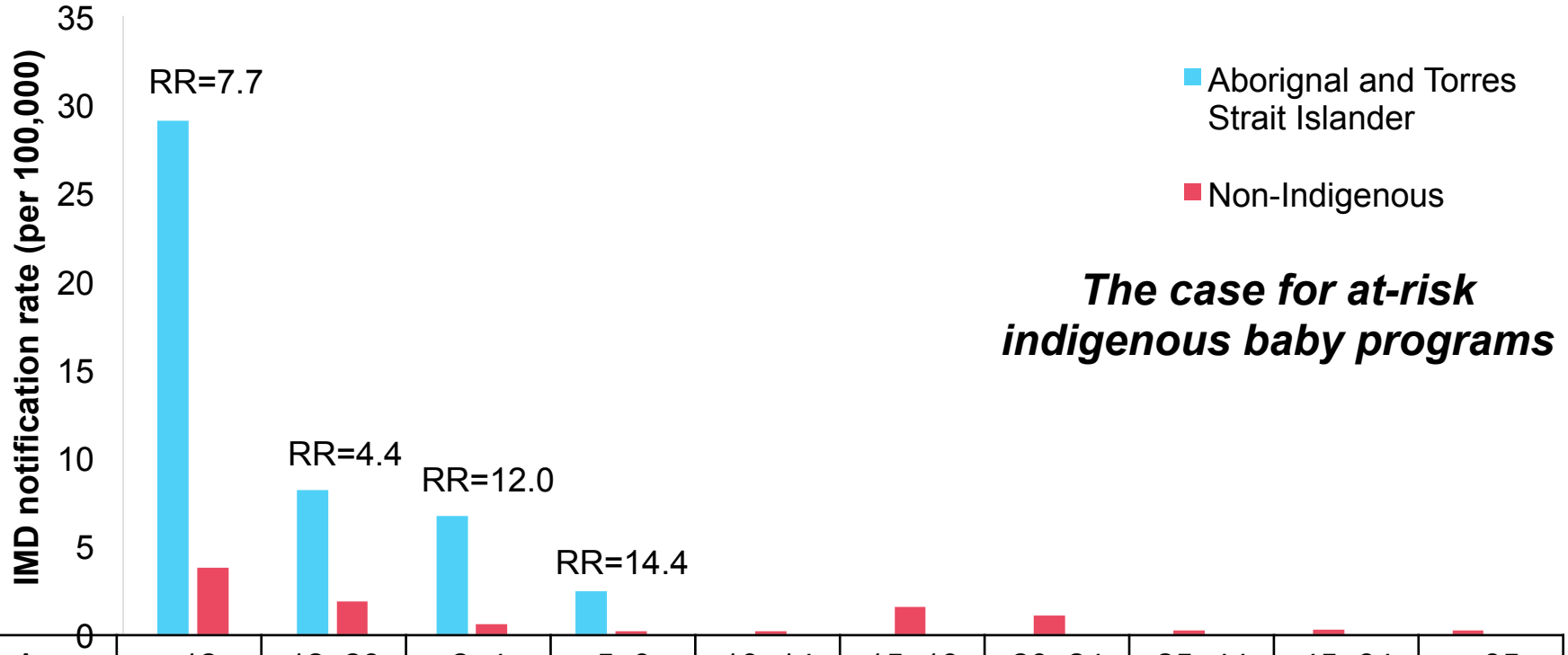
IMD mortality and case fatality ratios, 2016–2017 (comparison with MenC 1999–2002)

Serogroup	Number of deaths	Number of cases	Case Fatality Ratio
MenB	10	229	4.4%
MenC	49	686	7.1%
MenW	23	247	9.3%
MenY	5	114	4.4%

Case fatality rates WA 1990 – 2017



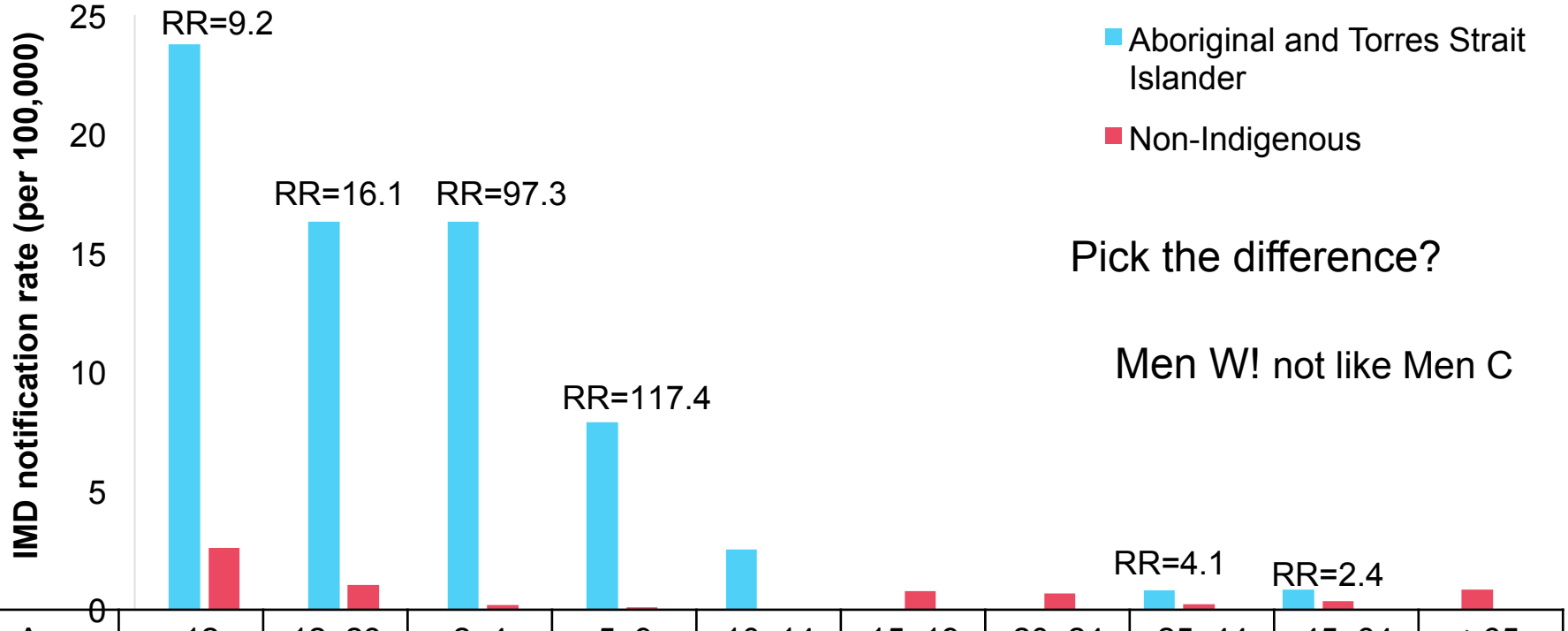
MenB notification rate for Aboriginal and Torres Strait Islanders vs non-Indigenous people, by age group, 2016–2017



The case for at-risk indigenous baby programs

Age group	<12 months	12–23 months	2–4 years	5–9 years	10–14 years	15–19 years	20–24 years	25–44 years	45–64 years	≥65 years
Aboriginal & TSI	11	3	7	4	0	0	0	0	0	0
Non-indigenous	22	11	10	5	4	43	35	26	32	16

MenW notification rate for Aboriginal and Torres Strait Islanders vs non-Indigenous people, by age group, 2016–2017



Age group	<12 months	12–23 months	2–4 years	5–9 years	10–14 years	15–19 years	20–24 years	25–44 years	45–64 years	≥65 years
Aboriginal & TSI	9	6	17	13	4	0	0	3	2	0
Non-indigenous	15	6	3	2	0	21	21	25	39	61

Overview of key findings

- Rising trends in MenW and MenY, continued through 2016 and 2017
- MenB remains endemic in Australia and causes about 40% of all IMD cases; *esp'ly babes and teens*
- Current trends remind me of historic trends
- MenW mortality > MenB or MenY

(similar to MenC; same genetic background, ST-11)

Implications for vaccination policy

- Epidemiology supports Men ACWY and Men B vaccination for:
  - All young children and adolescents
  - Aboriginal and Torres Strait Islander children aged <15 years
- ***Proving cost-effectiveness is a challenge***
- Jurisdictional adolescent MenACWY vaccine programs appear to be working

Acknowledgements

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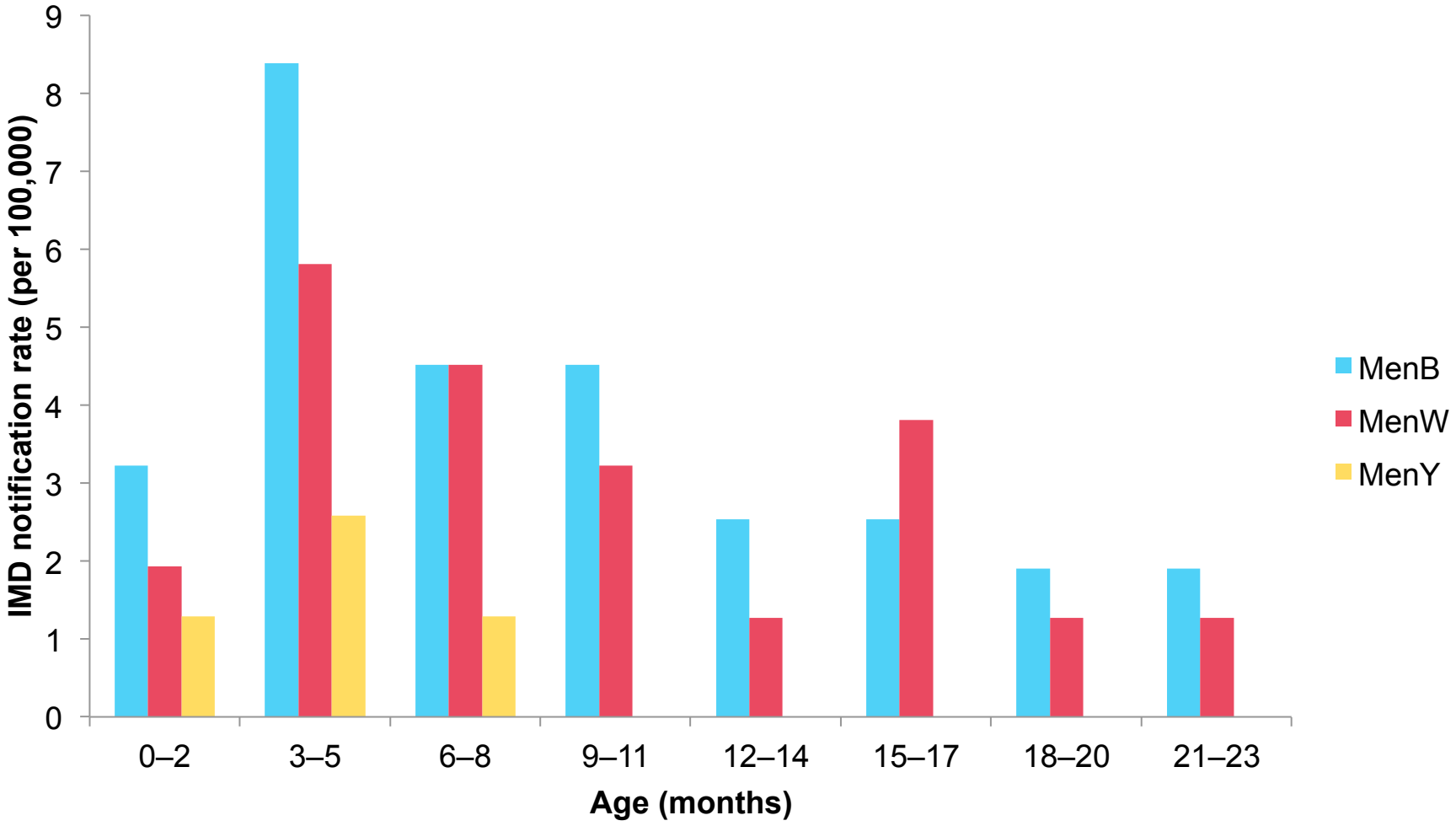
- National Notifiable Diseases Surveillance System
- Communicable Diseases Network of Australia
- Australian Government Department of Health
- Australian Technical Advisory Group on Immunisation and its Meningococcal Working Party

Additional slides

IMD notification rates in <2 years, 2016–17



IMD notifications rates in <2 years, 2016–17