Assessing the impact of hepatitis A vaccination

Vignette

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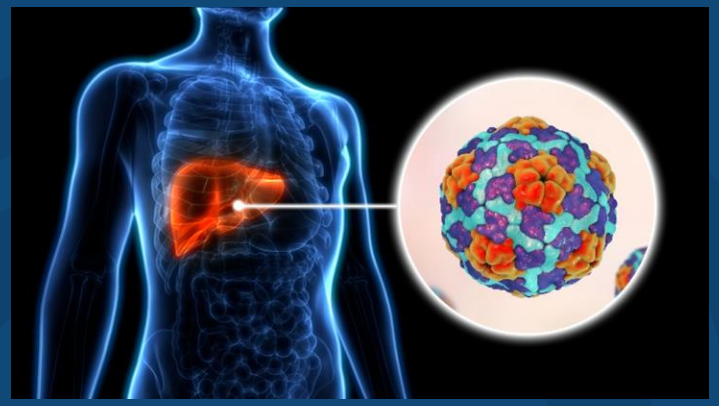
Source: https://www.fda.gov/food/foodborne-pathogens/hepatitis-virus-hav

Overview

Vignette: Real-world example

- Background
- Methods: Study design, data sources, time period
- Results
- Questions and Answers on Key Findings
- Limitations
- Commentary/Discussion

Hepatitis A



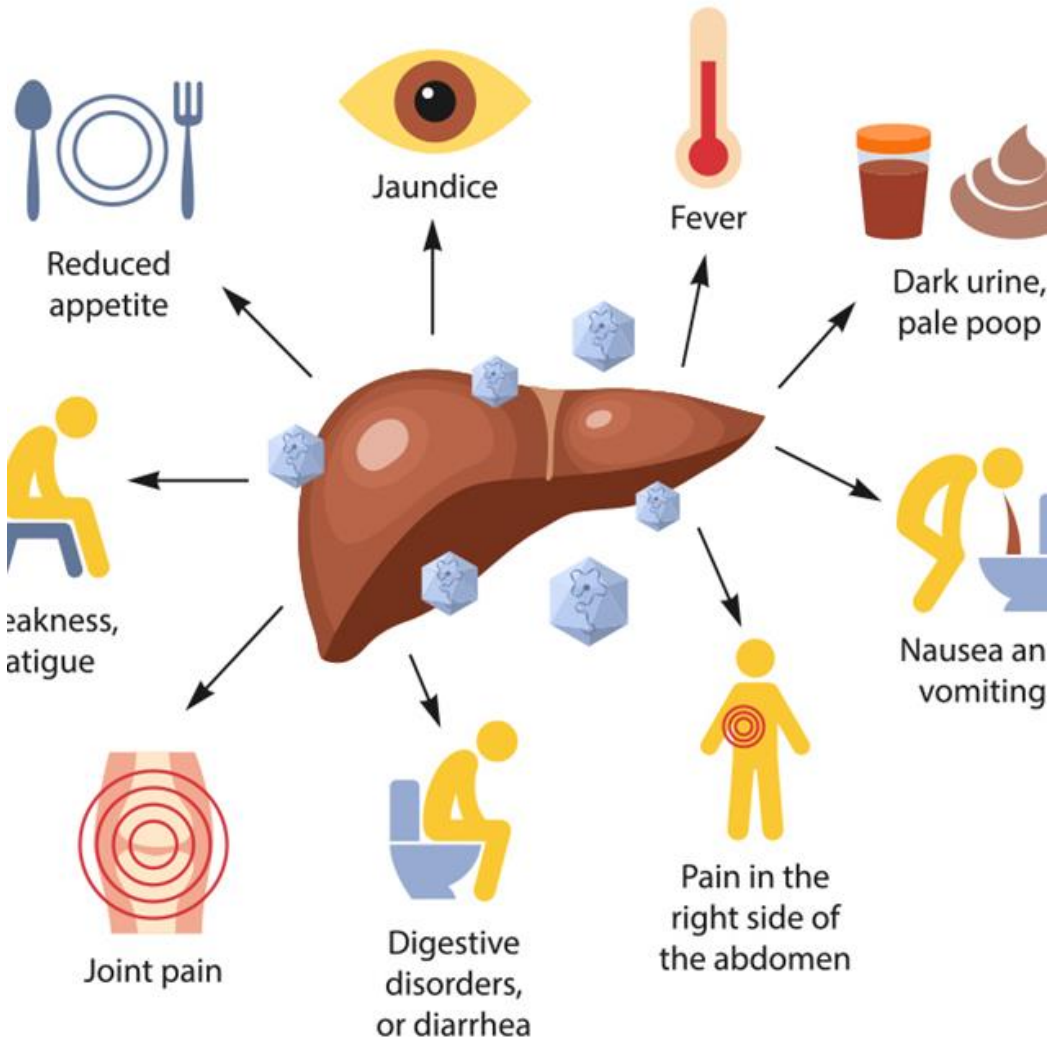
Source: https://www.cdc.gov/hepatitis-a/about/index.html

Background

- Hepatitis A is an acute infection of the liver caused by the hepatitis A virus, a picornavirus.
- Inflammation of liver can cause mild to severe illness.
- Complications include acute liver failure, relapsing hepatitis, autoimmune hepatitis, extrahepatic disease, e.g. arthritis, vasculitis, myocarditis
- Globally: affects ~120 million people annually
- Transmitted through the faecal-oral route

Source: https://www.who.int/news-room/fact-sheets/detail/hepatitis-a
https://www.cdc.gov.au/topics/hepatitis-a-health-professionals

SYMPTOMS OF HEPATITIS A



Source: https://sexualhealth.gov.mt/content/hepatitis-0

Vaccination history in Australia: Hepatitis A

Significant events in hepatitis A vaccination practice in Australia

Year	Month	Intervention
1994		First hepatitis A vaccine registered for use in adults; 3 doses recommended for at-risk groups: • travellers to areas of intermediate or high endemicity • persons with an occupational risk of exposure (day care centre carers; teachers of intellectually disabled; staff and residents of facilities for intellectually disabled; health workers and teachers in remote Aboriginal and Torres Strait Islander communities; nursing staff and other healthcare workers in contact with patients in paediatric and infectious disease wards) • homosexual men • persons with chronic liver disease or liver transplants • recipients of blood products
1997	February	List of at-risk individuals for whom hepatitis A vaccination is recommended expanded to include: nursing staff and other healthcare workers in contact with patients in the emergency department and intensive care units; sewage workers; food handlers
1999	February	Funded Hepatitis A vaccination program commenced in north Queensland for Aboriginal and Torres Strait Islander children aged 18 months to 6 years
2005	November	Hepatitis A vaccination (2 doses) recommended and funded for Aboriginal and Torres Strait Islander children aged 12–24 months of age residing in NT, QLD, SA and WA: in NT and WA scheduled at ages 12 and 18 months; in QLD and SA scheduled at ages 18 and 24 months
2018	May	Hepatitis A vaccine funded by TAS for men who have sex with men, aged 16 to 69 years, given as two doses at least six months apart
2020	July	Scheduled ages for funded hepatitis A vaccination (2 doses) for Aboriginal and Torres Strait Islander children in the NT, Qld, SA, WA changed to 18 months and 4 years

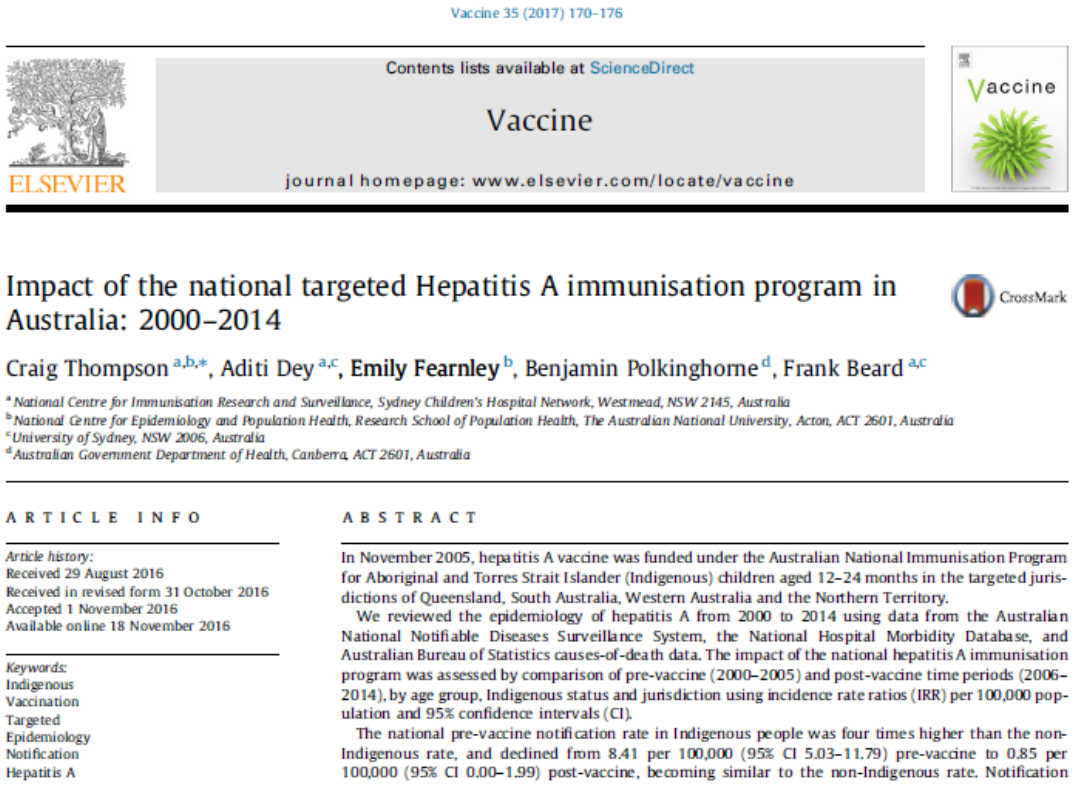
Funding for hepatitis A vaccination program

National Immunisation Program funded for Aboriginal and Torres Strait Islander children aged 12-24 months in November 2005.

Funded jurisdictions: Queensland, South Australia, Western Australia and the Northern Territory

https://ncirs.org.au/sites/default/files/2020-07/Hepatitis-A-history-July%202020.pdf

Impact of the national targeted Hepatitis A immunisation program in Australia: 2000–2014



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Impact of the national targeted Hepatitis A immunisation program in Australia: 2000–2014

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ABSTRACT

In November 2005, hepatitis A vaccine was funded under the Australian National Immunisation Program for Aboriginal and Torres Strait Islander (Indigenous) children aged 12–24 months in the targeted jurisdictions of Queensland, South Australia, Western Australia and the Northern Territory.

We reviewed the epidemiology of hepatitis A from 2000 to 2014 using data from the Australian National Notifiable Diseases Surveillance System, the National Hospital Morbidity Database, and Australian Bureau of Statistics causes-of-death data. The impact of the national hepatitis A immunisation program was assessed by comparison of pre-vaccine (2000–2005) and post-vaccine time periods (2006–2014), by age group, Indigenous status and jurisdiction using incidence rate ratios (IRR) per 100,000 population and 95% confidence intervals (CI).

The national pre-vaccine notification rate in Indigenous people was four times higher than the non-Indigenous rate, and declined from 8.41 per 100,000 (95% CI 5.03–11.79) pre-vaccine to 0.85 per 100,000 (95% CI 0.00–1.99) post-vaccine, becoming similar to the non-Indigenous rate. Notification

Study aims

To assess the impact of a national targeted hepatitis A vaccination program in Australia

Thompson C, Dey A, Fearnley E, Polkinghorne B, Beard F. Impact of the national targeted Hepatitis A immunisation program in Australia: 2000-2014. Vaccine. 2017 Jan 3;35(1):170-176. https://pubmed.ncbi.nlm.nih.gov/27876203/

Methods

Study design

Descriptive epidemiological study

Data sources

- National Notifiable Diseases Surveillance System (NNDSS)
- National Hospital Morbidity Database (NHMD)
- Australian Bureau of Statistics (ABS)

Analysis

Comparison of notifications, hospitalisations **before** (2000–2005) and **after** (2006–2014) the introduction of program

RESULTS

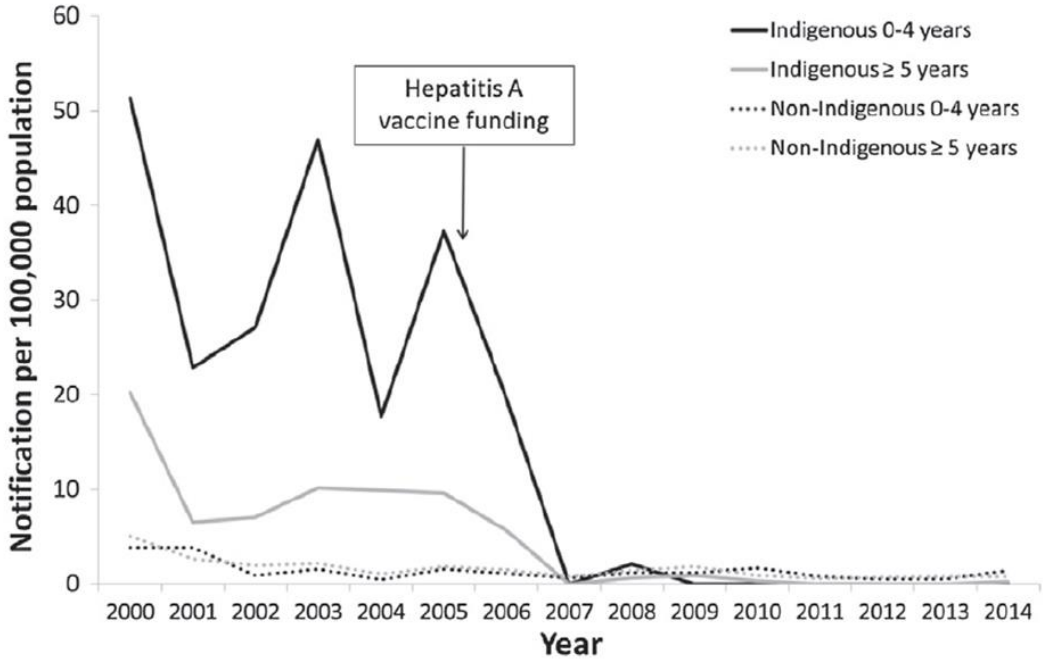
Notification rates per 100,000 population

Within your groups/tables, discuss what do graphs (a) and (b) show?

 # You have 5 minutes for discussion

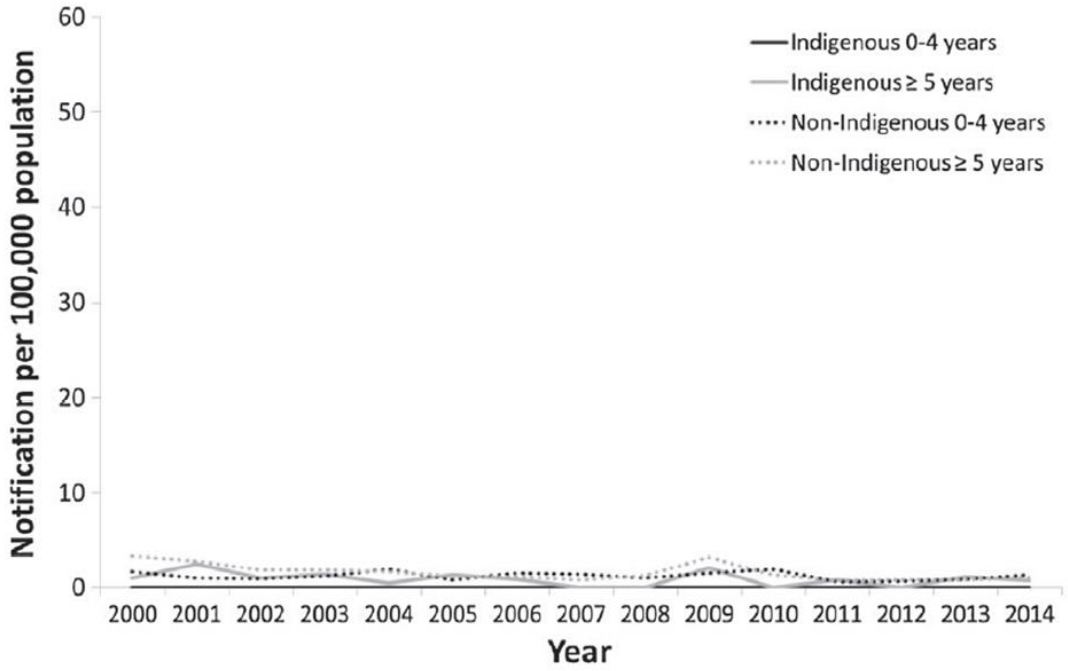
Targeted jurisdictions: Queensland, South Australia, Western Australia and the Northern Territory

*(a) Notification rates for targeted jurisdictions^*



Non-targeted jurisdiction: New South Wales, Victoria, Tasmania and the Australian Capital Territory

(b) Notification rates for non-targeted jurisdictions~



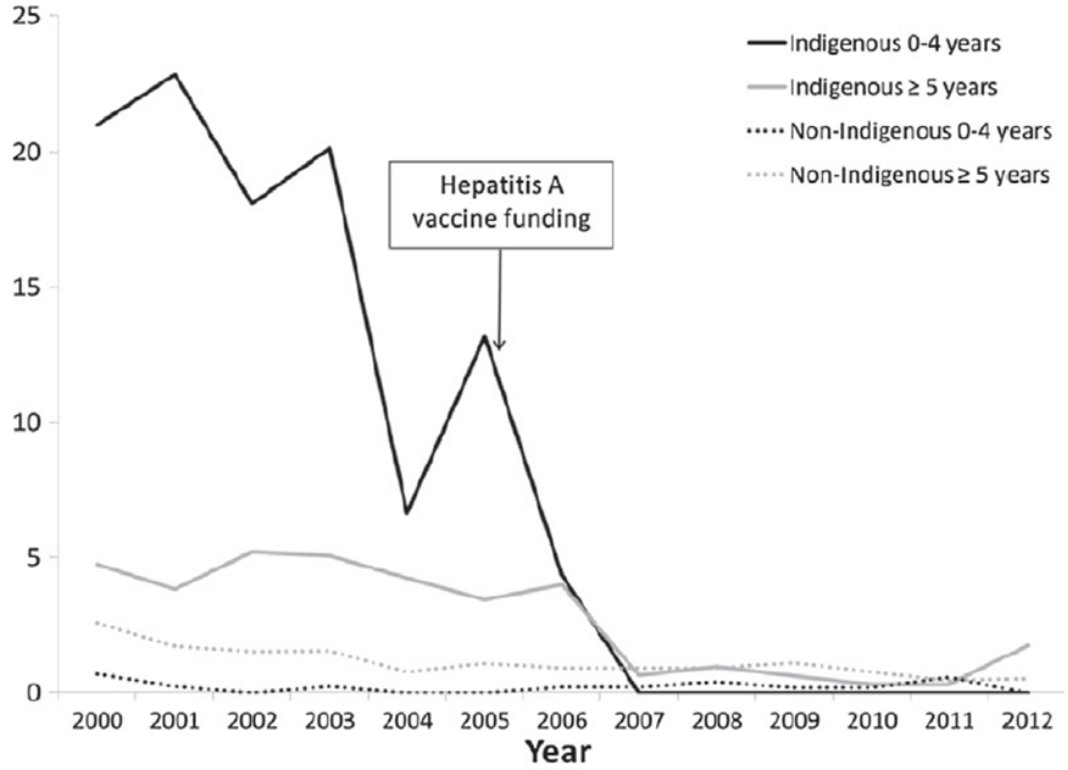
Hospitalisations rates per 100,000 population

Within your groups/tables, discuss what do graphs (c) and (d) show?

 # You have 5 minutes for discussion

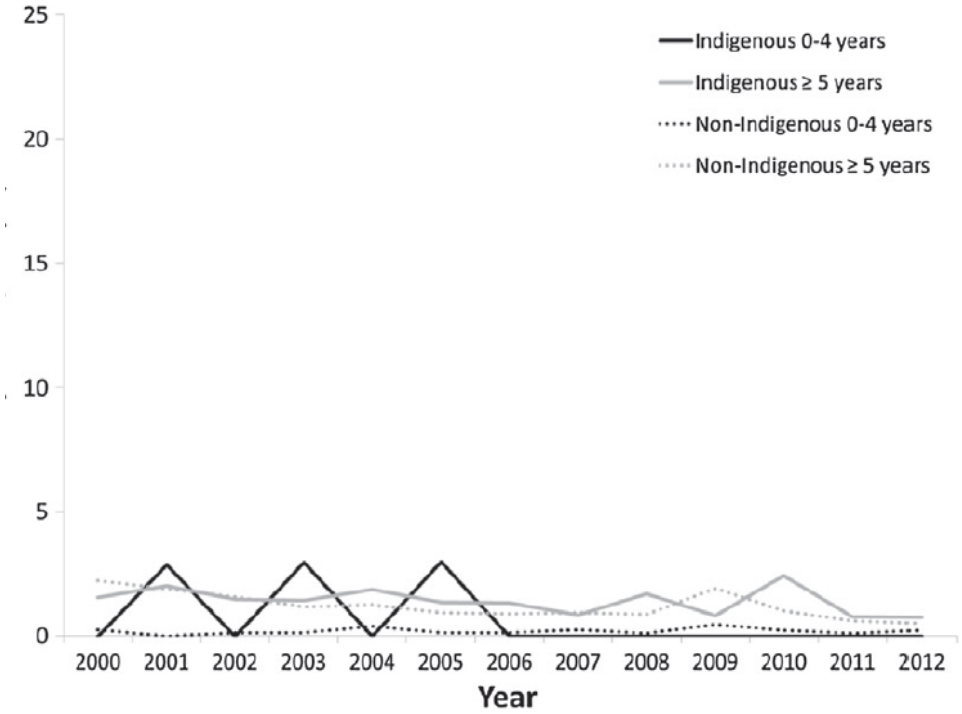
Targeted jurisdictions: Queensland, South Australia, Western Australia and the Northern Territory

*(c) Hospitalisation rates for targeted jurisdictions^*



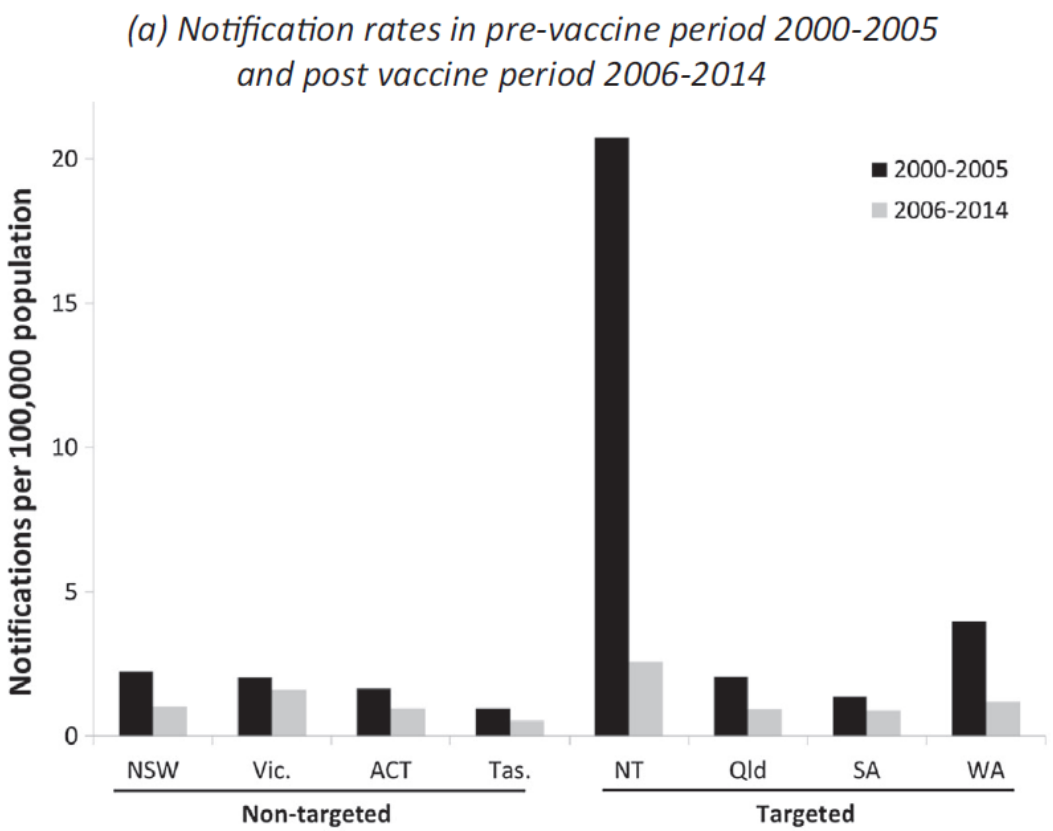
Non-targeted jurisdiction: New South Wales, Victoria, Tasmania and the Australian Capital Territory

(d) Hospitalisation rates for non-targeted jurisdictions~



Rates before and after program introduction

Notifications



Hospitalisations

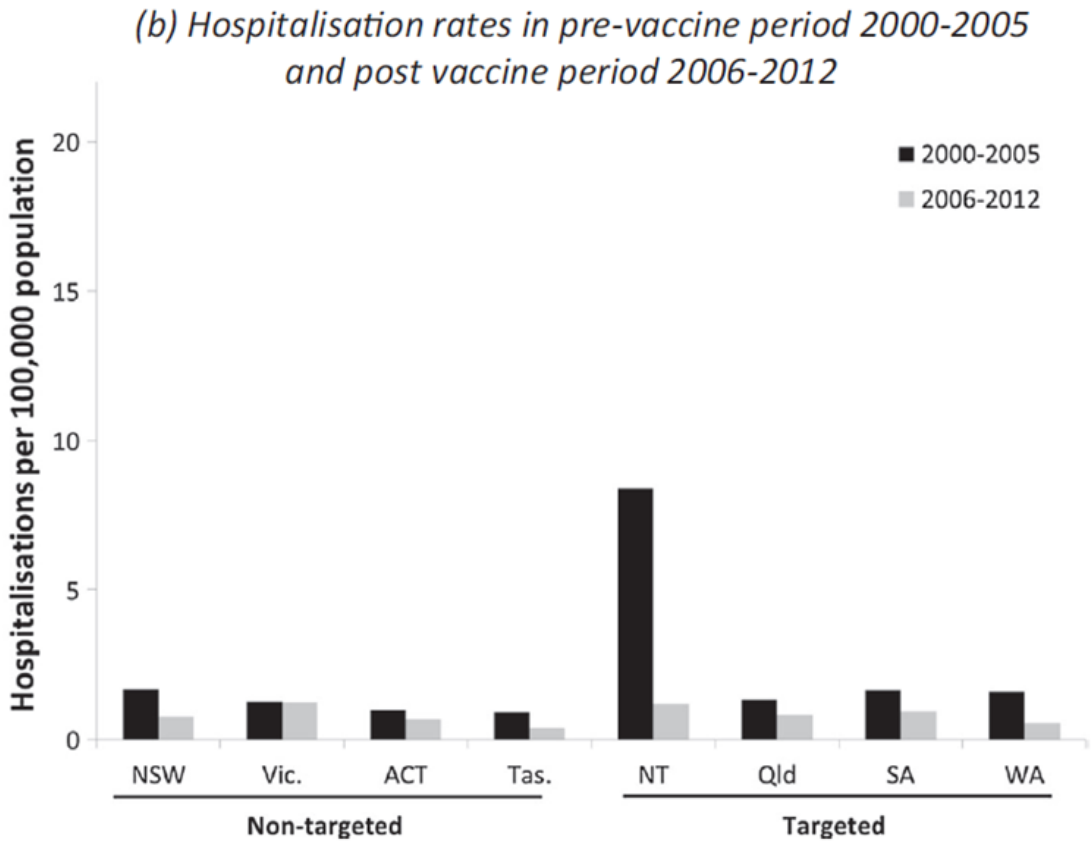
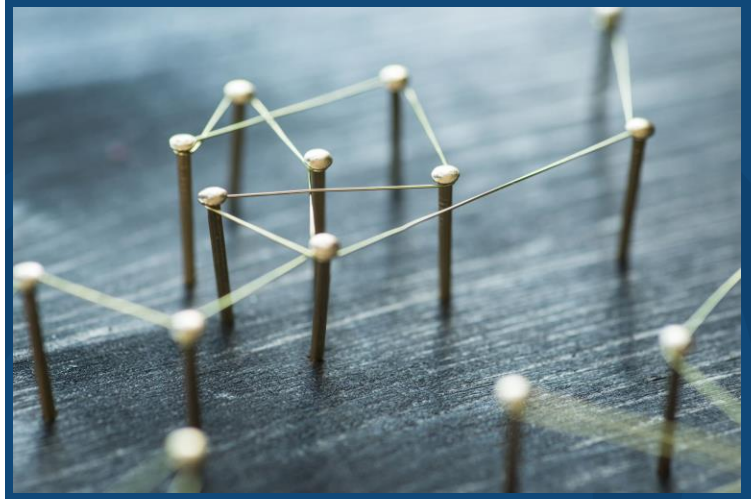


Table 1
Hepatitis A notifications and hospitalisations, by age group, Indigenous status and pre-/post-vaccine period, Australia, 2000–2014; rates, counts and incidence rate ratios (95% CI).

	Age group (years)	Pre-vaccine (2000–2005)		Post-vaccine [a]		Incidence rate ratio[b]	
		Non-Indigenous[c] (N)	Indigenous[c] (N)	Non-Indigenous[c] (N)	Indigenous[c] (N)	Non-Indigenous (95% CI)	Indigenous (95% CI)
(a) Targeted jurisdictions: Queensland, South Australia, Western Australia and the Northern Territory							
Notifications	<5	2.09 (55)	33.91 (90)	0.99 (46)	2.41 (10)	**0.49 (0.33–0.73)**	**0.07 (0.04–0.13)**
	5–19	2.24 (194)	18.37 (120)	1.33 (185)	1.46 (16)	**0.59 (0.48–0.73)**	**0.08 (0.05–0.13)**
	20–49	3.30 (604)	6.13 (48)	1.30 (404)	0.38 (5)	**0.39 (0.35–0.45)**	**0.06 (0.02–0.15)**
	50–64	1.63 (116)	2.36 (3)	0.66 (88)	0.81 (2)	**0.41 (0.31–0.54)**	0.29 (0.05–1.73)
	⩾65	1.01 (52)	0.00 (0)	0.35 (33)	0.98 (1)	**0.34 (0.22–0.52)**	–
	Total	2.44 (1021)	13.85 (261)	1.04 (756)	1.08 (34)	**0.43 (0.39–0.47)**	**0.07 (0.05–0.10)**
Hospitalisations	<5	0.19 (5)	16.99 (45)	0.26 (9)	0.62 (2)	1.45 (0.49–4.33)	**0.04 (0.01–0.16)**
	5–19	0.54 (47)	5.26 (35)	0.43 (44)	1.04 (8)	0.82 (0.54–1.23)	**0.18 (0.09–0.40)**
	20–49	1.95 (359)	4.51 (35)	0.89 (200)	1.72 (16)	**0.46 (0.39–0.55)**	**0.37 (0.20–0.66)**
	50–64	1.53 (108)	1.54 (2)	0.88 (87)	0.00 (0)	**0.61 (0.46–0.81)**	–
	⩾65	1.76 (91)	0.00 (0)	0.94 (65)	0.00 (0)	**0.55 (0.40–0.76)**	–
	Total	1.45 (610)	6.20 (117)	0.77 (405)	1.15 (26)	**0.54 (0.48–0.62)**	**0.18 (0.12–0.27)**
	Age group (years)	Pre-vaccination (2000–2005)		Post-vaccination[a]		Incidence rate ratio[b]	
		Non-Indigenous[c] (N)	Indigenous[c] (N)	Non-Indigenous[c] (N)	Indigenous[c] (N)	Non-Indigenous (95% CI)	Indigenous (95% CI)
(b) Non-targeted jurisdictions: New South Wales, Victoria, Tasmania and the Australian Capital Territory							
Notifications	<5	1.21 (55)	0.00 (0)	1.23 (92)	0.00 (0)	0.96 (0.69–1.33)	–
	5–19	2.21 (319)	1.96 (10)	1.79 (393)	0.57 (5)	**0.81 (0.70–0.94)**	**0.32 (0.11–0.95)**
	20–49	2.89 (907)	1.09 (6)	1.43 (720)	0.70 (7)	**0.50 (0.46–0.56)**	0.67 (0.23–1.99)
	50–64	1.12 (133)	0.00 (0)	0.77 (164)	0.86 (2)	**0.69 (0.55–0.87)**	–
	⩾65	1.07 (102)	2.07 (1)	0.64 (107)	0.00 (0)	**0.59 (0.45–0.78)**	–
	Total	2.12 (1516)	1.19 (17)	1.25 (1476)	0.55 (14)	**0.60 (0.56–0.64)**	**0.47 (0.23–0.95)**
Hospitalisations	<5	0.18 (8)	1.48 (3)	0.23 (12)	0.00 (0)	1.28 (0.52–3.14)	–
	5–19	0.53 (77)	0.81 (4)	0.61 (99)	0.28 (1)	1.18 (0.87–1.58)	0.20 (0.02–1.80)
	20–49	1.79 (562)	2.50 (14)	1.01 (383)	2.08 (15)	**0.60 (0.52–0.68)**	0.88 (0.42–1.82)
	50–64	1.56 (185)	0.90 (1)	1.15(177)	1.99 (4)	**0.76 (0.62–0.93)**	2.67 (0.30–23.88)
	⩾65	2.22 (211)	2.34 (1)	1.19 (142)	0.00 (0)	**0.54 (0.44–0.67)**	–
	Total	1.45 (1043)	1.61 (23)	0.94 (813)	1.10 (20)	**0.67 (0.61–0.73)**	0.70 (0.38–1.27)

N = number of cases.
Bold IRR denote significant reductions (p-value < 0.05).
[a] Post-vaccine period-Notifications: January 2006-December 2014; Hospitalisations: January 2006-June 2012.
[b] Comparison of pre- and post-vaccine periods.
[c] Average annual rate per 100,000 total population.



Limitations

- Descriptive nature of the study makes it difficult to quantify the exact contribution of this program.
- Notifications may underestimate true incidence, particularly in young children, and may be influenced by
  - changes in diagnostic and public health follow-up practices over time and across jurisdictions
- Hospitalisation data may be influenced by access to hospital care, changes in admission practices, and coding error

Commentary/Discussion

Targeted program worked well

- The national targeted hepatitis A immunisation program introduced in 2005 was highly effective.
- In Aboriginal and Torres Strait Islander children aged <5 years in QLD, WA, SA and NT, hepatitis A notifications dropped significantly in the post-vaccine period compared to the pre-vaccine period
- This shows that a targeted approach, focused on the most at-risk groups, can achieve significant reductions in disease burden with target approach.

Commentary/Discussion

Why is follow-up of eligible children (not vaccinated or partially vaccinated) important?

- Children who miss doses remain vulnerable, and in communities with high mobility or where families use multiple services, follow-up is essential.
- The hepatitis A program evaluation* highlighted gaps in identifying and recalling Aboriginal and Torres Strait Islander children, especially in urban and general practice settings.
- Active follow-up (through recall systems, catch-up schedules, and the Australian Immunisation Register) ensures equity and sustained protection.

* https://ncirs.org.au/sites/default/files/2018-11/Evaluation-hepatitis-A-program-Indigenous-children-2015_1.pdf

Commentary/Discussion

Why is documentation and reporting important?

- Accurate documentation in the Australian Immunisation Register (AIR) is critical for tracking doses, monitoring coverage, and identifying missed vaccinations.
- Reliable data helps services target resources and strengthen local outreach, especially in high-risk or underserved communities.
- The hepatis A program evaluation* recommended improved reporting at local levels and the use of consistent, culturally-appropriate communication resources to support uptake.
- Documentation also ensures accountability and demonstrates the ongoing success of the program to governments and communities.

* https://ncirs.org.au/sites/default/files/2018-11/Evaluation-hepatitis-A-program-Indigenous-children-2015_1.pdf

Thank you

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