EPIDEMIOLOGY OF VACCINE-PREVENTABLE VIRAL INFECTIONS IN ABORIGINAL & TORRES STRAIT ISLANDER AUSTRALIANS

Did you know that the influenza vaccine is available for free and recommended as part of the childhood vaccination schedule for Aboriginal children aged over 6 months to 5 years?

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VIRUSES IN MAY, 2017, KATOOMBA

Outline

- Why consider epidemiology & prevention of vaccine-preventable diseases in Aboriginal and Torres Strait Islander populations as a separate/special situation
- Current and projected demographics of Aboriginal and Torres Strait Islander populations in Australia
- Trends and current status of overall vaccine coverage and access
- Update on individual diseases

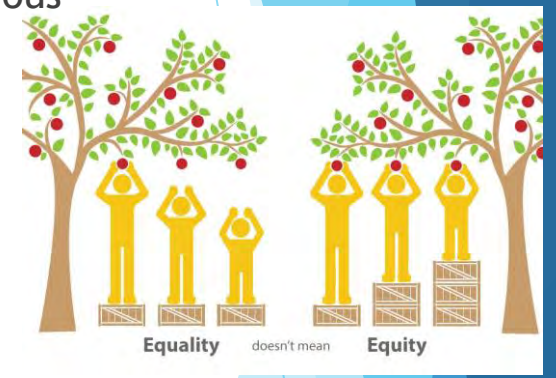
what's the opposite of generalise?

specify, ignore, miss, neglect, overlook, unsettle, except, specifize, particularize, specialize

Thesaurus.plus

Why does it remain important to consider immunisations and VPDs in Aboriginal & Torres Strait Islander Australians in particular?

- Overall burden of morbidity and mortality, including from infectious diseases
  - Life expectancy gap (2010-2012): 69.1 vs 79.7 ♂, 83.1 vs 73.7 ♀
- Equity, not equality, needed to address health disparities
- Issues specific to immunisation/VPDs:
  - Control suboptimal in total population, including Aboriginal and Torres Strait Islander people e.g. pertussis
  - Diseases for which Aboriginal & Torres Strait Islander people have not benefited from the same reductions in incidence as the general population as a whole
    - Reduced vaccine coverage and/or timeliness of administration
    - Higher exposure related to social and environmental issues in some communities
    - Reduced coverage against circulating strains



http://www.who.int/healthsystems/topics/equity/en/

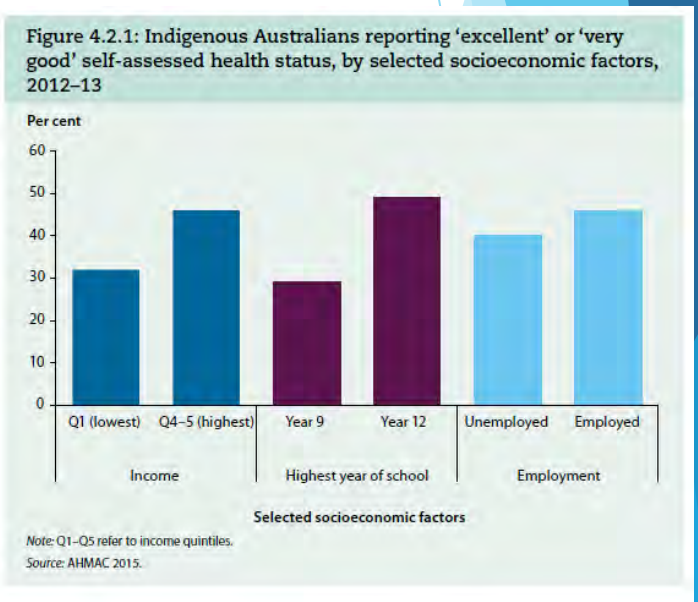
Social determinants of health

- A person:
  - Is working
  - Feels safe in their community
  - Has a good education
  - Has enough money
  - Feels connected to friends and family
- And for many Aboriginal and Torres Strait Islander people there are also cultural determinants:
  - Connection to land and spirit
  - The history of being forced from their traditional lands and away from their families

http://www.healthinfonet.ecu.edu.au/health-facts/summary
Accessed 8/4/2017

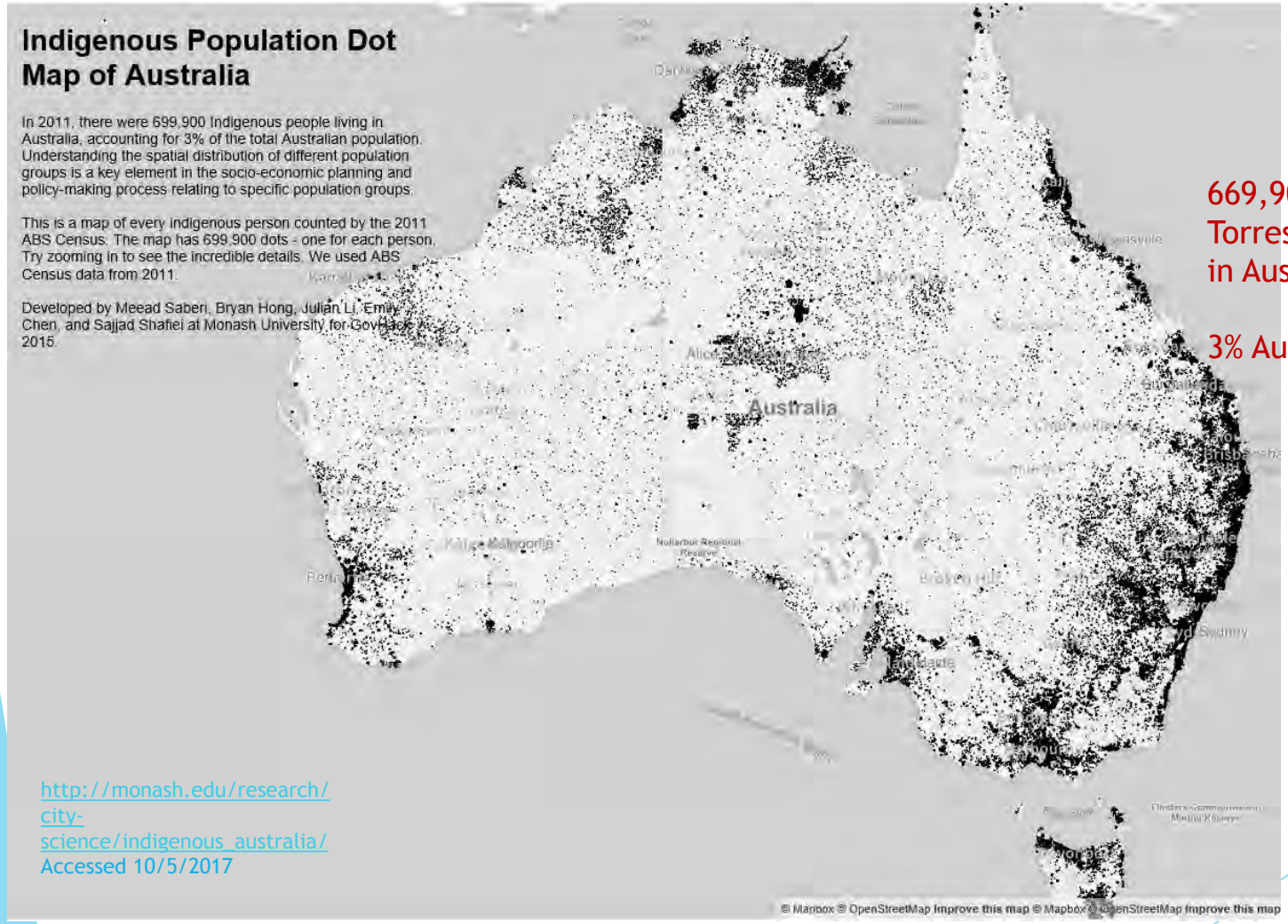
Social determinants

- 1/3 – 1/2 of health gaps are associated with difference in socioeconomic position
- Social disadvantage
- Relationship between Aboriginal and Torres Strait Islander people and non-Indigenous society
  - Importance of “creating the conditions that enable people to take control of their lives”.



Australian Institute of Health and Welfare 2016. *Australia’s health 2016*. Australia’s health series no. 15. Cat. no. AUS 199. Canberra: AIHW. http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129556758 accessed 11/5/2017

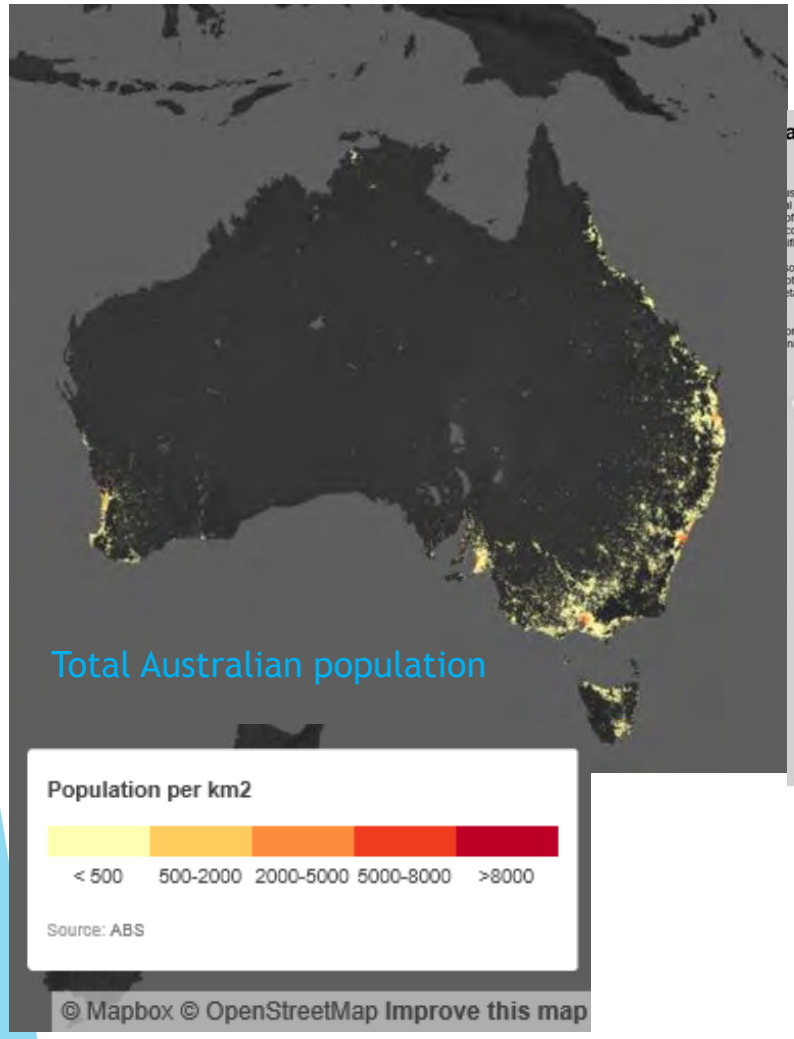
Marmot 2011 Social determinants and the health of Indigenous Australians. MJA 194 (10): 512-513

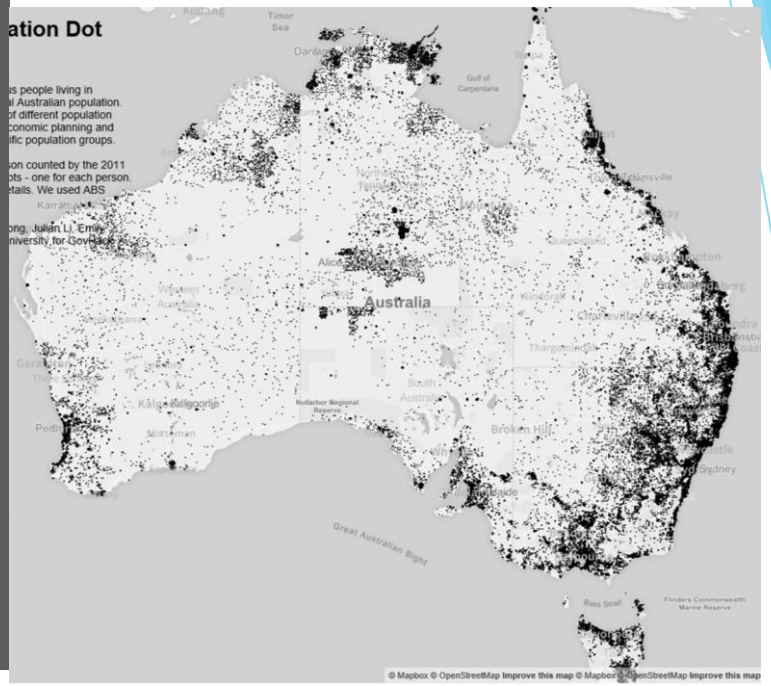


669,900 Aboriginal and Torres Strait Islander people in Australia (2011)

3% Australian population

http://monash.edu/research/city-science/indigenous_australia/
Accessed 10/5/2017


Total Australian population
Population per km2
< 500
500-2000
2000-5000
5000-8000
>8000
Source: ABS
© Mapbox © OpenStreetMap Improve this map

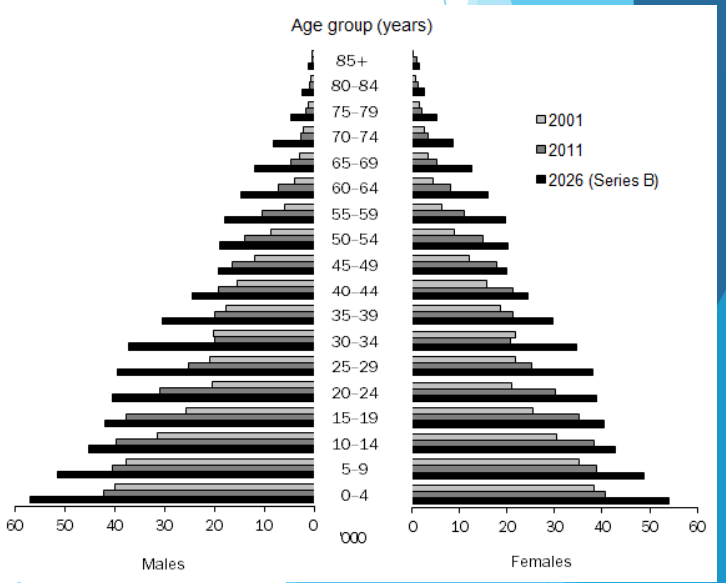

ation Dot
Australia
Great Australian Bight
© Mapbox © OpenStreetMap Improve this map

Demographics

- Expected growth 2 – 2.3% per year (cf 1.5-1.8% in total Aust population)
- > 900,000 Aboriginal & Torres Strait Islander people by 2026
- Biggest proportional increase in older age groups

	2001	2011	2026 (SERIES A)	
	no.	no.	no.	Growth rate (%)(a)
NSW	170 827	208 476	289 808	2.2
Vic.	35 816	47 333	71 379	2.8
Qld	143 545	188 954	278 019	2.6
SA	29 068	37 408	52 321	2.3
WA	71 994	88 270	121 836	2.2
Tas.	19 292	24 165	34 724	2.4
NT	59 702	68 850	87 486	1.6
ACT	4 256	6 160	9 674	3.1
Aust.(b)	**534 718**	**669 881**	**945 594**	**2.3**

(a) Average annual growth rate for the period 2011 to 2026.
(b) Includes Other Territories.



Auatralian Bureau of Statistics: 3238.0 - Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026. Accessed 1/5/2017
http://www.abs.gov.au/ausstats/abs@.nsf/Products/31329946F1E095BACA257CC9001438BA?opendocument

Table 3.1.1: Additional* vaccines recommended for Indigenous persons, due to their higher risk of disease

Vaccine	Recommendation for Indigenous persons
BCG	Neonates living in areas of high TB incidence† 1 dose
Hepatitis A	Children resident in the Northern Territory, Queensland, South Australia and Western Australia 2 doses in the 2nd year of life‡
Hepatitis B	Adults who have not previously been vaccinated against hepatitis B and are non-immune
Influenza	All persons aged ≥6 months§ Annual vaccination
Pneumococcal conjugate (13vPCV)	Children resident in the Northern Territory, Queensland, South Australia and Western Australia Booster dose in 2nd year of life in addition to primary course‡
Pneumococcal polysaccharide (23vPPV)	Persons aged 15–49 years with underlying conditions increasing the risk of IPD¶ All persons aged ≥50 years¶

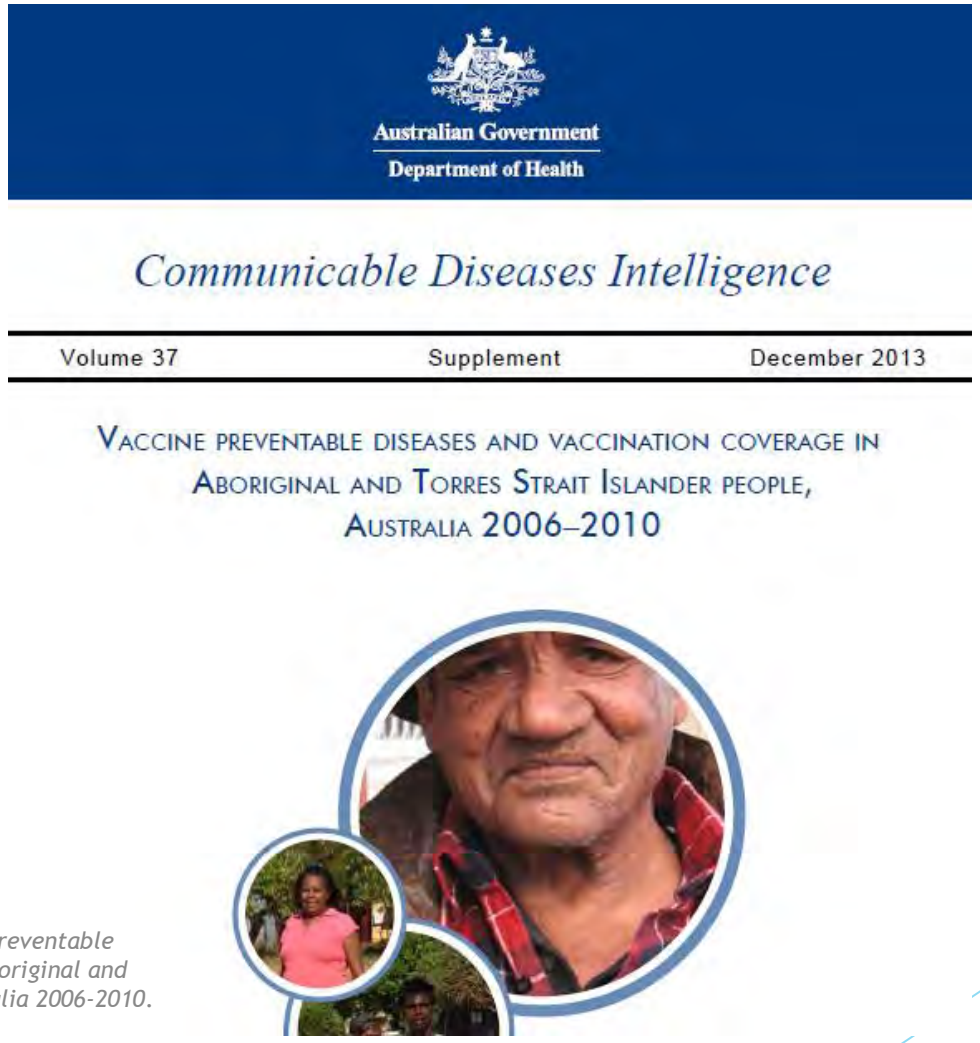
* In addition to those vaccines recommended for all Australians or those in particular medical, occupational, behavioural or other risk groups.

† Northern Territory, Queensland, northern South Australia

‡ Exact ages may differ between jurisdictions.

§ Refer to 4.7 *Influenza*.

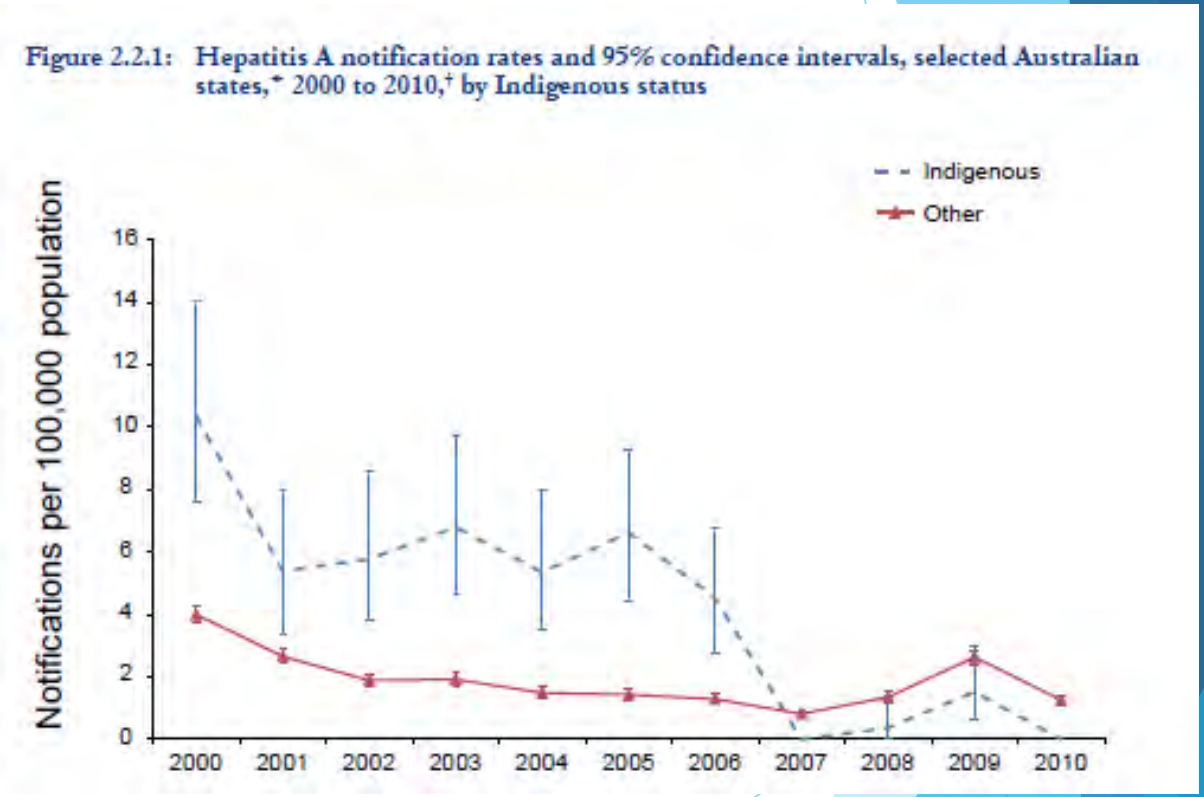
¶ Refer to 4.13 *Pneumococcal disease* for recommendations on revaccination.



Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Hepatitis A

- 2005: 2 dose schedule recommended and funded for Aboriginal & Torres Strait Islander children 12 -24 months of age in NT, SA, Qld & WA
- Pre vaccine era:
  - Notification rate 24 x higher
  - Hospitalisations 100 x higher in Indigenous children < 5 yrs



Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Hepatitis A

- Post vaccine era:
  - Almost disappeared from high incidence jurisdictions
    - 93% decline in notification rates for Indigenous children <5 years (2005 to 2014)
    - 96% decline in hospitalisation rates for Indigenous children <5 years
    - 57% decline in notification rate in non-Indigenous people in targeted jurisdictions
  - NT update
    - Only 4 cases of locally acquired hepatitis A infection since 2006, last in 2010
    - No hepatitis A notifications at all in 2016
  - Most cases in Aust are in returned overseas travellers or foodborne outbreaks
  - Future policy directions to be determined
  - e.g. US: routine hepatitis A vaccination for all children after shift in epidemiology away from disease burden in Native Americans.
  - Risk factors for transmission persist

Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel
Northern Territory Disease Control Bulletin vol 24 no 1 Mar 2017 http://www.ncirs.edu.au/assets/indigenous/2017-05-Message-stick.pdf

Hepatitis B

- Overall prevalence in Australia: 0.8-0.9%
  - Estimated 38% overall remain undiagnosed
- Prevalence chronic HBV in Aboriginal and Torres Strait Islander people 3.9%
- Estimated seroprevalence in NT Indigenous communities 5 – 20%
- Notification rates 2016 3 x higher among Indigenous people:
  - 66 per 100,000 vs 22 per 100,000
  - Indigenous status often not known in notifications
- Notifications declining over 10 years; esp younger age groups
- Vaccination coverage at 24 months of age (2015):
  - 95 % non- Indigenous
  - 96% Aboriginal and Torres Strait Islander

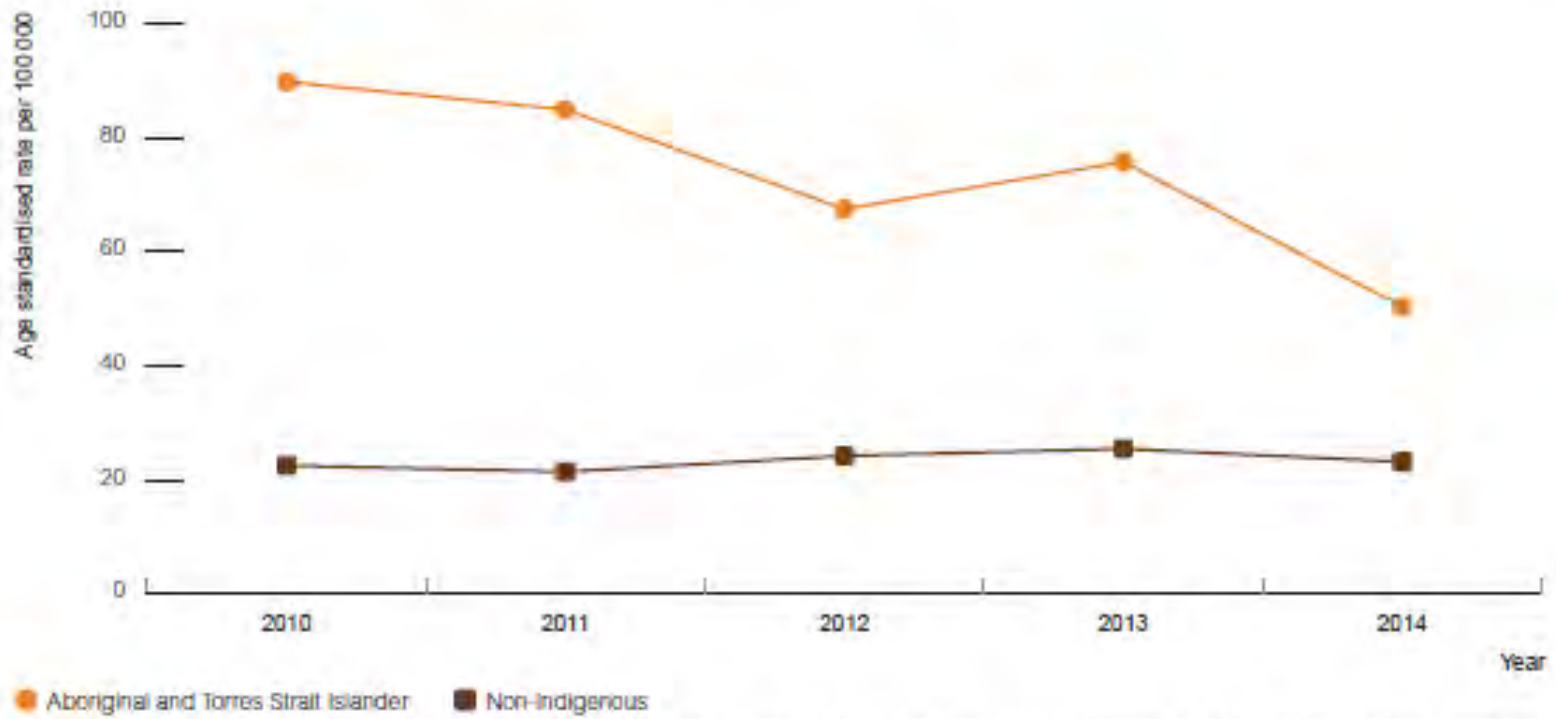
Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Davies et al 2013 *The Molecular Epidemiology of Hepatitis B in the Indigenous people of Northern Australia.* Journal of Gastroenterology and Hepatology 28:1234-1241

Kirby Institute 2016 *HIV, viral hepatitis and sexual transmissible infections in Australia.* Annual Surveillance Report 2016. UNSW (https://kirby.unsw.edu.au/sites/default/files/kirby/report/SERP_2016-Annual-Surveillance-Report_UPD170116.pdf)

Hepatitis B

Figure 34 Newly diagnosed hepatitis B notification rate per 100 000, 2010 – 2014, by Aboriginal and Torres Strait Islander status



Source: Australian National Notifiable Disease System; ABS Catalogues: 3101051 – 3101058; 3100DO003_201212; 32380do001_2011; Includes jurisdictions (ACT, NT, SA, Tas., WA) in which Aboriginal and Torres Strait Islander status was reported for more than 50% of diagnoses for each year

Kirby Institute 2015 *Bloodborne viral and sexually transmitted infections in Aboiriginal and Torres Strait Islander people: Annual Surveillance Report 2015*. UNSW
https://kirby.unsw.edu.au/sites/default/files/kirby/report/ATSIP_2015-Aboriginal-Surveillance-Report.pdf

Hepatitis B – impact of vaccination

- Potential to prevent 90% of perinatal infections
- HBsAg prevalence among Indigenous women estimated to be 10%
- Meta-analysis (Graham et al 2013 BMC Inf Dis):
  - Pooled prevalence estimate pre-2000
    - 16.72 vs 0.36% Indigenous vs non-Indigenous
  - Pooled prevalence estimate post-2000
    - 3.96% vs 0.90% Indigenous vs non-Indigenous
- Disparity has reduced with time / advent of universal vaccination
- Pregnant women in NSW:
  - Prevalence in Indigenous women born in universal vaccine era (1992-1999) 0.15% cf 1.31% born before 1981.

Graham et al *Chronic hepatitis B prevalence among Aboriginal and Torres Strait Islander Australians since universal vaccination: a systematic review and meta-analysis.* BMC Infect Dis. 2013; 13: 403

Deng L 2017 *Trends in the prevalence of hepatitis B infection among women giving birth in NSW.* MJA 206 (7): 301-305

Hepatitis B – vaccine effectiveness; an unresolved quandary

- Dent 2010 NT
  - Cohort of 37 adolescents vaccinated in 1989 – 1990 (plasma derived vaccines; ?cold chain breaches)
    - 11% (4/37) active HBV infection
    - 19% (7/37) past HBV infection
    - 41% (15/37) non-infected, non-immune
    - 30% (11/37) immune
- Hanna et al 1997 JPCH
  - 239 vaccinated children (recombinant vaccine) tested at 5 yrs of age
  - 15 (6%) current or past infection
  - 224 non infected
    - 92 (41%) immune
    - 132 (59%) non -immune
      - 113 boosted
        - 84% (95) immune after boosting;
        - 16% (18) still non-immune (8% original cohort)

Dent Commun Dis Intell Q Rep. 2010 Dec;34(4):435-9

Hanna J Paediatr Child Health 1997 Feb 33(1):67-70

Suggested pathway for management of pregnant women with HBV infection

Screen all antenatal women for HBsAg and anti-HBc
(GPs, remote communities, antenatal clinics, CARPA)

HBsAg -ve

If HBcAb and HBsAb -ve
Offer HBV vaccination postpartum

HBsAg +ve

Request HBeAg, anti-HBe, HBV DNA VL, LFT

HBV DNA VL >10,000,000 (10^7) IU/mL
OR
ALT >30 and HBV DNA VL >2000 IU/mL

Discuss with Liver Clinic doctor ASAP AND Refer to Liver Clinic
(see at 28-32 weeks)

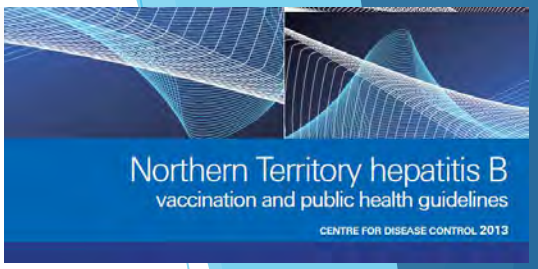
Consider commencing antiviral (usually tenofovir) between 28-36 weeks
(the earlier the better)
Continue until 12 weeks post partum*

HBV DNA VL<10,000,000 (10^7) IU/mL
AND
ALT <30

No treatment received: LMO/ remote clinic to perform yearly LFTs, HBeAg/Ab and HBV DNA VL. Refer to liver clinic if concerned regarding need to start treatment.

Give all infants HBIG and HBV vaccine at birth (in different sites within 12 hours of delivery). Notify RDH Gastro Registrar or ASH Infectious Diseases of admission to ward.

Follow-up of infants at >9 months of age (testing 3 to 12 months after final hepatitis B vaccination) for HBsAg and anti-HBs (put alert on PDIS, Communicare or Jadecare).
Follow up mothers treated with tenofovir: repeat HBVDNA VL and LFTs at delivery, 12 weeks post partum and then LFTs 2, 6, 12 and 24 weeks after tenofovir ceased.*



http://digitallibrary.health.nt.gov.au/prodjspui/bitstream/10137/710/1/Northern%20Territory%20Hepatitis%20B%20Public%20Health%20Guidelines.pdf

Hepatitis B

- Despite reductions since rollout of immunisation programs, a number of issues have been identified:
  - Large cohort of susceptible people born before 1990
  - Incomplete immunisation
  - Ongoing vertical transmission despite use of HBIG
  - Poor response to vaccination among some Aboriginal children
  - Potential need for booster doses for people vaccinated as infants

Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Influenza

- Vaccination recommended for Aboriginal and Torres Strait Islander people > 50 yrs since 1994
  - Funded > 50 yrs and those >15 with risk factors since 1999
- Currently recommended and funded annually for all Aboriginal and Torres Strait Islander people > 6 mo of age

Did you know that the influenza vaccine is available for free and recommended as part of the childhood vaccination schedule for Aboriginal children aged over 6 months to 5 years?

http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home~handbook10part3~handbook10-3-1

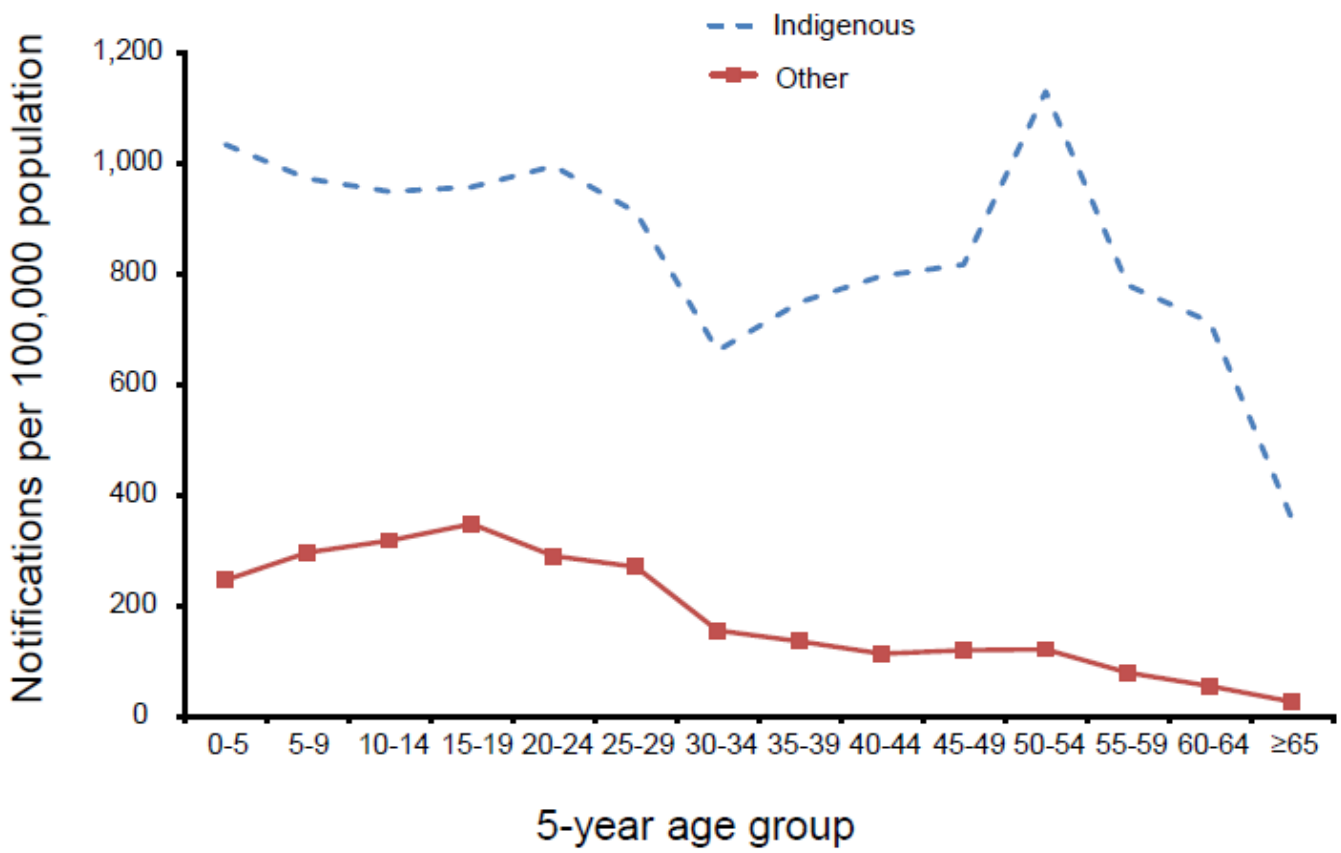
Influenza

- Pandemic influenza A had disproportionate impact on Indigenous people
  - Infection rates 6.6 x higher
  - Hospitalisation rates 6.2 x higher
  - Death rates 5.2 x higher
- Influenza & pneumonia rates in Indigenous people 25-49 yrs similar to non-Indigenous adults > 50
  - 8 x greater hospitalisations and 20 x deaths than non-Indigenous peers
- <5 and >50 year age groups have twice the hospitalisation and death rates respectively

http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home~handbook10part3~handbook10-3-1

Influenza

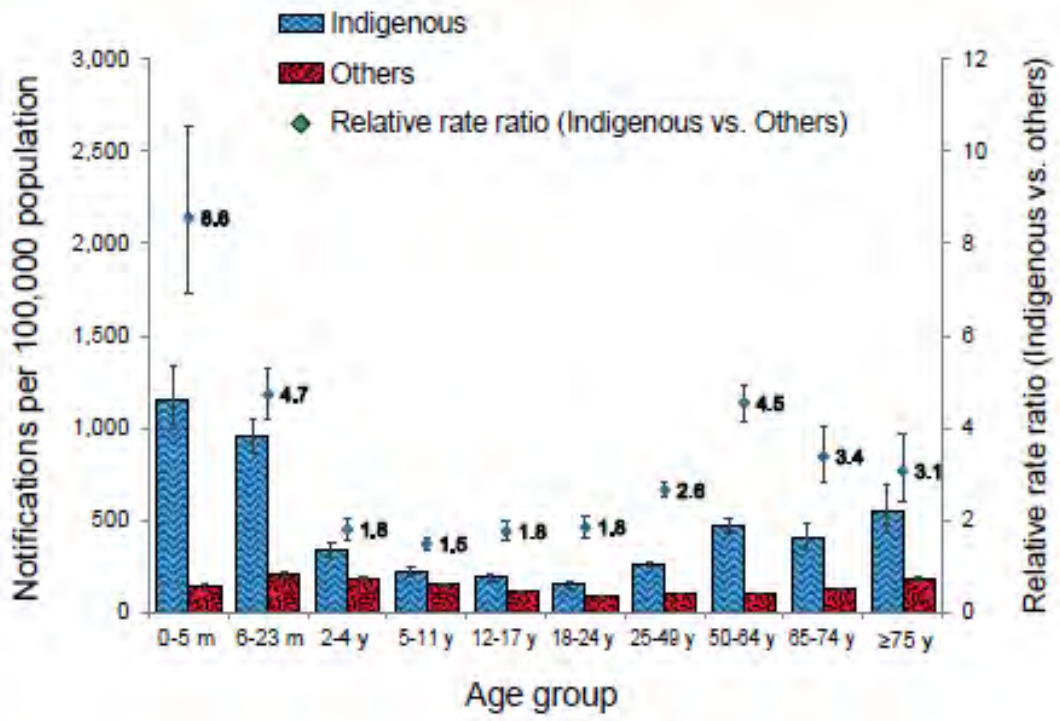
Figure 2.4.3: Pandemic influenza A (H1N1) 2009 infection reporting rates to NetEpi, Australia, 2009, by age group



Source: H1N1 2009 infections in Australia's Indigenous population in 2009, DOHA27

Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010*. Commun Dis Intel

Figure 3: Notification rate for influenza with 95% confidence intervals, Western Australia and the Northern Territory*, 2006 to 2015 (excluding 2009), by age group and Indigenous status

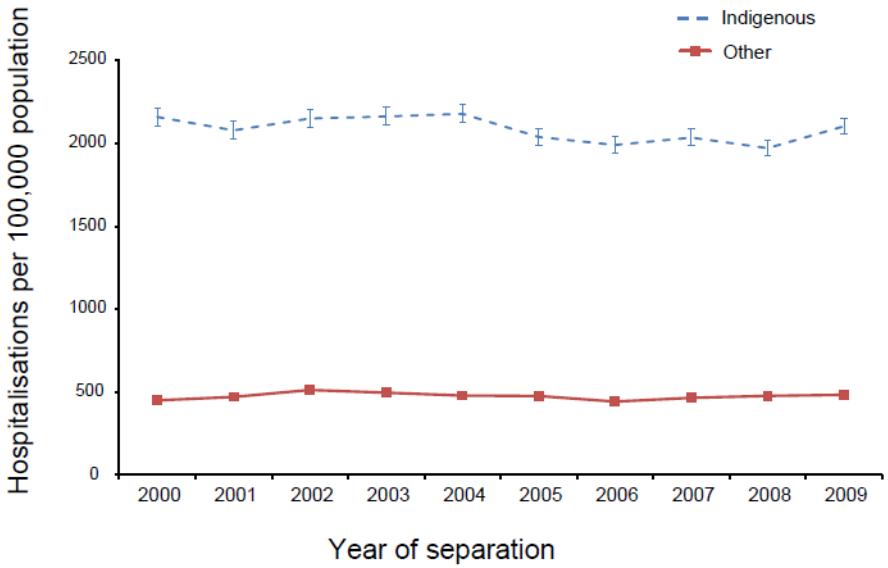


* Western Australia and the Northern Territory had greater than 90% completeness of Indigenous status recorded.

Li-Kim-Moy et al 2016 *Australian Vaccine Preventable Disease Epidemiological Review Series: Influenza 2006-2015.* Commun Dis Int 40(4)

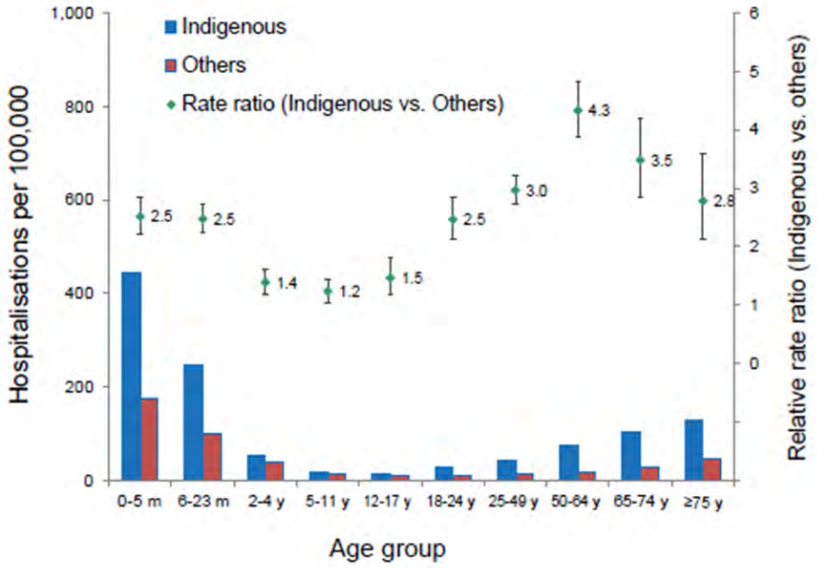
Influenza

Figure 2.4.2: Influenza and pneumonia* hospitalisation rates and 95% confidence intervals, selected Australian states,† 2000 to 2009,‡ by Indigenous status



Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Figure 7: Rate of ICD-coded hospitalisation for influenza (any diagnosis) with 95% confidence intervals, Australia, 2010 to 2013, by age group and Indigenous status



All rate ratios significant with 95% confidence intervals excluding one.

Li-Kim-Moy et al 2016 *Australian Vaccine Preventable Disease Epidemiological Review Series: Influenza 2006-2015.* Commun Dis Int 40(4)

Why are Aboriginal and Torres Strait Islander people at greater risk of/from influenza?

- Higher prevalence of comorbidities:
  - Cardiac disease
  - Respiratory disease
  - Diabetes
  - Renal disease
- Sociodemographic factors in some communities
  - High mobility between communities
  - Overcrowded living conditions
  - Poverty
  - Poorly constructed and maintained housing

Influenza vaccine uptake in pregnancy

- NT study, part of RCT
  - Prepandemic coverage 2%
  - Post pandemic coverage 41%
  - No sociodemographic factors found to predict uptake
- 39.3% influenza & 22.3% pertussis overall coverage in subsequent study using perinatal register and NT Immunisation register
  - 64.4% Indigenous
  - 23.2% non-Indigenous
- Australian women recommended to the have the vaccine by a HCP 20 x more likely to have it
- An opportunity not to be missed

Moberley 2016 Influenza vaccine coverage among pregnant Indigenous Women in the Northern Territory of Australia. CDI 40 (3)

Overton 2016 *Influenza & pertussis vaccination coverage in pregnant women in the Northern territory in 2015 - new recommendations to be assessed. NT Disease Control Bulletin 23 (4)*

Influenza vaccine uptake in older adults

Influenza and/or pneumococcal vaccination in Aboriginal and/or Torres Strait Islander Australians by age range and time period

Disease	Study ID	Year/s vaccination given	Age range	Estimated coverage (%)	Number vaccinated/Total population
Influenza					
	Hanna, 2003 [24]	2001	15–49	85	7719/9081
	Hanna, 2004 [22]	2003	15–49	85	7671/9025
	Menzies, 2008 [20]	2004–2005	18–49	23	N/A
	AIHW 2011 [15]	2009	≥18	27.5	N/A
	Taylor, 2001 [3]	1998	40-64*	9.4	1/10
	Taylor, 2001 [3]	1999	40-64*	19.9	3/15
	Taylor, 2001 [3]	2000	40-64*	22.5	3/13
	Hanna, 2004 [22]	1995–2000	≥50	96	2582/2690
	Hanna, 2003 [24]	2001	≥50	59.4	3275/5513
	Menzies 2004 [21]	2001	≥50	51	N/A
	Hanna, 2004 [22]	2003	≥50	63	3533/5608
	Menzies 2004 [21]	2001	50–64	47	N/A
	Menzies, 2008 [20]	2004–2005	50–64	52	N/A
	Taylor, 2001 [3]	1998	≥65	80.1	19/24
	Taylor, 2001 [3]	1999	≥65	89.0	21/24
	Taylor, 2001 [3]	2000	≥65	78.2	19/24
	Menzies 2004 [21]	2001	≥65	71	N/A
	Menzies, 2008 [20]	2004–2005	≥65	84	N/A

≥50 years:
51 - 96 %

≥65 years: the
71 % - 89 %

Dyda 2016 *Influenza and pneumococcal vaccination in Australian adults: systemiatic review of coverage and factors associated with uptake BMC Infect Dis*

Measles, mumps, rubella & varicella

- Measles
  - Vaccine funded for all Aust infants at 12mo of age since 1975
    - 9mo/age for Aboriginal & Torres Strait Islander chn in NT, 1994 – 1998
    - 2nd dose adolescents → 4-5 yrs → 18 mo (MMRV)
    - Extremely low rates in Indigenous population and whole Australian population

Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010*. Commun Dis Intel

Measles, mumps, rubella & varicella

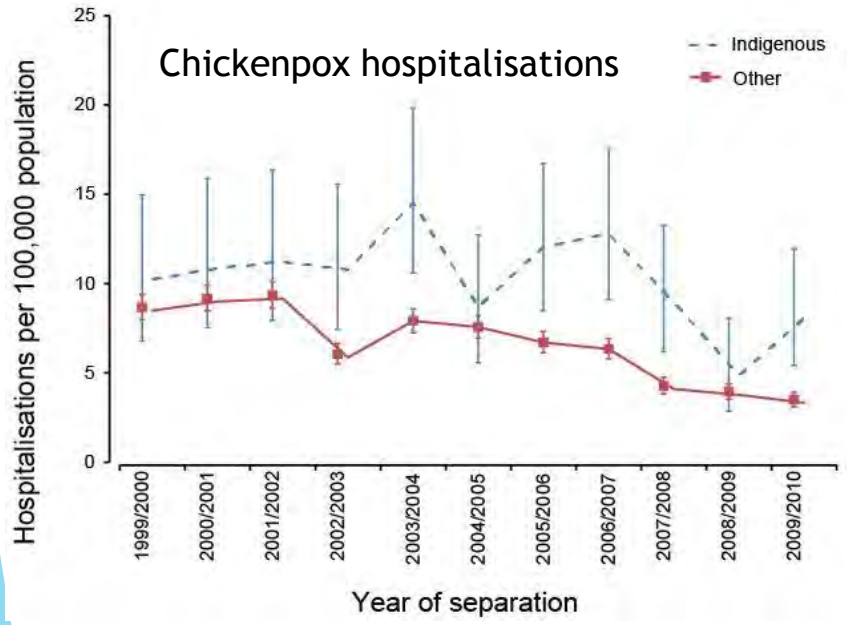
- Mumps
  - Sporadic cases; overall gradual resurgence in higher income countries
  - Periodic outbreaks
    - 2007/08 Kimberly WA (153 cases) and NT (99 cases)
      - 45-48% cases had received only 1 dose vaccine
      - Also early vaccination (9mo, waning), overcrowding, & resurgence of mumps circulating among non-Indigenous adolescents
    - 2015-2016 WA & NT
      - 83% cases aged 10 – 34 years
      - 48.6% fully vaccinated, 38.1% partially vaccinated and 13.3% unvaccinated.
  - Reasons for resurgence / outbreaks:
    - Primary vaccine failure
    - Secondary vaccine failure / waning immunity
    - New genotypes
    - Reduced immune boosting from circulating wild type strains

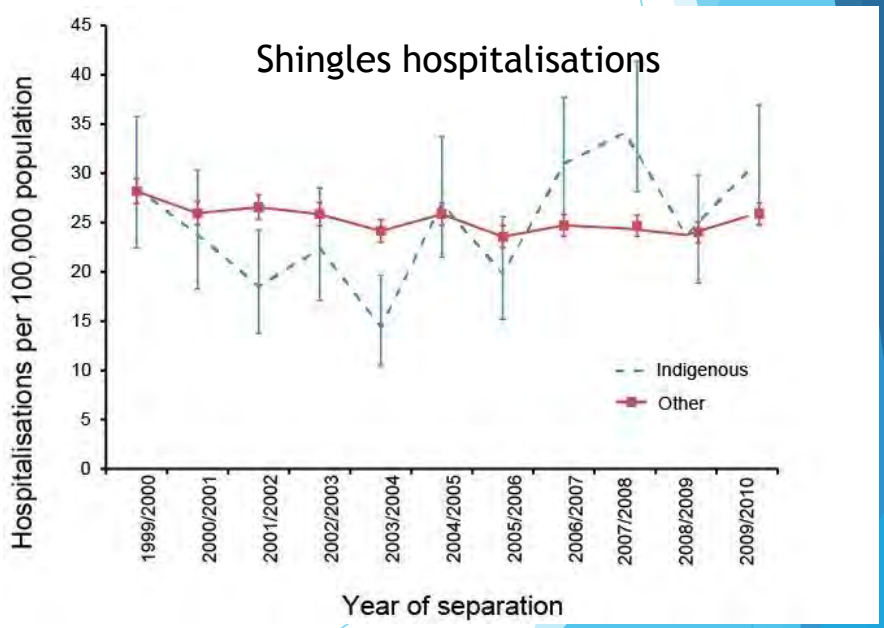
Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010*. Commun Dis Intel

Greenwood-Smith 2016 *Mumps Outbreak in the Northern Territory 2015-2016*. NT Disease Control Bulletin 23(4)

Measles, mumps, rubella and varicella

- Rubella
  - Endemic transmission essentially eliminated in Australia
  - Sporadic cases
  - No significant difference between Indigenous and non-Indigenous people
- Varicella

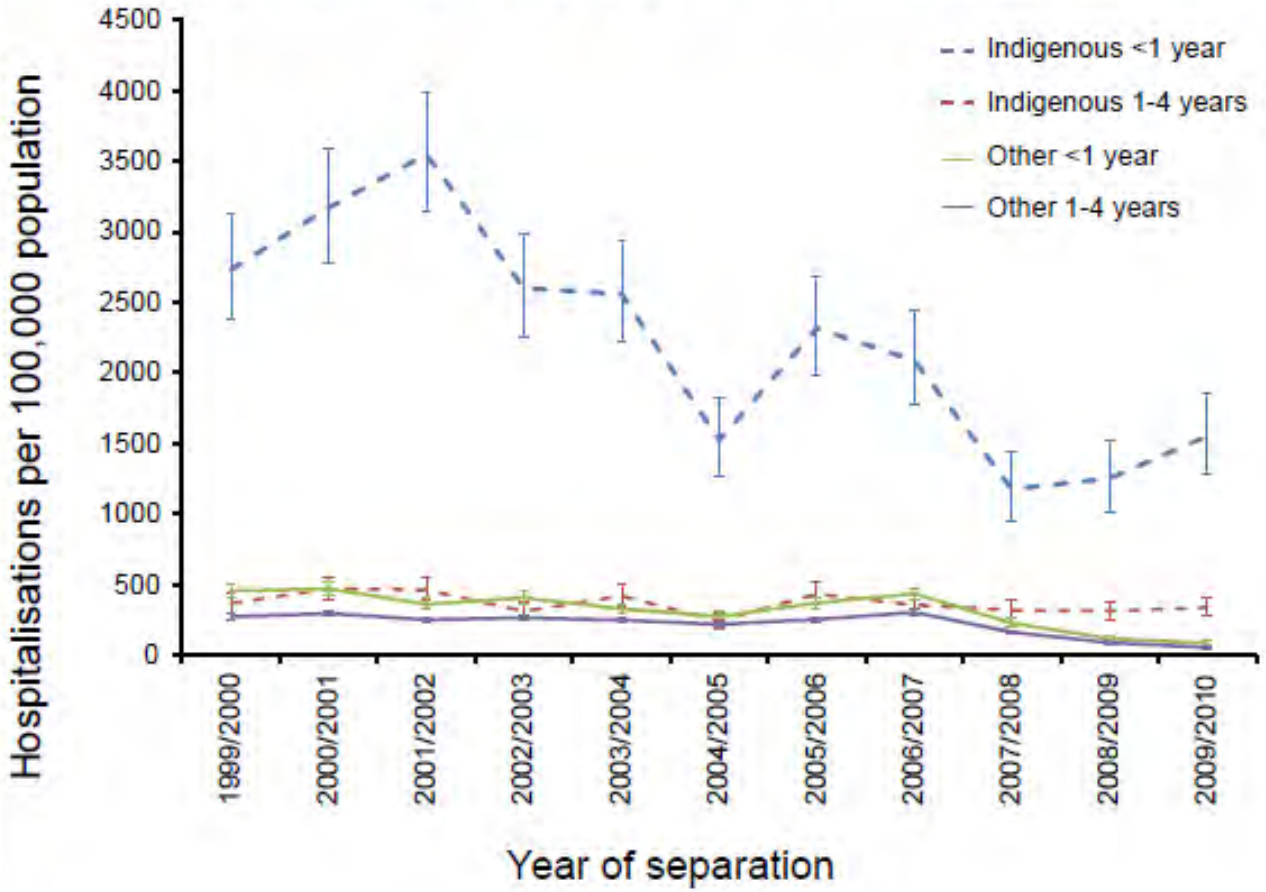




Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010*. Commun Dis Intel

Rotavirus

Figure 2.10.1: Rotavirus hospitalisation rates and 95% confidence intervals, selected Australian states,* 1999 to 2010,† by age group (<5 years) and Indigenous status



Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Rotavirus

Table 2.10.1: Rotavirus hospitalisation rates, comparing pre-vaccine period 2002 to 2006 and post-vaccine period 2008 to 2010, selected Australian states,* by age group and Indigenous status

Age group (years)	Pre-vaccine rates† 2002/2003–2005/2006			Post-vaccine rates† 2008/2009–2009/2010		
	Indigenous	Other	Rate ratio	Indigenous	Other	Rate ratio
<1	2,273.4	344.8	6.6§	1,404.1	99.4	14.1§
1–4	351.7	246.0	1.4§	327.3	70.0	4.7§
≥5	1.5	2.3	0.7	2.6	1.9	1.4

* Northern Territory, Queensland, South Australia, Western Australia.

† Average annual age-specific rate per 100,000 population, periods are financial years (July to June).

§ Indicates statistically significant, 95% confidence intervals do not overlap 1.0

Marked reductions post vaccine rollout 2006-2007 but less so than in non-Indigenous children

Monovalent vaccine effectiveness was found to be 78% in Northern Territory Aboriginal and Torres Strait Islander children during an outbreak of G9P(8) rotavirus in 2007,102 but only 19% during an outbreak of G2P(4) in 2009.

Incomplete vaccination due to age restrictions plays a role

Naidu et al for NCIRS 2013 *Vaccine Preventable Diseases and Vaccine Coverage in Aboriginal and Torres Strait Islander People, Australia 2006-2010.* Commun Dis Intel

Japanese encephalitis

- Routine vaccination at 12 months of age for children in the Torres Strait Islands
- No cases in the region since 1998
- Environmental strategies:
  - Pigs moved away from homes
  - Drainage works on islands have reduced mosquito breeding habitat
- JEVax supply issue 2007 restricted use
- Imojev & JEspect now available

http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home~handbook10part3~handbook10-3-1

VACCINE COVERAGE

2010 data

Table 3.3.1: Percentage of Australian children immunised, by vaccine type and Indigenous status

Age	Vaccine	Indigenous (%)	Other (%)
Coverage at 12 months of age (born January – December 2009)	DTP 3 doses	85.7	92.6
	Polio 3 doses	85.7	92.6
	Hib (2 or 3 doses)	85.7	92.4
	Hep B (2 or 3 doses)	85.6	92.1
	7vPCV 3 doses	85.3	91.7
	Rotavirus (3-dose states)	66.4	83.4
	Rotavirus (2-dose states)	77.4	86.5
	'Fully vaccinated'*	85.5	91.9
	'Fully vaccinated'† (including 7vPCV)	85.0	90.0
	'Fully vaccinated' (including 7vPCV) + rotavirus	69.9	83.7
Coverage at 24 months of age (born January – December 2008)	DTP 3 doses	94.1	94.7
	Polio 3 doses	94.0	94.6
	Hib (2 or 3 doses)	94.0	94.4
	Hep B (2 or 3 doses)	94.0	93.9
	MMR first dose	94.4	93.8
	MenC 1 dose	93.9	93.3
	Varicella 1 dose	82.3	82.9
	'Fully vaccinated'*	91.3	92.0
	'Fully vaccinated'† (including varicella and MenC)	79.4	81.1
Coverage at 60 months (born January – December 2005)	MMR 2 doses	86.1	89.6
	DTP-polio	85.0	88.8
	'Fully vaccinated'*	85.3	89.2

2016 Vaccine coverage data

	Aboriginal & Torres Strait Islander			Total Australian population		
	NSW	NT	All	NSW	NT	All
12 - <15 mo	93.3	92.08	91.16	93.35	92.98	93.41
24 - <27 mo	91.05	88.30	89.13	90.83	89.42	91.36
60 - <63 months	96.47	93.91	95.20	93.48	92.18	93.19

http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/acir-ann-hist-data-ATSI-child.htm

Conclusions

- Higher burden of VPDs in Aboriginal and Torres Strait Islander Australians persists despite major positive progress
- Excellent vaccine coverage with universal / NIP vaccines
  - Delays are more common
  - Strain / serotype / genotype coverage may be incomplete
  - Indigenous status not always known in notifications
- Lower coverage rates for special vaccines
- Higher exposure risks and risks factors for serious infection challenge the efficacy of vaccine programs
- Targeting specific health needs and particular geographical and social groups as well as broader national programs facilitates reduction in disease burden.


Thank you