Antenatal infections in Indigenous populations

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- Indigenous populations have
  - Higher prevalence of premature births and low birth weight
  - Perinatal mortality 2-3 times the level in non-Indigenous populations

NSW Department of Health. *The NSW Aboriginal perinatal health report.* NSW Department of Health, 2003

- Between 1998 and 2003 only 65-70% of Indigenous mothers commenced antenatal care before 20 weeks', compared with 85-87% in non-Indigenous women.
- "The under-utilisation of antenatal and postnatal services by Aboriginal women is associated with inappropriate and inaccessible maternal health services, lack of long-term targeted Aboriginal maternal health programs and the itinerancy of many Aboriginal women."

Indigenous status of pregnant women in Australia

Australian Institute of Health and Welfare 1996 to 1998

- Northern Territory 35%
- Western Australia 5.9%
- Queensland 5.5.%
- New South Wales 2.2%
- South Australia 2.1%
- Tasmania 2.1%
- ACT 1.4%
- Victoria 0.7%

Perinatal mortality among Indigenous infants in WA, 1980-1993

	Relative risk c/w non-Indigenous
Normally formed stillbirth	2.1
Intrapartum death	2.4
Immaturity	1.8
Infection	8.1
Accident/trauma	3.0
SIDS	4.4
Unknown	6.7

Alessandri LM *et al.* Med J Aust 175; 185

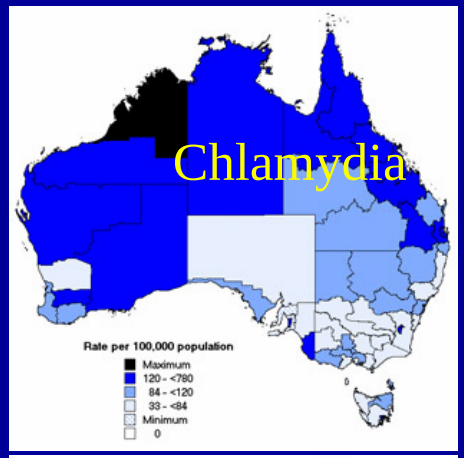
Infectious perinatal mortality among Indigenous infants in WA, 1980-1993

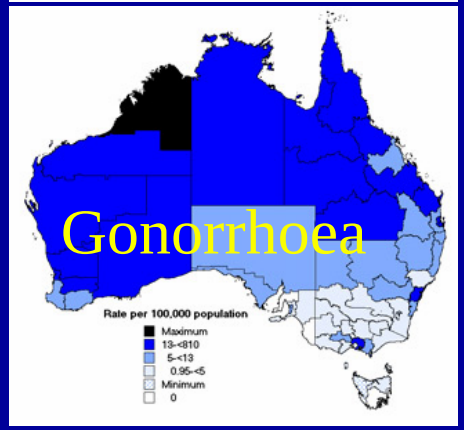
	Relative risk c/w non-Indigenous		
	Stillbirth	Neonatal	Postnatal
Unspecified	NA	5.8	55.0
Chorioamnionitis	2.9	4.2	6.9
Grp B Strep	NA*	1.7	NA
Other bacterial	NA*	8.7	21.6
Viral	NA*	3.8	24.5
Total	3.4	4.4	23.2

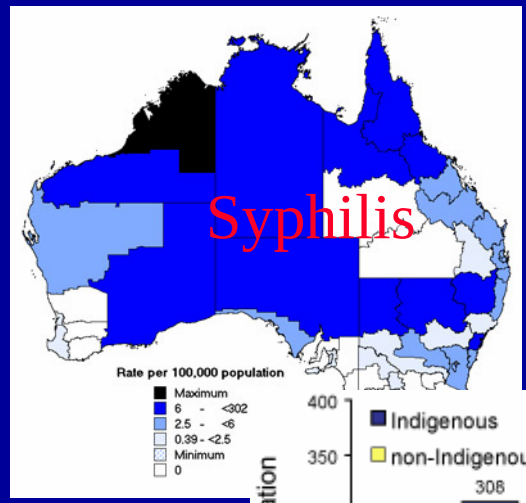
* **Deaths in these categories occurred only in Indigenous children**

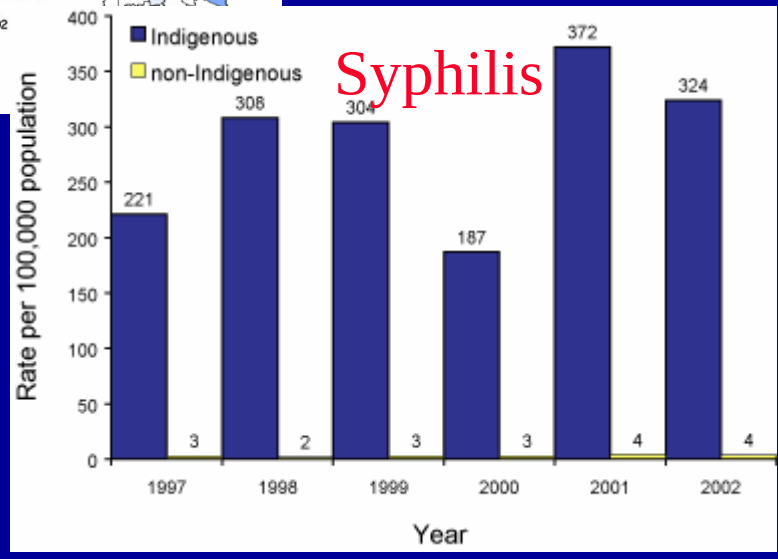
Alessandri LM *et al.* Med J Aust 175; 185

STIs in Indigenous populations









Significance of antenatal and perinatal viral infections

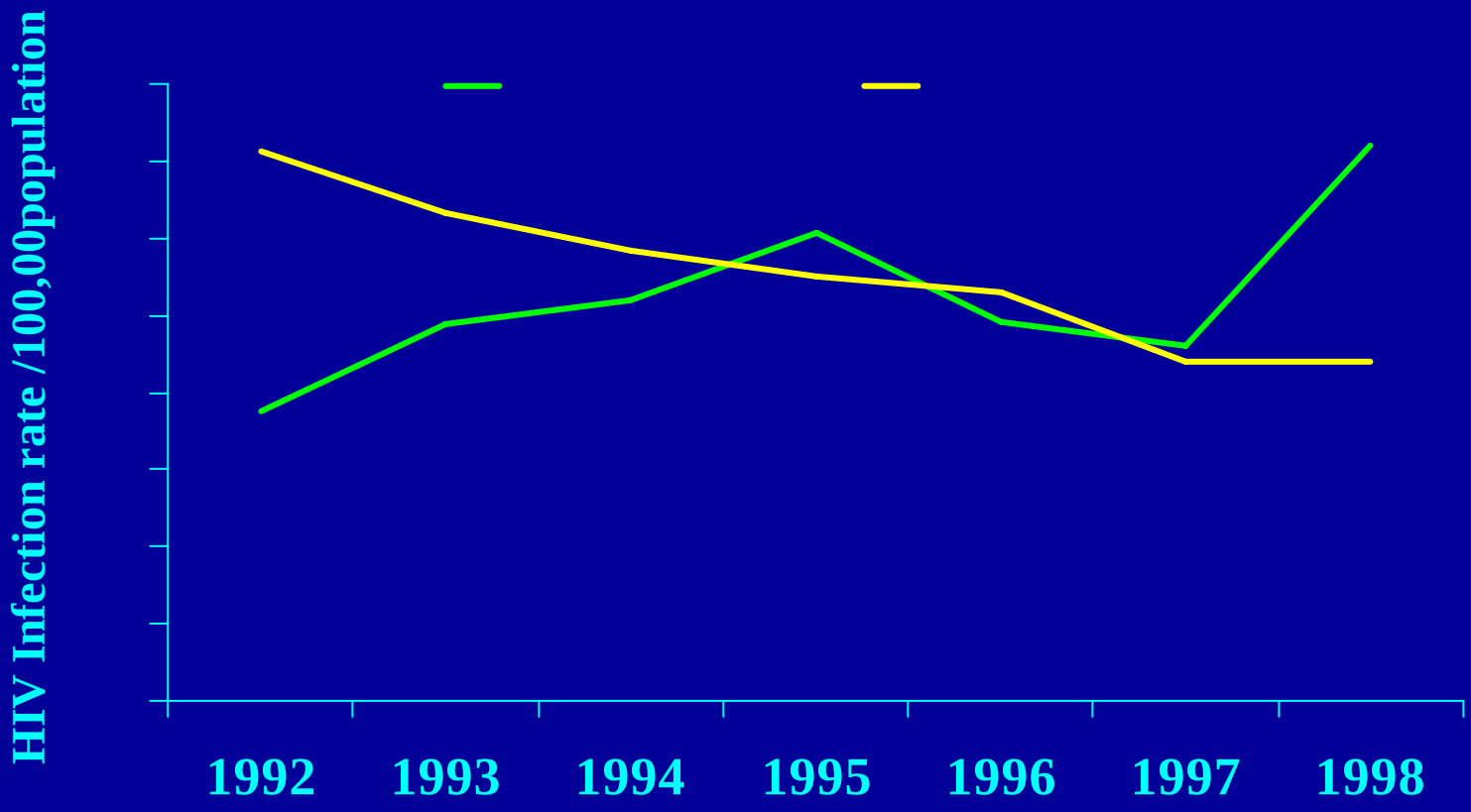
- Prenatal infection resulting in foetal death or congenital malformation
  - CMV, rubella, varicella, parvovirus B19
- Prenatal infection resulting in late disease
  - Hepatitis B, hepatitis C, HTLV-1, CMV
- Perinatal infection
  - CMV, enteroviruses, Herpes simplex, varicella,
- Perinatal infection causing late disease
  - Hepatitis B, hepatitis C, HTLV-1, human papillomavirus

Antenatal infections: special issues for Indigenous women

- Some infections are more common in the Indigenous population
  - hepatitis B, HIV
- Some are under-recognised as potential problems
  - herpes, varicella
- Some old enemies may re-emerge due to lack of preventive measures
  - rubella
- Some are special risks due to geographical location
  - arbovirus infections

HIV in Australia

Guthrie JA et al MJA 2000; 172: 266-269



HIV infection in Indigenous Australians

	Indigenous	Non-Indigenous
Women	26.8%	8.9%
Male homosexual contact	46.7%	75.0%
Heterosexual contact	36.7%	15.3%

Guthrie JA et al MJA 2000; 172: 266-269

Identifying antenatal HIV in the Kimberley

- Mak DB; Holman CD *J Public Health Med* 2000;22:540-5
- Among patients tested for chlamydia and gonorrhoea, only 14.5 % of patients had the recommended minimum screening tests. Full testing more likely if the patient was male or if they were ordered by a doctor
- Mak DB *et al Aust N Z J Obstet Gynaecol* 2003;43:457-62.
- Only 68% of antenatal patients were screened for HIV, compared with 91% for hepatitis B. Women seen by a doctor were more likely to have been tested

Antenatal HIV in Indigenous women

- Addressing the problems of spread of sexually transmitted infections in Indigenous communities is essential to preventing HIV infection in pregnant women
- Improved adherence to antenatal testing guidelines will help early identification of pregnant women and provide opportunities for antiviral therapy to prevent transmission

Hepatitis B

- For 2001 and 2002, The Northern Territory had the highest average annual notification rate at 6.3 per 100,000.
- The Northern Territory had the highest average annual hospitalisation rate at 1.8 per 100,000.
- The incidence of hepatitis B is 4-26 times higher in Indigenous versus non-Indigenous populations

Vaccine Preventable Diseases and Vaccination Coverage in Australia, 2001 to 2002 (Communicable Diseases Intelligence Vol 28 (Suppl 2))

Indigenous Sexual Health Strategy

Hepatitis B carriage rates in Indigenous populations

Place	Year	HBs Ag pos
WA, rural[1]	1987	4%
WA, Kimberley[2]	1990	8%
Qld, various[3]	1985	3-10%
NSW, urban[3,4]	1985/90	17%
SA, northwest[5]	1983	26%

1. Moore DJ *et al.* 1987. *Med J Aust*;147:557-558 2. Gill J *et al.* 1990. *Med J Aust*;153:34-37 3. Britton W *et al.* 1985 *ANZ J Intern Med*;15:641-644 4. Patterson F *et al.* 1993 *J Gastroenterol Hepatol*;8:410-413 5. Burrell CJ *et al.* 1983 *Med J Aust*;2:492-496

Hepatitis B vaccination in Indigenous populations

(*Hanna J et al. J Paed Child Health 1997;33:67-70*)

- Aboriginal and Torres Strait Island children have suboptimal responses to recombinant hepatitis B vaccination
  - 293 children (5 y.o.) who had vaccination as infants
  - 49% lacked detectable antibody and 16% failed to respond to a booster dose
- Despite that introduction of routine hepatitis B vaccination programs in Aboriginal and Torres Strait Island children has markedly reduce hepatitis B infection and carriage rates

Herpes simplex virus infections in pregnancy

Adverse outcomes

- Neonatal infection, especially for primary infection late in pregnancy
- Increased risk of acquisition of HIV

Genital herpes in Indigenous populations

- Little data for Indigenous populations
- “Genital herpes, formerly regarded as a minor STI in most developing countries, has now emerged as a leading cause of genital ulceration in many countries where syphilis and chancroid were more prevalent previously” *(O’Farrell N. Sex Transm Inf 1999;**75**:377–384)*
- “As is the case with the general population, it is thought that a substantial proportion of the Indigenous population is infected with the herpes simplex virus (HSV),” *(Queensland Indigenous Sexual Health Strategy 2003 to 2006)*

Causes of genital ulcer disease

- Swabs of genital lesions from 125 patients, 64 male and 61 female. All had donovanosis included in the differential diagnosis
- Tested for HSV by PCR, donovanosis by PCR, syphilis by PCR and/or serology and chancroid by PCR.

Causes of genital ulcer disease (2)

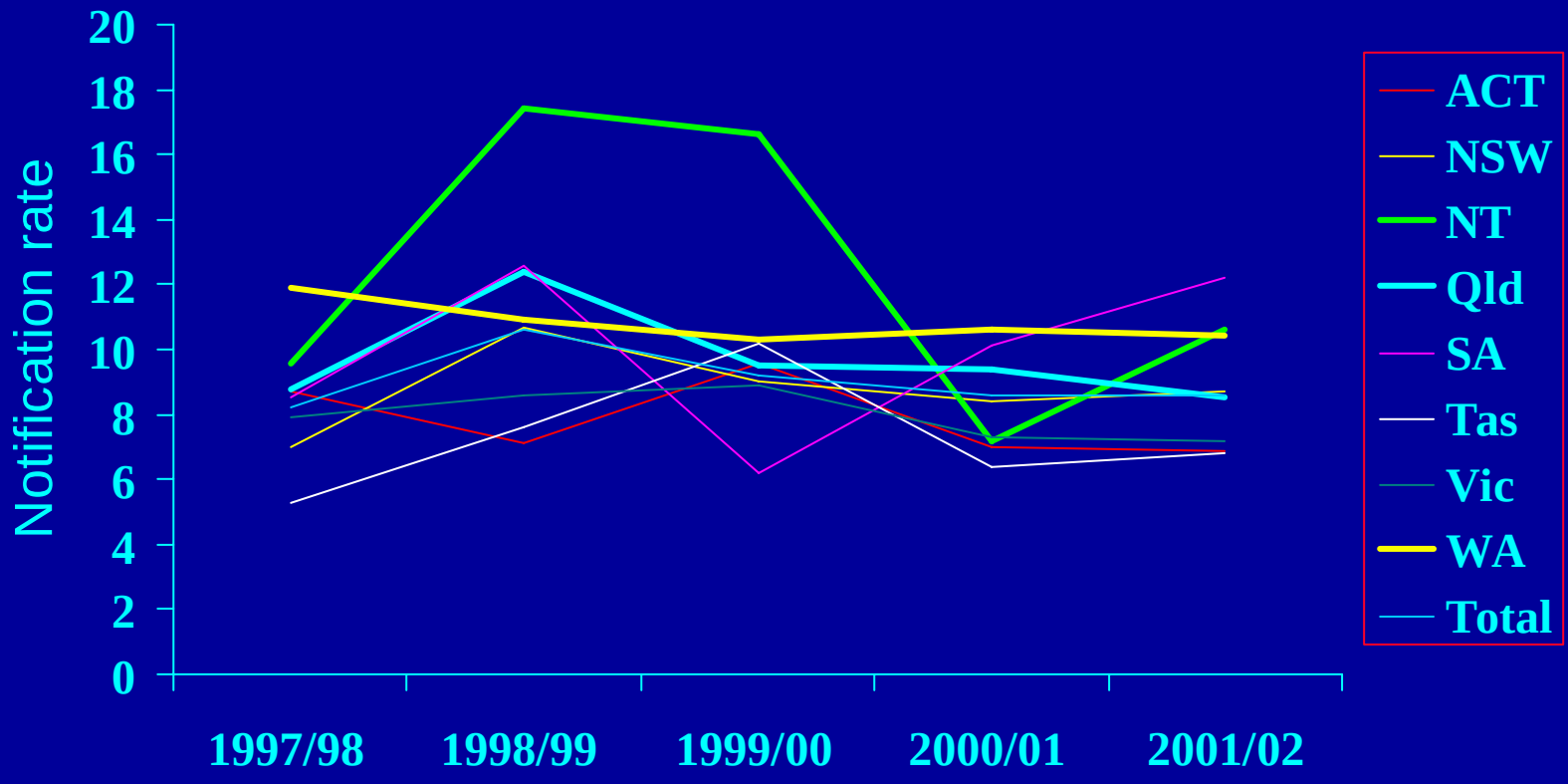
- Syphilis 11% (12/108)
- HSV-2: 29.7% (32/108)
- HSV-1: 1.9% (2/108)
- Donovanosis 14.8% (16/108)
- Chancroid 2.1% (1/48) (returned traveller)

In a predominantly remote area population, even when lesions were not typically herpetic, HSV-2 remained the commonest cause of genital ulcer disease

Varicella in pregnancy

- Infection in the first half of pregnancy may lead to foetal death or congenital malformation
- Maternal infection around the time of delivery may lead to severe neonatal infection

Varicella

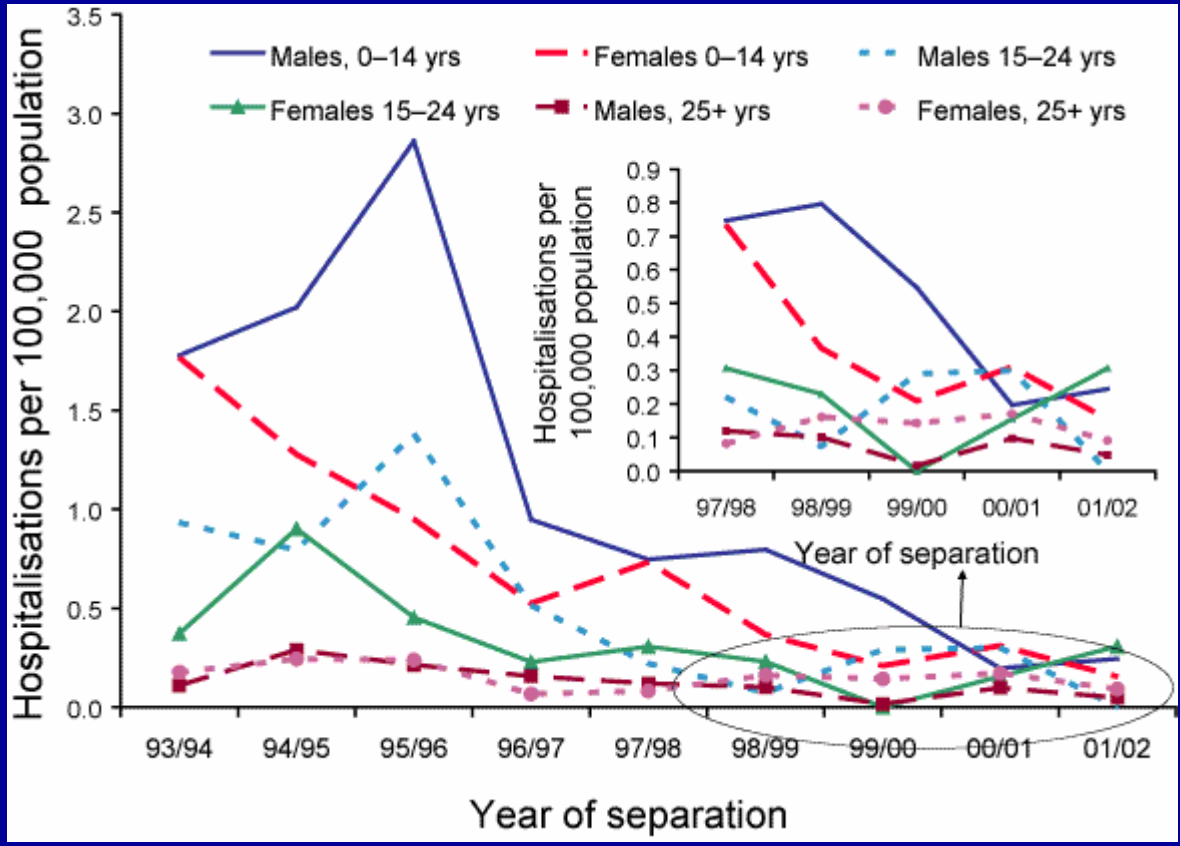


Dept of Health and Ageing

Varicella in Indigenous populations

- In tropical climates varicella appears to be less readily transmitted, so there is greater susceptibility among adults
- The seroprevalence of varicella in our Indigenous community is not known therefore it is not known whether there is an increased risk of intrauterine or neonatal infection
- Should varicella screening and vaccination be more actively pursued in Indigenous adolescents and adults?

Rubella



Vaccine Preventable Diseases and Vaccination Coverage in Australia, 2001 to 2002 - Vaccine preventable diseases (Communicable Diseases Intelligence Vol 28 Suppl 2)

Congenital rubella

- No children with congenital rubella defects were born to Australian residents during the five years 1998 to 2002.
- Two cases of congenital rubella were reported from Queensland in late 2003. Both were young mothers who missed vaccination with rubella in the school programme and highlight the need for continuing education regarding the risks of rubella infection in pregnancy.

Reporting of communicable disease conditions under surveillance by the APSU, 1 January to 30 June 2003 *(Comm Dis Intell Vol 28 No 4)*

Rubella immunity in Indigenous women

	Low	Marginal	Immune
Urban Indigenous	5.5%	3.4%	90.3%
Darwin rural Indigenous	17.6%	7.6%	72.9%
Indigenous out of Darwin	25.6%	6.4%	65.6%
Urban non-Indigenous	0%	2.5%	94.2%

- *Hunt JM, Lumley J CDI 2004; Vol 28(4)*
- Survey of antenatal patients
- Indigenous women from rural and remote communities were significantly less likely to have documented immunity to rubella.

Diagnostic problems for Indigenous women in remote areas

- Access to appropriate health care personnel for assessment, counselling and specimen collection
- Cultural issues in specimen collection
- Delays in the transport to the laboratory
- Maintaining specimen integrity during transport and storage
- Patient and specimen misidentification

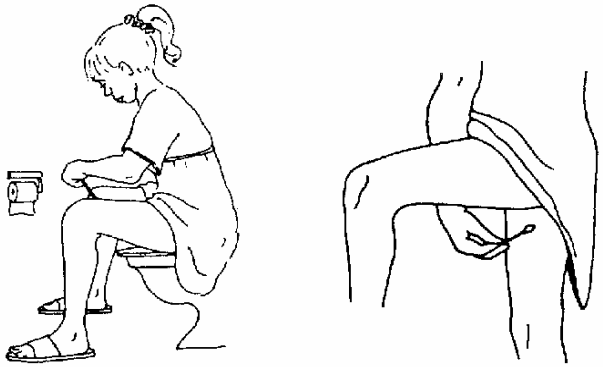
Benefits of nucleic acid detection tests in antenatal patients

- Often more sensitive than antigen detection and cell culture methods for viruses
- More robust and more tolerant of poor storage and transport conditions
- Able to be performed on a larger range of samples

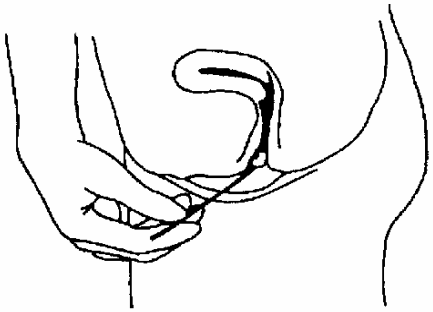
Culture vs PCR for detection of Herpes simplex virus

	PCR Positive	PCR Negative	Total
Culture Positive	45	4	49
Culture Negative	13	140	153
Total	58	144	202

This is how to take your own swab for a SOLVS PCR test



Put the tip of the cotton swab stick about 2cm (length of one finger joint) inside your vagina.. Turn the swab around once.



Count to ten whilst leaving the cotton swab stick in the vagina.

How to take a SOLVS test

- Insert at least 2cm
- Count to 10
- Twist
- Place in tube

SOLVS study

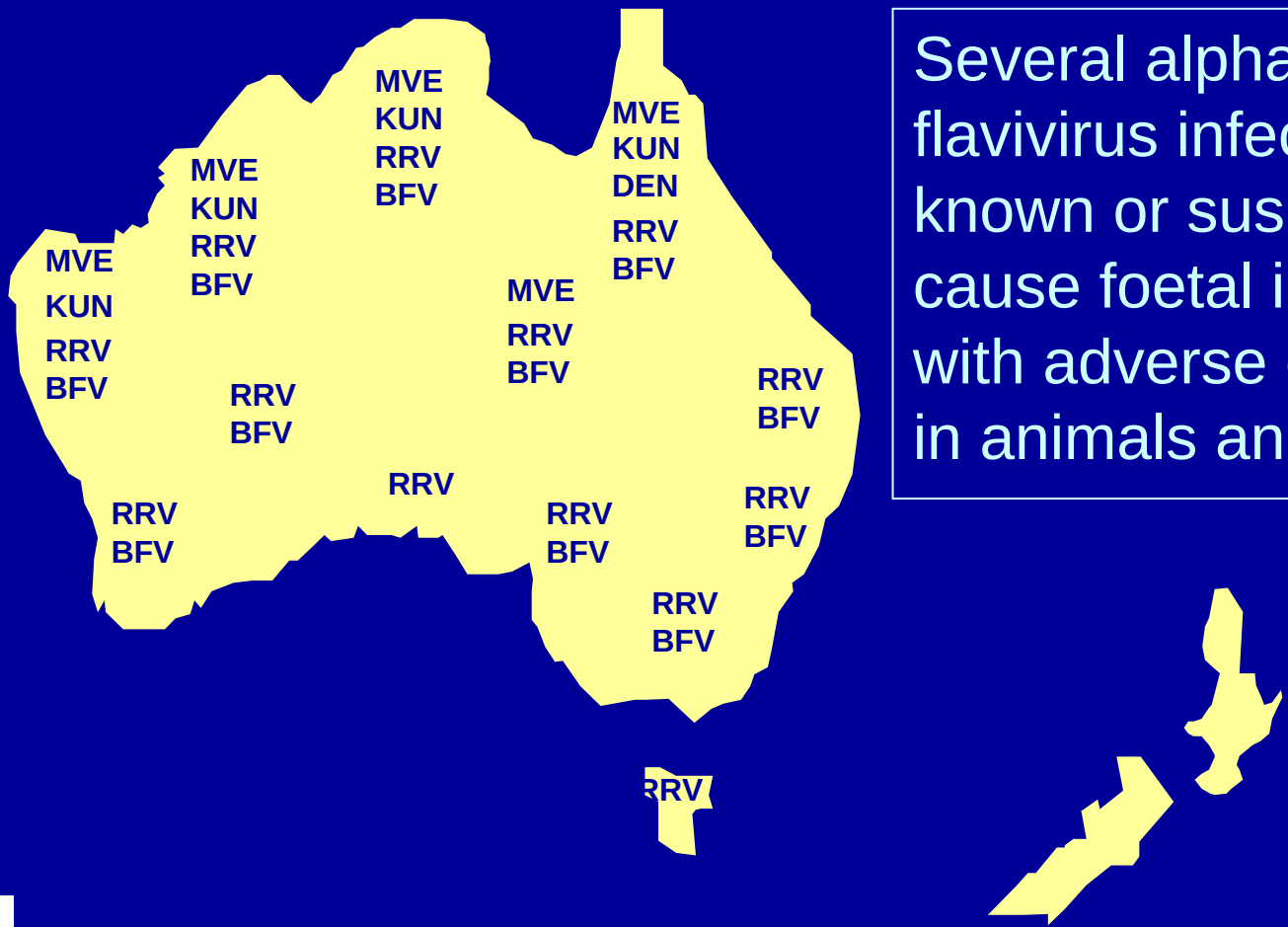
	ECS	SOLVS	FCU	LVS	Prevalence 2 pos tests
NG n = 283	19	21[a]	16		6.7%
CT n = 283	19	22[b]	20		7.4%
TV n = 266	34	39[c]	35	38	14.2%

a. 2 cases of NG by SOLVS alone

b. 1 case CT by SOLVS alone,

c. 1 case TV by SOLVS alone

Antenatal arbovirus infections

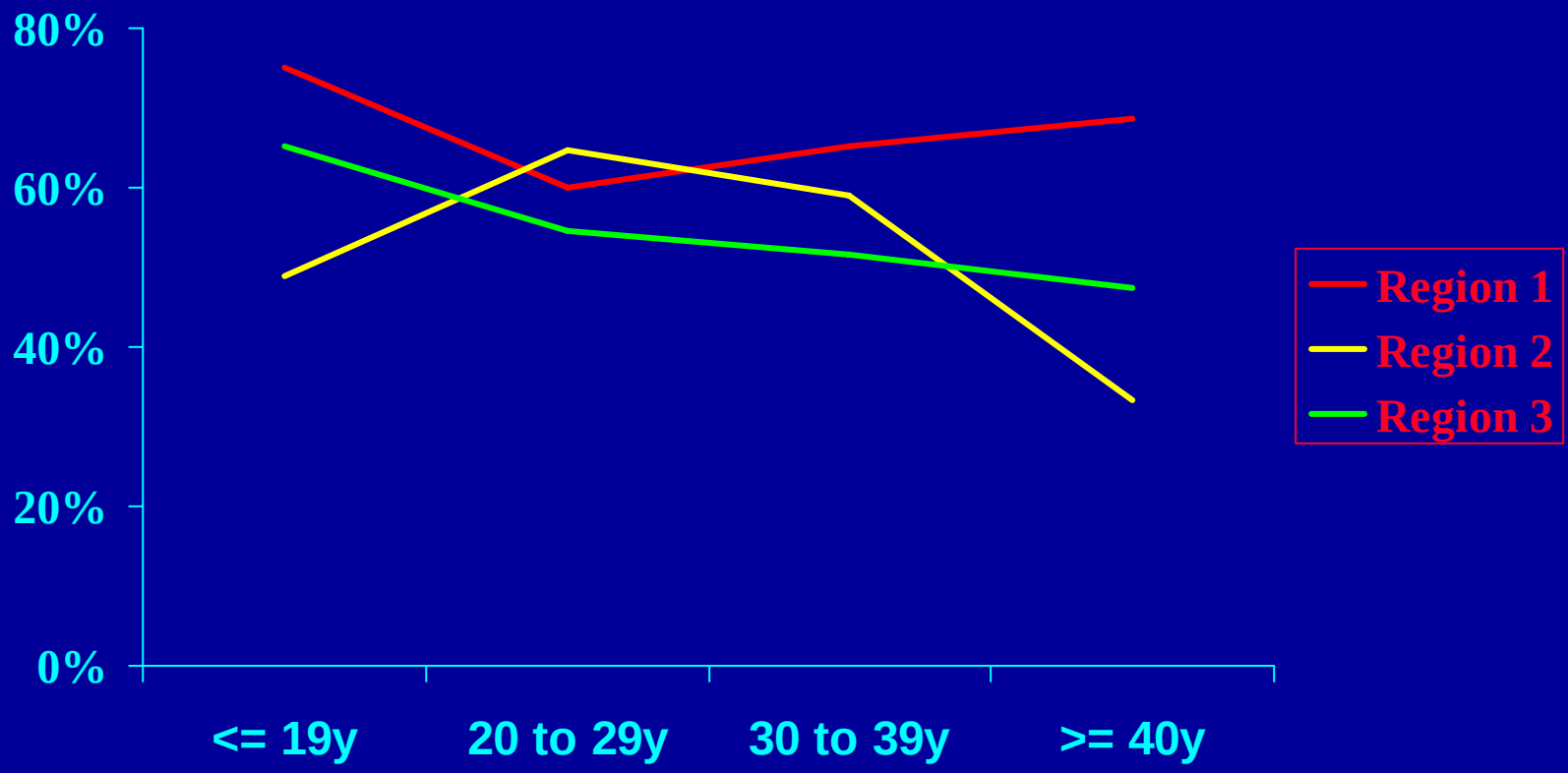


Several alphavirus and flavivirus infections are known or suspected to cause foetal infection with adverse outcomes in animals and humans

Ross River virus infection in pregnancy: the bad news

- Infection of pregnant mice with Ross River or Getah virus - RRV caused significant foetal mortality and post-partum mortality. Getah did not. *(Aaskov JG et al. Am J Trop Med Hyg. 1981;30:198-203.)*
- 368 children born to mothers pregnant during the 1979 Ross River virus in Fiji - 11 (3%) had RRV IgM in cord blood. 8 of the 11 mothers had RRV antibody (*Aaskov JG et al. Med J Aust 1981;2:20-21)*

RRV seroprevalence in women three regions of the Northern Territory



Ross River virus infection in pregnancy: the good news

- *Aleck KA et al. Am J Trop med Hyg 1983;32:618-620.*
- RRV epidemic in Cook islands in 1980. 80 mothers in first trimester during the epidemic. 52 mothers tested and followed
  - 75% of mother had RRV infection
  - none of their 63 infants had serological evidence of infection
  - maternal infection did not affect age, size or malformation rate in the neonates

Dengue infection in pregnancy

- *Carles G et al Effects of dengue fever during pregnancy in French Guiana. Clin Infect Dis 1999;28:637-640*
- Twenty-two women with probable or confirmed DF. Four confirmed Dengue 2, and one dengue 1.
- Three foetal deaths and 3 three cases of premature birth following the onset of the disease. All other infants appeared normal during physical examination, and no neonatal DF was diagnosed.
- The rate of foetal death associated with DF (13.6%) much higher than the mean rate for the gynaecology unit at the hospital (1.9%).

Japanese encephalitis virus in pregnancy

- JEV infection in pregnant mice is well described as a cause of foetal infection
- Epidemic of Japanese encephalitis in India (*Chaturvedi UC et al J Infect Dis 1980;141:712-715*)
  - five pregnant women affected by the illness were observed.
  - Two women aborted, two had apparently normal children, and the fate of one case is not known.
  - JEV was isolated from brain, liver, and placental tissues of one of the aborted foetuses.

West Nile virus infection in pregnancy in 2002

- 2002: Mother with serological and clinical evidence of recent West Nile virus fever at 27 weeks gestation
  - Live infant born at 38 weeks, normal weight and appearance
  - Bilateral chorioretinitis, cystic cerebral tissue destruction in temporal lobe, bilateral white matter loss in occipital and temporal lobes

Outcomes of 42 live births following pregnancies complicated by WNV infection, US, 2003

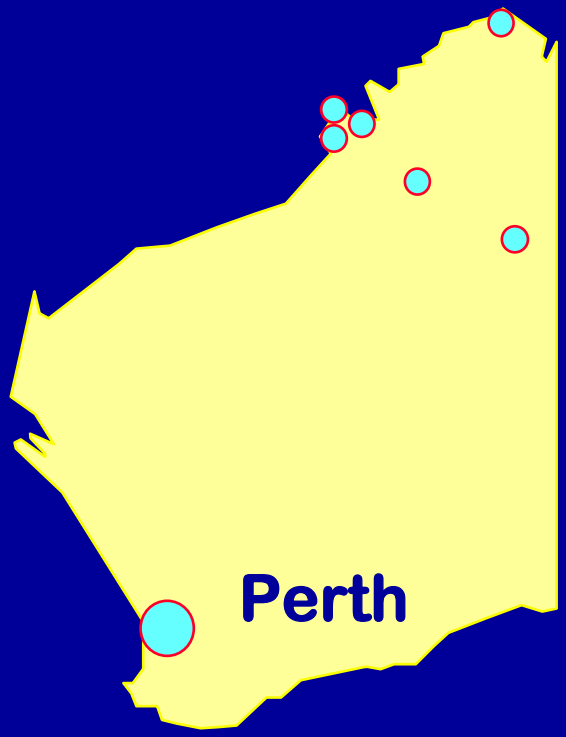
- Twenty-eight infants normal at delivery, 3 unknown
- 5 infants with major abnormalities (cleft palate, Down's syndrome, lissencephaly, microcephaly), 4 infants with minor abnormalities (rash, skin tags), 2 infants born premature
- One infant had laboratory evidence of intrauterine WNV infection without clinical illness
- Three infants had laboratory evidence of WNV infection that could have been acquired *in utero* but were unconfirmed (specimen timing) – one rash, two neuroinvasive disease

O'Leary D. West Nile virus disease in pregnancy, United States, 2003 . Fifth National Conference on West Nile Virus in the United States 2004 (http://www.cdc.gov/ncidod/dvbid/westnile/conf/February_2004.htm)

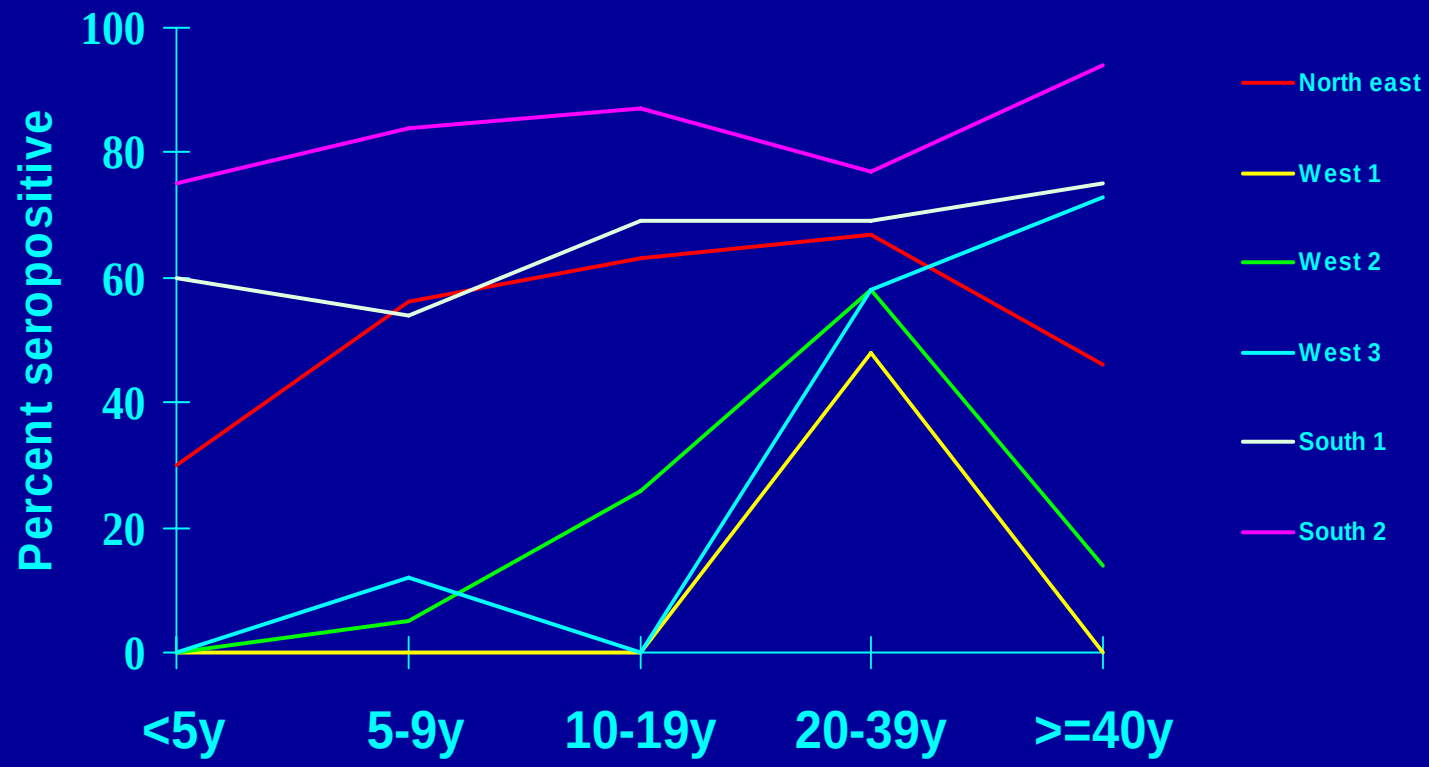
MVEV infection in pregnancy

- Infection of pregnant mice with Murray Valley encephalitis virus caused significant post-partum mortality, even though the virus could not be found in the neonatal mice.
- *(Aaskov JG et al. Am J Trop Med Hyg. 1981;30:198-203.)*

Seroprevalence of MVE in Aboriginal Communities



MVE seroprevalence Kimberley 1995



Outcome of MVE encephalitis: WA/NT 1978-2000

	Number	*Mortality*	*Severe sequelae*	*Minor sequelae*	*Normal*
Adults >= 50	**9**	**3 (33%)**	**2**	**1**	**3 (33%)**
Adults < 50	**17**	**0**	**1**	**6**	**10 (58%)**
All adults	**26**	**3 (12%)**	**3**	**7**	**13 (50%)**
Children <= 2	**22**	**6 (27%)**	**8**	**2**	**6 (27%)**
Children > 2	**3**	**0**	**0**	**1**	**2**
All children	**25**	**6 (24%)**	**8**	**3**	**8 (32%)**

Disease in young children is rarely in those under 6 months, and none were neonates

Flavivirus infections in pregnancy

- Data from overseas indicates that there is a known risk of foetal infection with dengue virus and with other viruses that are closely related to the Australian flaviviruses Murray Valley encephalitis virus and Kunjin virus. The current risk to pregnant women in Australia is not known
- Pregnant women should take particular care to avoid mosquito exposure during periods of flavivirus activity. The greatest risk is to women in areas with infrequent activity, or where they have recently moved into an area of endemic or epidemic activity

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