

# Surveillance and epidemiology of blood borne viral hepatitis in Australia: 21 years of the National Notifiable Disease Surveillance System

Aleece MacPhail

Alfred Health  
University of Melbourne  
Monash University

Prof. Karin Leder (Primary supervisor)

Dr. Katherine Gibney (Co-supervisor)

Infectious Diseases Epidemiology Unit, School of Public Health and Preventative Medicine, Monash University

# Abbreviations

- **HBV** — Hepatitis B
- **HCV** — Hepatitis C
- **HDV** — Hepatitis D
- **BBVH** — Blood-borne viral hepatitis
- **NNDSS** — National Notifiable Disease Surveillance System
- **CDNA** — Communicable Diseases Network Australia

# Background (1): Blood borne viral hepatitis (BBVH)

- HBV<sup>1</sup>
  - Vertical transmission; sexual transmission; direct blood contact
  - Chronic HBV prevalence: 0.5-1.0% (105 000 – 235 000 individuals)
- HCV<sup>2</sup>
  - Direct blood contact (principally injecting drug use); sexual transmission (uncommon)
  - Chronic infection prevalence in Australia: 1.1-2.3% (264 000 – 433 000 individuals)
  - 60-80% prevalence among people who inject drugs
- HDV<sup>3</sup>
  - HBV superinfection or coinfection
  - 5% people infected with HBV

1. MacLachlan JH, et al. The burden of chronic hepatitis B virus infection in Australia, 2011. Aust N Z J Public Health. 2013;37(5)  
Cowie B et al. Markers of hepatitis B virus infection and immunity in Victoria, Australia, 1995 to 2005. Aust N Z J Public Health. 2010;34(1)
- 2.. Razali K et al, HCV Projections Working Group. Modelling and calibration of the hepatitis C epidemic in Australia. Stat Methods Med Res. 2009;18(3)
3. Shadur B et al. Hepatitis D virus in Victoria 2000-2009. IMJ. 2013;43(10)

## Background (2) - the NNDSS

- National system of mandatory infection disease notification – established in 1991
- Notifications made by diagnosing doctor, or laboratory
- Notifications include basic demographic details: age, sex, postcode
- Reporting of BBVH
  - HBV since 1991 (Newly acquired notifications since 1995)
  - HCV since 1995
  - HDV since 1999
- Classification of HCV and HBV notifications
  - ‘Newly acquired’ or ‘unspecified.’
- Surveillance data reported regularly

# Aims

- To perform a descriptive analysis of Australian NNDSS data for blood borne viral hepatitis from 1991-2011 in order to characterise:
  - data completeness
  - temporal trends in notification number and notification rate
  - geographical and demographic distribution of disease burden
  - notification number and rate in populations eligible for HBV vaccination programs

# Methodology

- Descriptive analysis of the NNDSS notification data set using STATA 12.1
- Notification data set provided by Communicable Disease Network Australia (CDNA)
  - Data recoded and stratified into groups by year of reporting and demographic variables of interest
- Population data sourced from ABS and used to calculate notification rate
  - Notification rates adjusted such that only jurisdictions reporting national notifications in a given year were included in the population denominator for that year
- Geographical mapping
  - BBVH notifications distributed into Statistical Local Areas (SLAs) using notification postcode data and ABS postcode-to-SLA concordance tables and mapped using ABS digital boundary files
- Notifications in children of age-groups eligible for national vaccination programs extracted and analysed separately

# Results (1)

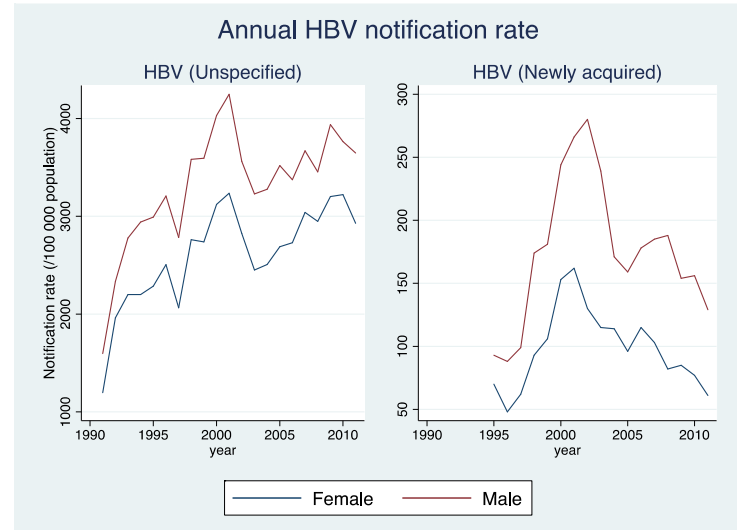
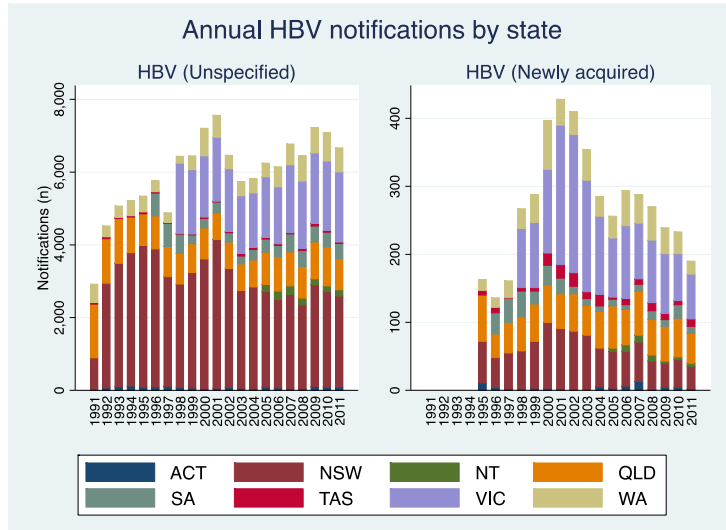
- 431 598 BBVH notifications reported nationwide (1991-2011)

**Table 1:** National reporting periods and total notifications to 2011

<b>Disease</b>		<b>Period of national notification</b>	<b>Notifications (n)</b>	<b>Notifications/year</b>	
				<i>Mean</i>	<i>(range)</i>
HBV	Unspecified	1991-2011	125 967	5 998	(2 918 – 7 562)
	Newly Acquired	1995-2011	4 659	274	(132 - 428)
HCV	Unspecified	1995-2011	233 120	13 576	(10 095 – 18 017)
	Newly Acquired		6 678	393	(115-678)
HDV	Unspecified	1999-2011	382	28	(16-43)
<b>Total</b>			<b>431598</b>		

# Results (2): Hepatitis B

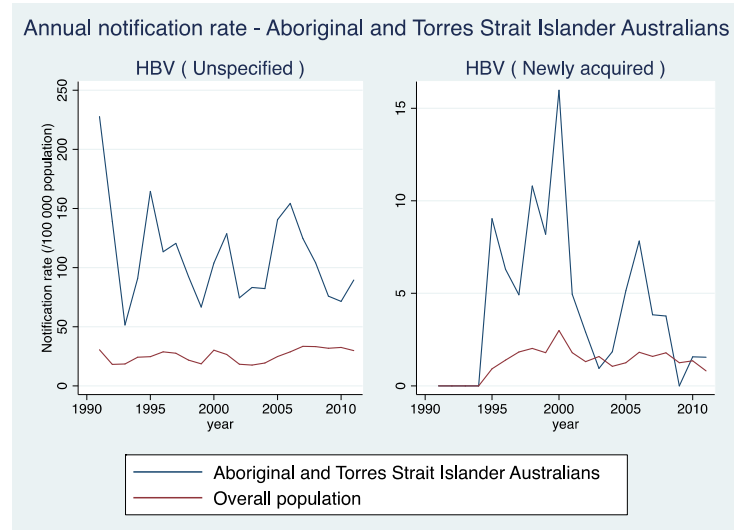
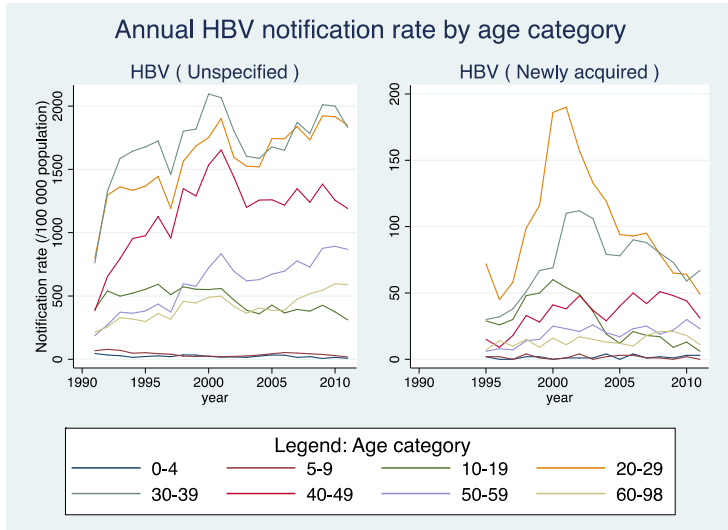
- Slight fall in notification number and rate since 2000





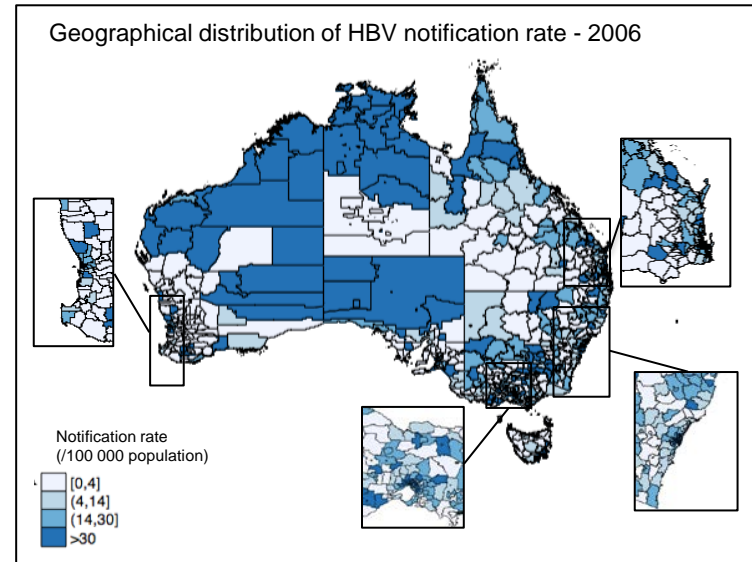
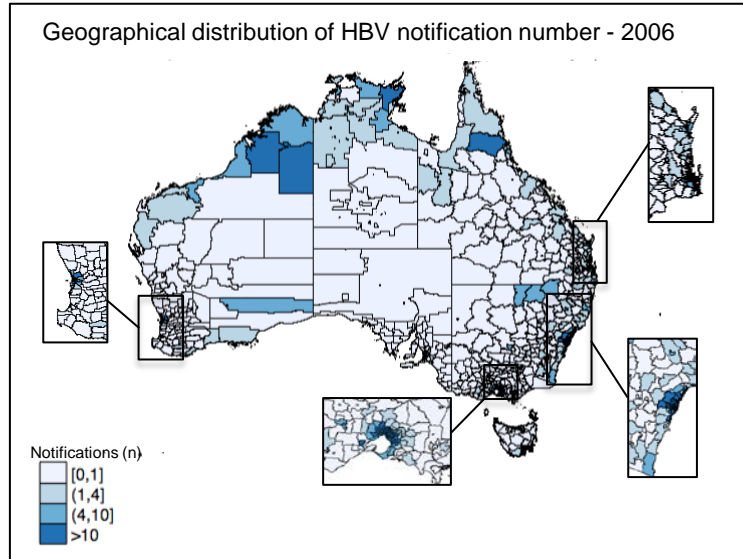
# Results (3): Hepatitis B

- High notification rate among males aged 20-49 and Aboriginal and Torres Strait Islander Australians



# Results (4): Hepatitis B

- Heterogeneous geographical distribution of disease burden



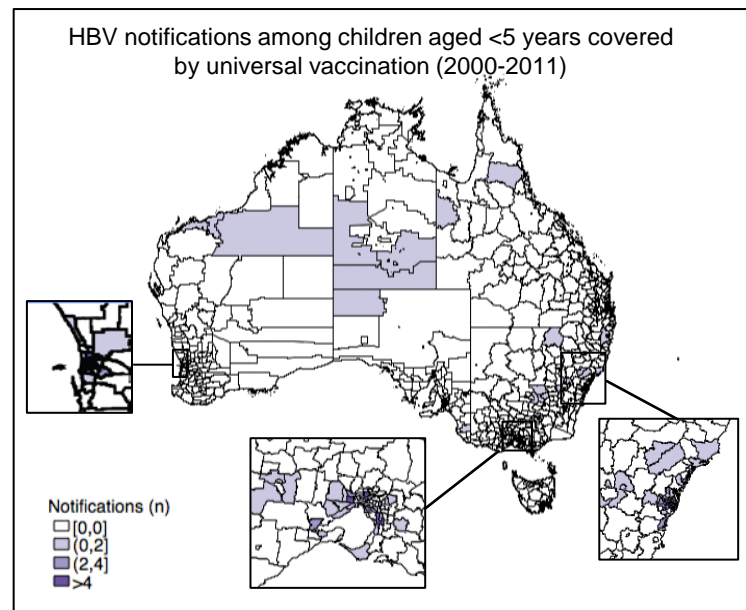
# Results (5) Hepatitis B

- Notifications reported in children and adolescents eligible for vaccination warrant further study

Program details	First year of implementation	Notifications among children and adolescents eligible for vaccination	
Universal infant vaccination*	2000 (NT in 1990)	Unspecified	193
		Newly acquired	23
		Total	216
Adolescent vaccination†	1996	Unspecified	10 039
		Newly acquired	449
		Total	10 488

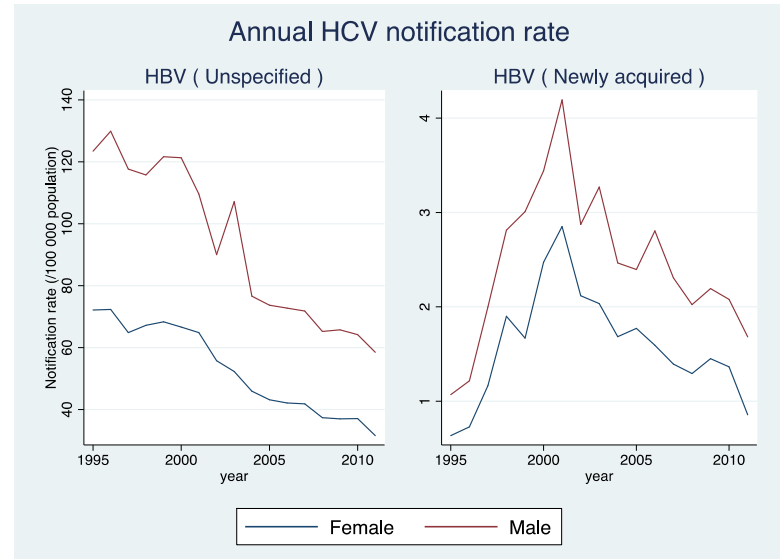
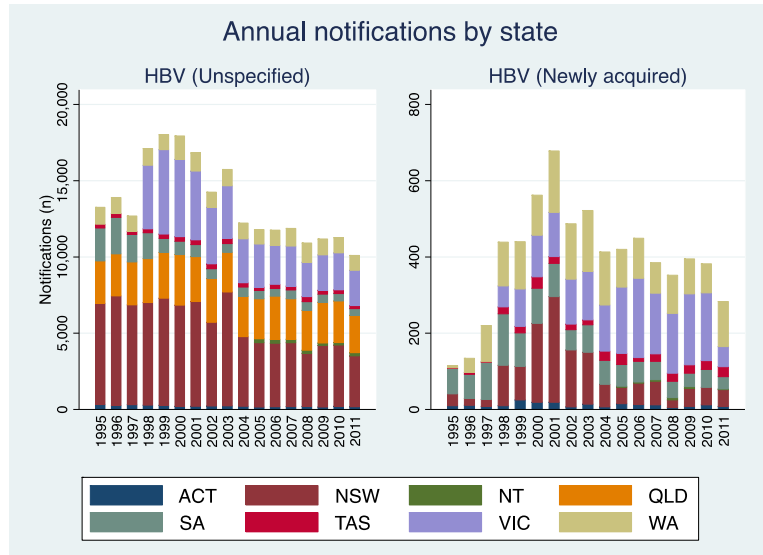
\*Vaccination funded and delivered at birth (within 7 days) for all babies born in Australia

†Vaccination for all 11-12 year olds recommended and funded from 1996, delivered through community and some school-based programs with variation between jurisdictions



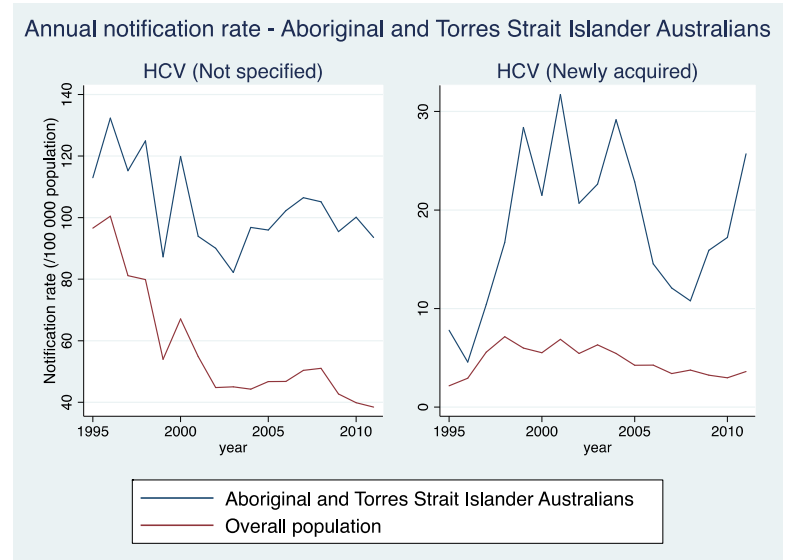
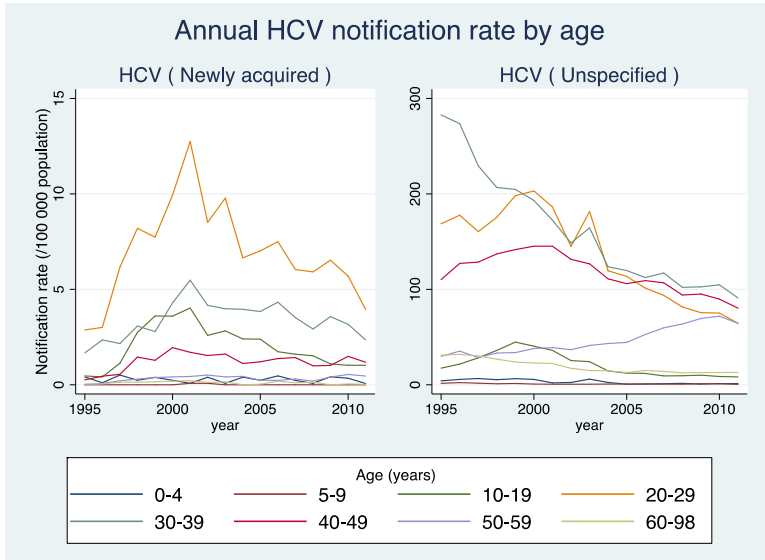
# Results (6): Hepatitis C

- Similar profile of notifications for HBV + HCV
- Fall in notification number and notification rate for both HCV and HBV since 2000



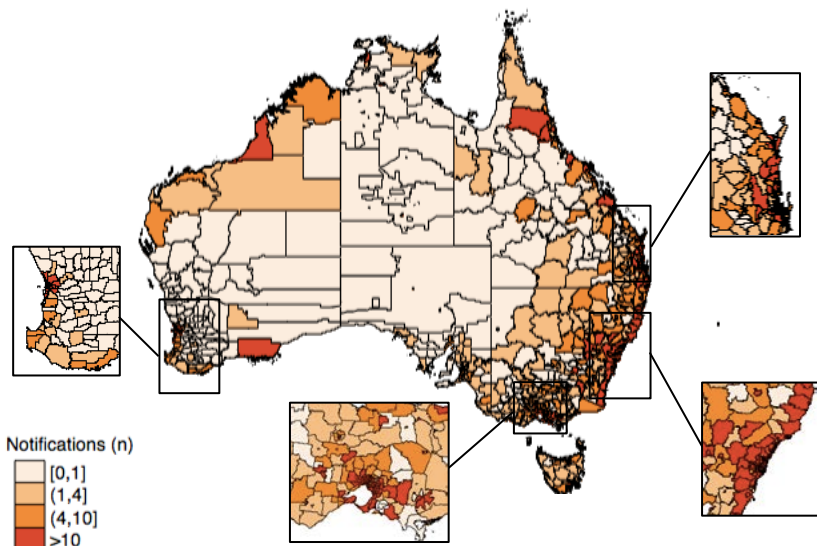
# Results (7): Hepatitis C

- High notification rate in males, age-group 20-49, and Aboriginal and Torres Strait Islander Australians

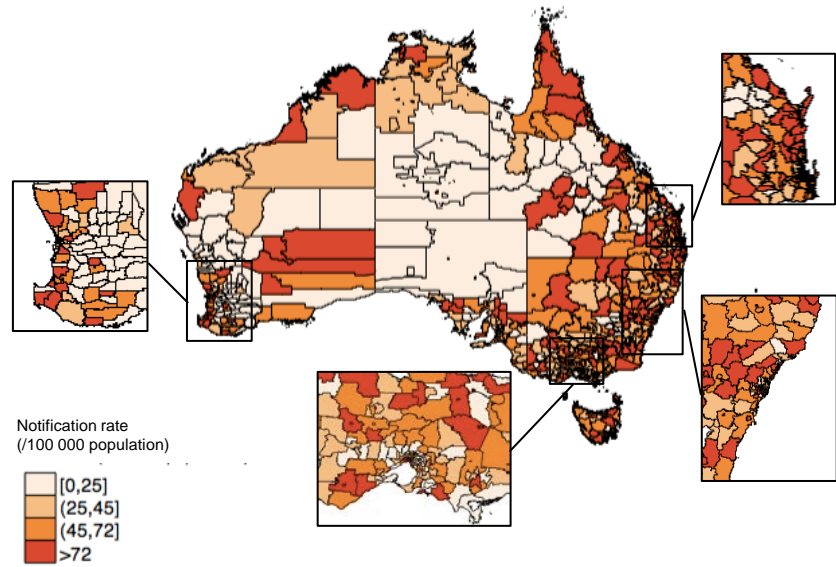


# Results (8) Hepatitis C

Geographical distribution of HCV notification number - 2006

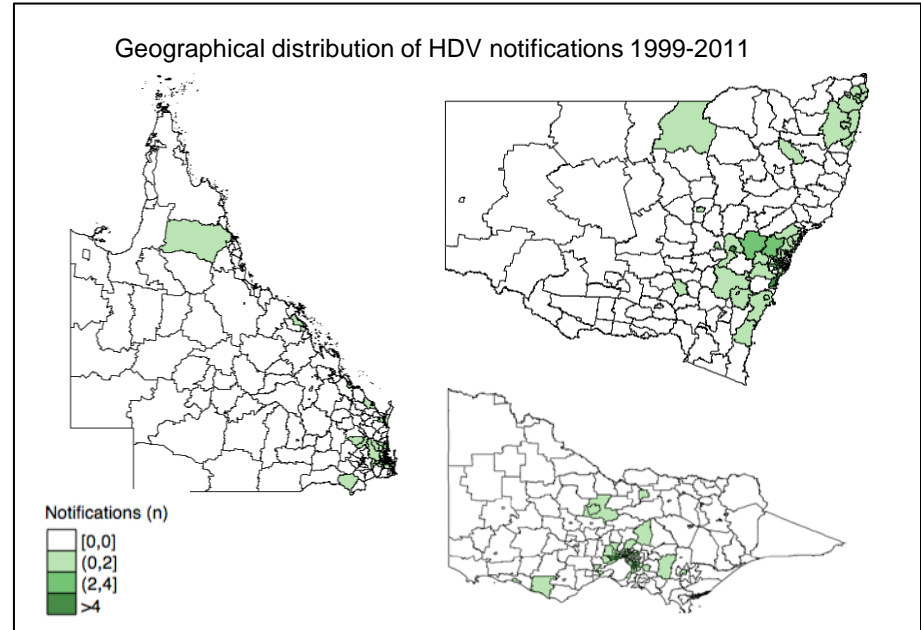


Geographical distribution of HCV notification rate - 2006



## Results (9): Hepatitis D

- Very low rates of reporting
- 382 notifications in total
- HDV reported at 0.4% reporting rate of HBV
- Notifications clustered around 3 major cities



# Discussion (1)

- Key findings
  - Fall in notification rate for both HCV and HBV since 2000 (unspecified and newly acquired)
  - Similar profile of notifications for HBV + HCV
  - High rates of notification in males, age-group 20-49, Aboriginal and Torres Strait Islander Australians, and people living in rural and remote areas
  - Very low rates of reporting for HDV (Estimated 5% prevalence vs 0.4% notification rate) – suggestive of under-diagnosis



## Discussion (2)

- Broadly consistent with the existing literature<sup>1,2,3,5</sup>
  - Fall in HCV + HBV since 2000 (coincides with introduction of vaccination programs and a reduction in the heroin supply in Australia)
  - Increased risk in young adult males, Aboriginal and Torres Strait Islander Australians
- Strengths and weakness of the data set
  - Convenience and feasibility of mandatory notification as a surveillance tool
  - Notifications an imprecise epidemiological marker – distorted by disease presentation, healthcare practice and resourcing as well as disease incidence

1. MacLachlan JH, et al. The burden of chronic hepatitis B virus infection in Australia, 2011. Aust N Z J Public Health. 2013;37(5)

2. Cowie B et al. Markers of hepatitis B virus infection and immunity in Victoria, Australia, 1995 to 2005. Aust N Z J Public Health. 2010;34(1)

3. Razali K et al, HCV Projections Working Group. Modelling and calibration of the hepatitis C epidemic in Australia. Stat Methods Med Res. 2009;18(3)

5. Iversen J et al. Australian NSP Survey national data report 1995–2010. Prevalence of HIV, HCV and injecting and sexual behaviour among NSP attendees: Kirby Institute, University of New South Wales, Sydney. 2011.

## Reflection – AFPHM core competencies (1)

- AFPHM core competencies ‘information, research and evaluation’
  - Role and applications of infectious disease surveillance and mandatory notification
    - *Public health surveillance is the systematic ongoing collection, collation and analysis of data for public health purposes and the timely dissemination of public health information for assessment and public health response as necessary. (World Health Organisation)*
  - Critical evaluation and scientific communication

## Reflection – AFPHM core competencies (2)

- ‘Policy’ and ‘Health promotion and disease presentation’
  - Intersection of BBVH incidence and broader healthcare inequality
  - Geographical considerations in resource allocation
  - Importance of ongoing evaluation of healthcare interventions including vaccination programs

# Acknowledgements

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- CDNA – Communicable Diseases Network Australia
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- RACP Foundation, AFPHM

# Appendices

# Appendix 1: data completeness

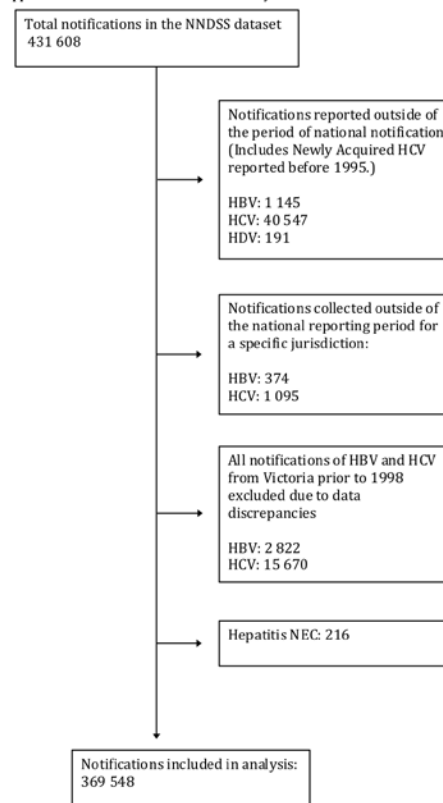
**Table 1:** Notification data completeness

<b>Data type:</b>	<b>HBV</b> <i>(% reporting rate)</i>	<b>HCV</b> <i>(% reporting rate)</i>	<b>HDV</b> <i>(% reporting rate)</i>
Age, sex, state, postcode	98-100%	>99%	>99%
Indigenous status	36%	35%	58%
Country of birth			
Any data reported	30%	29%	46%
Country other than Australia reported	<0.5%	<0.1%	0%
Reason for testing	25%	25%	33%
Vaccination status	1%	N/A	0%
Serogroup	N/A	<1%	N/A

N/A = not applicable

# Appendix 2: exclusion criteria

Appendix 2: Notifications excluded from analysis



# Appendix 3: impact of adolescent vaccination program

**Table 3:** Pooled notification rate for newly-acquired HBV in adolescents eligible for vaccination

Program details	First year of implementation	Age-group of interest	Years	Pre -vaccination group		Post-vaccination group*		
				Notifications (n)	Pooled notification rate (/100 000 person-years)	Years	Notifications (n)	Pooled notification rate (/100 000 person-years)
Adolescent vaccination†	1996	13-19 years	1991-1995	117	1.96	2005-2011	62	0.66