Hepatitis B – from targeted screening and immunisation of migrant mothers to universal immunisation in Australia

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Immunisation policy for migrants, refugees and travellers
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Hepatitis B: essential facts

- 360 million carriers globally
- The most contagious blood-borne virus
- Chronic carriage risk highest early in life; acute disease more likely in adolescence/adulthood
- Chronic HB can cause chronic hepatitis, cirrhosis and primary hepatocellular carcinoma – 15-25% risk premature mortality for early infection
- Accounts for up to 80% of liver cancer
- Second only to tobacco as fatal carcinogen
- Eventually eradicable
HB is different from other vaccine-preventable diseases

• Most infections asymptomatic / unrecognised until a complication develops
• Complications usually develop after decades
• Causative role of HB may not be recognised
• Preventing HB is not so much a ‘child survival’ issue – but primarily an issue of premature adult death
• The first vaccine against cancer
• The only infant vaccine where timing of first dose is critical
HB burden of disease in Western Pacific Region

- 28% global population
- 45% carriers - 160 million
- 325,000 deaths / yr: 890 / day ~= TB
- In absence of immunisation, 2.2% of annual birth cohort of WPR would be expected to die of HB-related causes
- HB currently causes more deaths than any other disease targeted by universal immunisation except pneumococcal disease

WPRO. Progress in HB control in WPR. Manila 2004
Proportion of Total Deaths in the 2000 Birth Cohort from Hepatitis B, By Age at Infection\(^1\)

\[^1\) Future deaths in 2000 birth cohort, without vaccination
Did you know that there is a vaccine to prevent cancer?

Hepatitis B: the first anti-cancer vaccine

Hepatitis B is the number one cause of liver cancer. It can be prevented with a safe and effective vaccine.
Risk of chronic infection

- Neonates
- Infants
- Children
- Adults

Age at Infection

% Risk
- Neonates: 100%
- Infants: 50%
- Children: 20%
- Adults: 0%
HB Australia immunisation milestones

• 1982 – HB vaccine available (plasma-derived)
  – The most expensive vaccine at that time
• 1983 - NHMRC guidelines targeted to high risk groups (including infants of carrier mothers)
• 1984 - Universal infant immunisation proposal by Director, Communicable Diseases Section, DOH
• 1987 - Federal funding for immunisation of infants born in high risk ethnic groups
  – Recombinant vaccine available
HB immunisation milestones 2

- 1987 Nov – at-risk infants
  - NT Jan 88, SA 1996
- 1990 NT universal infant
- 1996 – NHMRC rec universal infant + adolescent programs
- 1998 Jan – adolescents
  - Qu, Tas, NT Mar-Apr 98; NSW, SA 1999
  - School programs key – variable timing
    - Pre 98 – ACT, SA, Tas, Vic; after 2002 – Q, NSW, WA
- 2000 May – universal infant including dose at birth
Prevention of mother to infant transmission

- Immunisation of infants born to carrier mothers
  - Victoria 1991-2, n=336
    - Of those recorded in local government records HB3 coverage 80.8%
    - Of entire cohort documented HB3 coverage 57.4%

Prevention of mother to infant transmission

Immunisation of infant born to carrier mothers

• NSW 1987-8
  – Inner Sydney 41/49 (81%) coverage HB3

• NSW
  – SE Sydney, 13/20 (65%) infants of Chinese carrier mothers received HBIG, HB3 100%
    Su J et N. Med J Aust 1997; 166:446-7
Prevention of mother to infant transmission

Immunisation of infants born to carrier mothers

- SW Sydney, 1997
  - After period of follow-up using ACIR data, completed coverage increased from 22 to 46%

  Crone S, et al. 6th Nat Imm Conf, Melb 4-5.11.98

- 50% of NSW areas reporting, 1-3/99
  - 38/39 babies identified HBIG < 12 hr
  - 34/39 HB3 ≤ 6 mo

personal communication
Prevention of mother to infant transmission

Maternal HB Screening

- NSW, 1990, Medicare data, \( \geq 10,000 \)
- 77% pregnant women screened

High risk ethnic groups

• Victoria 1992-3, n = 3611
  – Documented HB3 64%
  – DTP/CDT3 ≥ 84% (p < 0.001)

• Victoria 1997, n = 500, mo country of birth or Aboriginality
  – HB vaccination in hospital 6%
  – Complete HB immunisation by 12m for infants registered with local council programs : 38%
    Beckmann K, Lester R. 6th Nat Imm Conf, Melb 4-5.11.98
High risk ethnic groups

- NSW (SW), 1987-90, n = 323
  - Carrier mother or high risk ethnic group, 69%
  - HB3 60%

Riley R et al. Aust J PH 1993; 17:171-3
Universal infant HB immunisation Australia

- Introduced in NT in 1990
- Introduced nationally with a routine dose at birth within 24 hours in 2000
- Low program costs
- Initial education and engagement of hospital staff not normally involved in infant immunisation required for implementation
- Routine – combine with oxytocin for mother and Vitamin K for baby in delivery room
Efficacy of a vaccination programme: Taiwan

Incidence of HCC in children 6-14 years old (per 100,000)

- 1981: 7.1
- 1991: 4.5
- 1992: 2.4
- 1993: 1.7

HBsAg rate, school children born 1985 – 96: Malaysia

190,077 school children aged 7-12 yrs (1985-1996)

Cross-sectional seroprevalence study

HBsAg in primary school children - Singapore

James L. Singapore Med J. 2001 Sep;42(9):420-4
Incidence of acute HB Singapore 1985-2002

- Reported acute indigenous HB cases (per 100,000)

- No indigenous cases reported in < 15 y olds since 1997