**The Hepatitis Foundation of New Zealand**

**HBV in New Zealand**

Community HBV screening to long-term follow-up

John Hornell, CEO, The Hepatitis Foundation of New Zealand

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**People Identifying as Māori in New Zealand (31 March 2013)**

- 598,602 Māori, 14.9% of the population
- 23.9 years median age (half are younger and half are older than this age)
- 48.2% male (288,636 people)
- 51.8% female (309,966 people)

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**1976: Identification of endemic HBV**

Notified cases of acute HBV in Whakatane (population 35,000), NZ, from 1976 to 1978

![Graph showing HBsAg+ icteric hepatitis cases](image)

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**1984: Kawerau community study**

- Township built in 1953 around paper mill
  - Population 10,000, predominantly Māori
  - 98% of population screened

Mode of HBV transmission is early horizontal, not vertical

![Graph showing age distribution of anti-Hbcore+](image)

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**The Hepatitis Foundation of New Zealand**

A registered charitable trust whose mission is:

- To improve health outcomes for people living with hepatitis B and C in New Zealand
- Over 30 years experience in delivering community-based services in a shared care environment - facilitation, assessment, follow-up, education and support.
- Work extensively with Māori, Pacific and Asian ethnic populations and communities
HBV vaccination: Beginnings

- 1983: Government decides to fund vaccines only for at-risk adults, health-care workers
- 1985: Hepatitis Foundation initiates and funds own mass childhood vaccination programme:
  - Plasma-derived vaccine (MSD)
  - IM low dose (2mg x3)
  - Anti-HBs neg children <12 years
  - >8000 vaccinated (>95% target)
  - Subsequent followed for protective immunity

Follow-up of low-dose vaccination programme in Kawerau children

(i) Seroconversion

<table>
<thead>
<tr>
<th>Year</th>
<th>1984</th>
<th>1992</th>
</tr>
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<tbody>
<tr>
<td>% seroconversion in 12yr olds</td>
<td>69%</td>
<td>5%</td>
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(ii) Infection

<table>
<thead>
<tr>
<th>Year</th>
<th>1984</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>% HBsAg+ in 12yr olds</td>
<td>10%</td>
<td>0%</td>
</tr>
</tbody>
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Roll out of HBV vaccination: Milestones

- 1985: International Vaccination Workshop
  - Saul Krugman, Palmer Beazley, Ron Lucas, Mary Dimitrikakas, Brian McMahon, Jim Maynard
- 1986: Vaccinate infants of HBsAg+ mothers
- 1987: Vaccinate all infants (80,000/year)
- 1988: Catch-up vaccination in all 12yr olds

Impact of endemic HBV infection in NZ

Liver mortality

- Alcohol 31%
- HBV 29%
- Other 4%

Hepatoma Clinic

- Alcohol 31%
- HBV 9%
- Other 7%

What about those already infected?

- 200 cases per annum
- 120 cases per annum

Fung J. et al. Hepatology 2005; 42: 258A
National HBV screening takes shape

- 1991-1995: MoH HBV carrier workshops
- 1997: Ministry announce funding for screening pilot for Māori in South Auckland
- Hepatitis Foundation disputes that the pilot would be:
  - unnecessary, given that reliable testing, vaccination, treatment, follow-up are available
  - unethical as carriers living outside the pilot area would be an untreated ‘control’ group
  - too small to collect accurate data on complication rates (HCC, liver-related mortality)
  - non-Māori high-risk groups must be included

Who should be included in a National HBV Screening Programme?

- Prevalence of HBsAg
- Incidence of HCC

Projected ethnic populations 2001-2021

National HBV Screening Programme

- June 1998: Pilot programme scrapped
- National screening programme funded from July 1999 until June 2002
- Targeting “at-risk” adults
  - Asian, Pacific Islander, Māori
  - ≥15 years old (post-vaccination)
- Total to be screened= 566,000
- All HBsAg+ offered life-long follow-up

Target population for screening

- 313,071 at risk
  - 41% Māori
  - 31% Pacific
  - 28% Asian
  - 90% urban
- 252,765 at risk
  - 75% Māori
  - 12% Pacific
  - 15% Asian
  - 75% rural
  - mobile clinics
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National HBV Screening Programme

- July 1999 - July 2002
- 177,292 Screened
- 11,936 HBsAg+ identified

- anti-HBs(+) = immune to HBV
- HBsAg+ = chronic HBV

Overall 6.5% 5.8% 7.3% 6.2% 1%
Maori 5.8% 9.1% 13.3% 9.3% 6.5%
Pacific 7.4% 4.5% 11.3% 12.4% 9.6%
Asian 5.8% 4.5% 11.3% 12.4% 9.6%
European 6.5% 5.8% 7.3% 6.2% 1%

Prevalence according to ethnicity

Maori Cook Is Niuean Tongan Indian SE Asian Chinese Overall
5.8% 7.4% 9.1% 13.3% 9.3% 6.5% 5.8%


National HBV Screening Programme followed by opportunistic screening in the community

Numbers exiting from the National HBV Surveillance Programme

Polynesians in Australia

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What are the long-term benefits of the national HBV screening programme?

Characteristic of Hepatoma: 
**Screened vs Non-screened tumours**

- Larger than 5cm: 28% screened vs 64% non-screened ($p<0.001$)
- Multinodular Tumour: 3% screened vs 46% non-screened ($p<0.001$)
- Bilobar Tumour: 16% screened vs 6% non-screened ($p<0.001$)
- PV Thrombosis: 1% screened vs 4% non-screened ($p<0.001$)
- Metastasis: 2% screened vs 38% non-screened ($p<0.001$)

Median tumour size: 3cm vs 8cm ($p<0.001$)

Survival in hepatocellular carcinoma:
**Screened vs non-screened HBV tumours**

- Screened group: Median survival = 2931 days ($n=284$)
- Non-screened group: Median survival = 130 days ($n=374$) 

Cumulative Survival

Log-rank: $P<0.0001$

Conclusions

- In a country with endemic HBV infection, neonatal vaccination will prevent chronic infection, thereby reducing the risks of liver-related complications
- Adults with chronic infection should be identified through targeted screening and recruited into a low cost national community-based surveillance programmes

Unresolved issues

- Need to increase recruitment into national programme
- Need to optimise current surveillance strategies
  - identify predictors and tailor screening to risk profile?
Kawerau cohort HRC study

- 1984: 572 HBsAg+ Māori children diagnosed with chronic HBV
- 2012: 511 original cohort alive. 497 traced and contacted. 384/511 patients reassessed (105 in Australia, Sydney, Brisbane, Perth & Melbourne)
  - 4% HCC, 11% cirrhosis (Fibroscan)
- Age, HBeAg status and baseline HBV DNA strongest predictors of HCC*
- 2013-5: Further studies on 1984 and 2012 sera including whole genomic sequencing
  - 1) Determine impact of HBV genotype (C/D)
  - 2) Identify which HBV mutations/deletions predict long term risk of HCC and cirrhosis
- Develop predictive model for liver-related complications based on baseline factors

* Lim T-H, et al. (in press)

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