Control of Acute Hepatitis B and Hepatocellular Carcinoma in Alaska: Follow-up 32 years after a Hepatitis B Newborn and Catch-up Immunization Program

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Background: Alaska
remote villages only accessible by boat and plane
History of Alaska Hepatitis B:

In the 1970s and 80s Alaska Native people had the highest U.S. rate of:

- Acute hepatitis B
- Chronic hepatitis B
- Hepatocellular cancer

Why?

- Hepatitis B virus is highly contagious
- 5 HBV genotypes in Alaska
  - Some are aggressively carcinogenic
  - Some have long-lasting infectivity increasing risk of maternal transmission
- Household crowding and lack of running water in rural communities facilitated transmission
Hepatitis B Vaccine Introduction

1981-1982
Demonstration Project

- Screening and vaccination in high rate regions
- Screening pregnant women – HBIG and vaccine to newborns

1984
Statewide screening & vaccination

- Screening and Vaccination Program extended to Alaska Native people statewide

1984
Routine childhood vaccination

- Tribal facilities gave hep B vaccine to infants starting at birth
- Vaccine catch-up in schools
32 years after Hep B vaccine introduction

Aim 1: Compare rate of 3 dose Hep B vaccine coverage in AN children versus the general population

Aim 2: Examine the rates of hepatitis B infection and hepatocellular cancer.

- Tribal surveillance system to detect acute hepatitis B virus infection
- Active twice yearly screening of persons with chronic hepatitis B with alpha-fetoprotein
- Hepatocellular cancer cases identified through CDC Cancer registry

McMahon et al. Hepatology 2011;54:801-807
Hepatitis B vaccination rates in Alaska Native toddlers have been higher than or similar to US rates since 1996.

Source: National Immunization Survey  [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines)
Incidence of Symptomatic Hepatitis B in Alaska Native People 1981-2008

CDC/IHS Vaccine Demonstration Program begins in 16 villages of Yukon Kuskokwim Delta

Statewide Program begins-all susceptibles immunized
- pregnant women screened/infants HB vax + HBIG
- begin universal newborns immunization
Incidence of Symptomatic Hepatitis B in Alaska Native People <20 years old

In 2009 – No cases after 1992

In 2017 – still no cases after 1992

McMahon et al. Hepatology 2011;54:801-807
Hepatitis B infected (HBsAb+) Alaska Native persons

A chronic carrier is a person who is HBsAg+ for longer than 6 months

1987
- 1500 HBsAg+ persons total
- 657 HBsAg+ under 20 years

1999
- 2 new HBsAg+ cases since 1999

2010
- The last HBsAg+ case in person < 20 years old
Incidence of Hepatocellular Cancer, Alaska Native People <20 years old.

3 per 100,000 in 1984-88

0 cases since 1998

No one
Conclusion

Strong universal child vaccination program starting at birth

Plus

Mass Screening & immunization of susceptible people

Plus

Screening all pregnant women and providing HepB vaccine and HBIG to infants of hepatitis-infected mothers

has eliminated Hep B infection and early hepatocellular cancer in Alaska Native people

This population-based approach can serve as a model for other populations.
Extra slides
FIGURE 3. Reported acute hepatitis B incidence* among persons aged <19 years, by race/ethnicity and year — United States, 1990–2004

* Per 100,000 population.
† Asian/Pacific Islander.
§ American Indian/Alaska Native.