

Adverse Events Associated with Hepatitis B Vaccine in U.S. Children Less Than Six Years of Age, 1993 and 1994

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MONICA A. FISHER, MPH, PhD, STEPHEN A. EKLUND, DrPH, MHSA,
SHERMAN A. JAMES, PhD, AND XIHONG LIN, PhD

This article has 56 references.

Abbreviations and Acronyms

CDC	Centers for Disease Control and Prevention
HB	Hepatitis B
IOM	Institute of Medicine
NHIS	National Health Interview Survey

FROM ABSTRACT:

PURPOSE:

This study evaluated infrequent adverse reactions to hepatitis B vaccine by investigating the association of this vaccine with adverse health outcomes for U.S. children less than six years of age.

The evaluation of the association between hepatitis B vaccine and chronic arthritis provides needed data, relevant to the Institute of Medicine's Report that there are inadequate data available to assess the causal relationship of hepatitis B vaccine to arthritis risk.

METHODS:

The 1993 (n = 5505 children) and 1994 (n = 6515 children) National Health Interview Survey (NHIS) datasets were analyzed to provide post-marketing surveillance data from probability samples of the U.S. population. Incident cases of adverse events were determined from the temporal association between the hepatitis B vaccination and the adverse events.

RESULTS:

Controlling for age, race, and gender simultaneously in the 1994 NHIS, hepatitis B vaccine was found to be associated with prevalent arthritis, incident acute ear infections, and incident pharyngitis / nasopharyngitis.

CONCLUSIONS:

Evidence from this study suggests that hepatitis B vaccine is positively associated with adverse health outcomes in the general population of US children.

THESE AUTHORS ALSO NOTE:

"Hepatitis B (HB) is not generally considered to be a childhood disease in the U.S."

"There were a total of 10,176 cases of HB reported to CDC in 1996, with 78 (0.77%) of them among children < 5 years old."

Adverse reactions to HB vaccine have been reported for the five-day period following each dose during field trials.

Short-term, relatively common complications of HB vaccine are often encountered in clinical trials.

Published potential serious adverse reactions to HB vaccine include: (Each of these is supported with 1 – 13 references):

- Arthritis
- Psoriasis
- Other collagen conditions
- Visual impairment
- Paralysis or muscles affected
- Digestive conditions
- Flu-like symptoms
- Liver dysfunction
- Blood and blood-forming systems
- Nervous system conditions
- Convulsions and seizures
- Neuralgia or neuritis
- Kidney conditions
- Acute pericarditis
- Respiratory conditions

"The Institute of Medicine (IOM) reported that the evidence established a causal relation, along with demonstrated biologic plausibility, for the association of HB vaccine and anaphylaxis."

"In the committee's judgment, the HB vaccine could cause fatal anaphylaxis."

"When the IOM evaluated long-term out-comes such as arthritis, Guillain-Barre' syndrome, and other demyelinating diseases (optic neuritis, multiple sclerosis, or transverse myelitis), the conclusion was that the evidence was inadequate to accept or reject a causal relation with HB vaccine."

The purpose of this study was to evaluate HB vaccination and associated adverse health outcomes in a population of children less than 6 years of age.

"This study addresses the lack of long-term follow-up after HB vaccination, and the unknown external validity of results from high risk populations in clinical trials."

This study also addresses the issue of rare adverse reactions, which are not found in clinical trials.

In this study, the total interview sample for 1994 was 45,705 households and 116,179 individuals. The total interview sample for 1993 was 43,007 households and 109,671 individuals.

"This study evaluated separately the association between HB vaccine and chronic arthritis, acute ear infection, and pharyngitis/nasopharyngitis.

CHRONIC ARTHRITIS

"The risk of chronic arthritis was 6.20 (1.08–35.46) times greater among those children 0–5 years of age who received the HB vaccine than among those children without HB vaccination."

"The risk of chronic arthritis was 5.91 (1.05–33.14) times greater among those children who were HB vaccinated than among those children who did not receive the HB vaccine."

PHARYNGITIS and NASOPHARYNGITIS

"The risk of incident cases of pharyngitis/nasopharyngitis was 1.19 (0.85–1.67) times greater among those children 0–5 years of age who received the HB vaccine than among those children without HB vaccination."

ACUTE EAR INFECTIONS

"The risk of incident cases of acute ear infections was 2.15 (1.34–3.45) times greater among those children 0–5 years of age who received the HB vaccine than among those children without HB vaccination."

"The risk of incident cases of acute ear infection was 3.02 (1.24–7.34) times greater among those children, < 2 years old who received the HB vaccine than among those children, < 2 years old who did not receive the vaccine."

DISCUSSION

This study of two large datasets representing the general population of U.S. children less than 6 years old found a positive association between HB vaccine and chronic arthritis, acute ear infection, as well as pharyngitis and nasopharyngitis.

The study design provides more valid results than the typical cross-sectional survey because the temporal association of disease (adverse reaction) and HB vaccination were computed for pharyngitis/ nasopharyngitis and acute ear infection, and because the specific conditions found to be associated with HB vaccine were consistent with two other studies (1993, 1994, NIHS).

The universal infant HB vaccination recommendation was made on November 22, 1991. The vaccine has been available since 1982.

The authors acknowledge "that only morbidity data are available" in this survey. There is no data in NHIS for children who died; "hence it is not possible to evaluate the IOM's inclusion of sudden infant death syndrome as an adverse event."

"In the 1994 NHIS, the potential adverse reactions associated with HB vaccine included chronic arthritis, acute ear infection, pharyngitis, and nasopharyngitis."

"A hypothetical explanation for the biological plausibility for the association of pharyngitis and nasopharyngitis is that the HB vaccine affects the immune system, which may make the vaccinated children more susceptible to agents, or exaggerate the inflammatory response, resulting in a greater proportion of HB vaccinated children developing pharyngitis or nasopharyngitis than non-HB vaccinated children."

The association of acute ear infections with the HB vaccine is related to the child's age; 2 year olds and younger children are more susceptible to ear infections because of the development of the ear canal, and a greater proportion are HB vaccinated than the older children.

"The IOM report concluded that there is insufficient data available to accept or reject a causal relation between HB vaccine and Guillain-Barre' syndrome, other demyelinating diseases (optic neuritis, multiple sclerosis, or transverse myelitis), arthritis, and sudden infant death syndrome."

"The IOM report also concluded that the data established a causal relation for the association of HB vaccine with anaphylaxis."

“Other investigators stated that, in the U.S., the HB vaccine is recommended for use only by those at high risk of exposure to HB virus and that the risk of HB infection for most infants is negligible, therefore, routine HB vaccination of U.S. infants is not indicated.” **[Important!]**

“Under these circumstances, the HB vaccination policy remains an open question because more infants are subject to vaccination than to the disease and the infants who suffer from the preventive measure may not be the ones who would have suffered from the disease.” **[Important!]**

Dan Murphy