

# Public Health Briefs

## Prevalence of Hepatitis A Virus Antibody among Navajo School Children

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**Abstract:** Previous studies of the prevalence of immunity to hepatitis A (anti-HAV) in the United States have used urban settings or institutions for the mentally handicapped. In a rural setting among normal children, a serologic investigation of prevalence of anti-HAV was conducted in a boarding school adjacent to the Navajo reservation. The results show rates of anti-HAV that are the highest reported at the ages tested in any subpopulation in the United States, comparable only with those in developing countries. (*Am J Public Health* 1986; 76:282-283.)

### Introduction

Studies of the prevalence of hepatitis A immunity in the United States have for the most part focused on urban dwellers,<sup>1-3</sup> or residents of boarding schools for the mentally retarded.<sup>1,5,8</sup> This report presents data on prevalence of antibody to hepatitis A (anti-HAV) in a boarding school of normal children living in a rural area with generally suboptimal sanitary conditions.

### Methods

The Crownpoint Boarding School provides instruction in grades K-8 to Native American (predominantly Navajo) children living in an isolated section of northwest New Mexico adjacent to the Navajo reservation. The children come from homes generally less than 40 miles away; average enrollment is 500-700. Similar boarding schools throughout the reservation area provide education for the majority of Navajo children living on or near the reservation. Crownpoint Boarding School students therefore are fairly representative of the reservation children.

The traditional style of living among the 160,000 Navajos living in the reservation area is in extended family clusters of homes called camps, although many now live in small communities. Sanitary conditions vary widely but are often substandard for the purpose of disease control. Thirty-seven per cent of the residents have no plumbing facilities. Many people must haul water for consumption many miles in discarded oil barrels. Regular handwashing is not a uniformly common practice. In addition, a high birth rate provides a large number of children in diapers. Together, these factors provide circumstances for ready transmission of enteric pathogens in the community.

Within the boarding school setting, proper sanitation is also problematic, with the adult to child ratio as low as 1:60 at times. For a variety of reasons, bathrooms may often lack soap or paper goods.

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In December of 1983 and January of 1984, students in grades K, 1, 4, 5, and 8 were tested for prevalence of hepatitis A virus antibodies (anti-HAV). Table 1 shows the numbers of students enrolled and tested. Those who were not tested were either absent (nine) or their parents refused consent (eight). There were no recognized cases of hepatitis involving any of the children or their families within four weeks of the testing period.

Serologic testing for anti-HAV was performed by Damon Clinical Labs, Phoenix, AZ, using a commercially available radioimmunoassay kit (HAVAB, Abbott Laboratories, N. Chicago, IL). Those found to be positive were then differentiated into IgG and IgM anti-HAV presence (using the HAVAB-M Kit).

### Results

The prevalence of anti-HAV by grade level is shown in Table 1. All those students reported as positive exhibited IgG antibody; one student also had IgM antibody. Prevalence of anti-HAV was substantially lower in entry level grades than in the more advanced grades. To evaluate the role of years of attendance at the school, a multiple regression analysis was performed using years of attendance at the school and grade level as independent variables. This produced an intercept value of 39.1 (the per cent estimated positive for anti-HAV at entry) with partial regression coefficients of 5.5 (95 per cent confidence limits—4.95, 6.17) for grade level and 1.04 (95 per cent confidence limits—0.32, 1.75) for years at the school. Of the two independent variables, grade level (which had the stronger relationship to anti-HAV) might reasonably be assumed to be more representative of duration of community exposure, while years in the school might be more representative of duration of school exposure.

Rates of anti-HAV prevalence were similar for males (N=141, 68.8 per cent positive) and females (N=120, 72.5 per cent positive).

TABLE 1—Grade-specific Prevalence of Anti-HAV among Boarding School Children, Crownpoint, NM

Grade	No. Enrolled	No. Tested	No. Positive	Per Cent Positive
K	43	43	16	37.2
1	41	37	18	48.6
4	65	62	54	87.1
5	64	64	48	75
8	65	55	48	87.2
TOTAL	278	261	184	70.1

### Discussion

Various studies both within<sup>1-9</sup> and outside<sup>2,10-18</sup> the United States have examined rates of anti-HAV prevalence among different groups. Very high prevalences—90 per cent or greater—of anti-HAV exist in some countries,<sup>1,2,11</sup> while others<sup>15,18</sup> have much lower rates (2–17 per cent). In the United States, while a prevalence as low as 7 per cent has been reported in a rural community,<sup>9</sup> the prevalence in urban adults appears to be 45 per cent,<sup>2,4</sup> and in urban children 20–25 per cent.<sup>5-7</sup> Boarding institutions for the mentally retarded have long been recognized as having excessive rates of hepatitis A transmission with anti-HAV prevalences of 75–98 per cent.<sup>1,5,8,16,17</sup>

The present study is unique in that it examines rates of anti-HAV among children of normal intelligence in a boarding school setting, and that it examines rates of anti-HAV in a rural population where community sanitation is often substandard. The results show prevalence rates for anti-HAV that are the highest reported for any subpopulation of children in the United States. The rates in the mid- and upper-level grades exceed those found in some institutions for the retarded.<sup>1,8,16</sup> The rates are comparable only with those found among Canadian Inuit<sup>13</sup> or developing countries.<sup>1,2,11</sup>

Because this is a cross-sectional rather than longitudinal study, the issue of whether this represents a situation of high endemicity, periodic epidemics, or both is not settled. However, there have been no community-wide outbreaks observed within the lifetime of these children. The fact that children in entry level grades, who have had relatively little opportunity for at-risk exposure in the community except for that within their own households, have high prevalence rates for their age suggests high endemicity in this population.

While both school and community factors seem to be related to prevalence, factors within the community (lack of plumbing facilities, overcrowded housing, poor sanitary habits, etc.) were apparently of greater importance.

Although one study<sup>12</sup> did show a difference in prevalence rates between sexes in one subpopulation, the present study is in agreement with the vast majority of others<sup>2,3,8,11,13,14,16</sup> that show no such difference.

Over the last 30 years, great progress has been made in controlling various infectious diseases and improving sanitation among the Navajo.<sup>19,20</sup> The results of this study show that much remains to be done in both areas, however.

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## Irradiated What?

*“Recent investigations of the fat soluble, anti-rachitic vitamin D have advanced our methods for insuring its universal consumption by growing infants and children. During the past decade Windhaus and Alfred Hess discovered the identity of vitamin D and irradiated ergosterol and Hess and Steenbock demonstrated that ultra-violet irradiation rendered a large variety of foodstuffs antirachitogenic. As a result commercial concerns raced to irradiate all of their saleable products: milk, cereals, peanut butter, bread, cocoa malt, cigarettes and even underwear, in this ‘era of irradiation.’ ”*

*In: Levine SZ: Recent Advances in Knowledge of Some of the Common Diseases of Childhood. Bull NY Acad Med December 1938; 14:747. (Contributed by William M. Schmidt, MD, Harvard University, Department of Maternal and Child Health.)*