

Hepatitis A vaccine: Is it being used to best advantage?

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Hepatitis A virus (HAV) infection causes substantial morbidity in children of school age and adults, the troublesome symptoms being prolonged nausea, anorexia and weakness. Most individuals with symptomatic cases miss 2–4 weeks of work or school, and about 20% need hospital care.¹ Recovery is usually complete within 3–6 months of onset, but occasionally patients experience acute hepatic failure, persistent cholestatic jaundice or relapsing hepatitis. In the absence of urgent liver transplantation, there is a high mortality rate among patients with acute hepatic failure. Although safe and effective HAV vaccines have been available since 1994² to prevent such morbidity, Canada continues to record over 1000 hepatitis A case reports annually.³ The true number is much larger,³ because of underreporting and nonrecognition of milder cases, especially among young children. The limited impact of vaccine use to date means that we need to consider different immunization strategies, including universal childhood vaccination against hepatitis A in some settings.

HAV vaccines are remarkably immunogenic, requiring only a single dose to induce protection and one later dose to sustain it for many years. Protection rates are nearly 100%. The safety profile of these vaccines is excellent. A convenient range of adult and pediatric vaccine formulations is available from 3 companies, at moderate cost (about Can\$55 per adult dose). The national guidelines for vaccine use focus on groups or communities at high risk of acquiring HAV infection, such as users of illicit drugs, male homosexuals with multiple partners, travellers abroad and residents in communities with high rates or recurrent outbreaks of infection.⁴ Routine childhood immunization has not been recommended but could eliminate HAV disease, because the virus occurs in a single serotype and replicates only in humans.

Deciding how to apply the national guidelines for vaccine use has been difficult, because the epidemiology of HAV infections in Canada is both poorly defined and complex and changing. Reported rates differ substantially among the provinces, between men and women, and with age.³ The highest rates were reported for men aged 30–59 years, and in British Columbia. However, it is uncertain whether these differences are real or reflect variations in case ascertainment and reporting: no countrywide enhanced surveillance or seroepidemiology projects have been performed to clarify the situation.

The past decade was noteworthy for large, extended outbreaks of HAV infections in several major cities, mainly among illicit drug users and gay men.^{3,5} In Vancouver, a vaccination program to control an outbreak among those risk groups has continued since 1998 and has been associated

with an 83% decline in reported hepatitis A rates. The program was challenging to deliver but enabled BC in 2000 to report its lowest HAV rate in over a decade. Some small communities in several provinces have also experienced outbreaks. Saskatchewan, for example, reported over 450 cases in 1996, mainly from outbreaks in rural and northern communities. The province implemented an outbreak management program in affected communities that targeted children (< 16 years) and household contacts of individuals with hepatitis A, including adults, for vaccination and was followed by a program of routine early childhood vaccination to prevent future outbreaks. The initiative was highly successful, with only a single case reported from affected communities during the past 3 years, and with a corresponding reduction in reported cases provincially to fewer than 10 per year compared with an average of over 175 cases annually in the 10 years before the targeted program, 1986–95 (Dr. Eric Young, Mrs. Rosalie Tuchscherer, Saskatchewan Health, and Dr. Shauna Hudson, First Nations and Inuit Health Branch, Health Canada, Regina, Sask.: personal communication, 2002). This program should be a model for vaccine use in communitywide outbreaks and where endemicity is high.

Greater insight into the epidemiology of this disease is available in the United States from special surveillance projects. Most cases occur in the context of localized, multi-year, communitywide epidemics during which all age groups are affected.⁶ Infection rates are particularly high among specific risk groups during epidemics, but for over half of the cases there was no recognized risk factor. These observations led to the conclusion that “it is unlikely that sustained nationwide reductions in hepatitis A incidence will occur through vaccination of selected high-risk groups or short-term programs to control individual communitywide epidemics.”⁶ The US Centers for Disease Control and Prevention subsequently urged states and counties with hepatitis A rates well above the national average to implement routine childhood immunization programs.

One large such undertaking recently reported impressive results.⁷ In Butte County, California, a routine childhood vaccination program was implemented in 1995 as a funded demonstration project to determine the program's effect on persistently high disease rates. Two-thirds of an estimated population of 45 000 children aged 2–12 years received at least one dose of vaccine by 2000. Disease incidence decreased 79% among children under 18 years of age and 44% among individuals over this age. In 2000, Butte County had the lowest rate of hepatitis A cases of any county in California. The estimated protective efficacy of one or more vaccine doses was 98% (95% confidence in-

terval 86%–100%). The project demonstrates that routine childhood vaccination is feasible, sustainable and can reduce overall disease rates in the community, even in unvaccinated groups at high risk. It illustrates the value of well-planned demonstration projects as a means to build evidence-based immunization programs. Demonstration projects have been a rarity in Canada but are a powerful way of addressing questions of vaccine effectiveness, safety, program feasibility and cost relative to benefit.

The uneven distribution of hepatitis A risk in the United States and Canada, which varies among communities and with time, adds to the challenge of disease control. Community or regional vaccination undertakings targeting “hot spots” run afoul of traditional provincial-level decision-making about programs and funding, despite being advocated in national guidelines. Community leaders may perceive a stigma attached to implementing local programs, but in rural Saskatchewan and Butte County officials are smiling broadly, now the envy of others.

The national guidelines for HAV vaccine use⁴ are sound but have been timidly applied, especially to communities outside Saskatchewan with high rates or recurrent outbreaks of infection. More aggressive use of vaccine is warranted in affected communities, with broad coverage of at-risk populations to stop outbreaks and universal childhood vaccination to prevent repeat outbreaks, as was done in Saskatchewan. When regions or provinces have sustained high rates of infection despite interventions among high-risk groups, universal childhood vaccination may offer a feasible means of control. The definition of high rates of infection should be fluid, that is, as rates of infection decrease, the definition of high rates should decrease, to encourage progressive intolerance of cases. The effectiveness of this vaccine has been clearly demonstrated: this lesson needs bolder application to improve disease control in Canada.

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