CANADIAN PAEDIATRIC SOCIETY STATEMENT

ID 98-04

Prevention of congenital rubella syndrome

Congenital rubella syndrome (CRS) continues to occur despite 25 years of an immunization program in Canada. Accordingly, further measures are required to eliminate this preventable disease.

The 1994 Mumps and Rubella Consensus Conference (1) recommended the national goal of eliminating indigenous rubella infection during pregnancy, and, thus, preventing fetal damage, CRS and other negative outcomes by the year 2000. Achievement of this national goal requires a concerted effort by governments, health care providers and the community.

HOW OFTEN DOES CRS OCCUR IN CANADA?

Between 1986 and 1995, a mean of three cases of CRS per year were reported to the Notifiable Diseases Reporting System (NDRS) (2).

From 1993 to 1995, 14 cases of congenital rubella were reported through Immunization Monitoring Reporting System ACTive (IMPACT), an active surveillance system based on a network of 11 paediatric hospitals including 85% of all paediatric tertiary care beds in Canada. In the same period, 13 cases were reported to the NDRS.

In 1996, active surveillance for CRS and congenital rubella infection (CRI) through the Canadian Paediatric Surveillance Program (CPSP) commenced using a monthly mail survey of all Canadian paediatricians. As of April 1996, all cases identified through IMPACT are forwarded to CPSP. During 1996, a total of five cases of CRS were identified through CPSP/IMPACT and NDRS combined. Of the four cases reported to CPSP/IMPACT, three were born to immigrant mothers and one to a nonaboriginal Canadian-born mother. No maternal immunization histories were available, but the three immigrant mothers were from countries in Central America where rubella immunization is not part of the routine childhood immunization program (3). During 1997, one confirmed case and three clinical cases of CRS were reported to the CPSP; two of the children were born to immigrant mothers susceptible to rubella (4).

The Rubella-associated Adverse Pregnancy Outcomes (RAAPO) surveillance system was established in July 1996 to determine the magnitude of rubella-associated adverse pregnancy outcomes including those previously not monitored, such as spontaneous and induced abortions and stillbirths (5). In its first year of implementation, RAAPO identified 134 women of childbearing age with positive rubella IgM, and of these, 14 (10%) were pregnant at the time of testing. The majority (57%) of pregnant women with rubella were nonaboriginal Canadian-born women; two (14%) were aboriginal Canadian women; two (14%) were foreign-born and the ethnicity of two women was unknown. Four (29%) of the pregnant women were previously vaccinated, five (36%) were unvaccinated (including three nonaboriginal Canadians) and five (36%) did not have immunization histories available. There were no newborns with CRS reported through RAAPO.

HOW EFFECTIVE HAS THE RUBELLA VACCINATION PROGRAM BEEN?

The rubella vaccination program has been very effective. Prevaccine era epidemics have essentially disappeared.

In Canada, before the introduction of rubella vaccine in 1969, rubella epidemics occurred in irregular three- to 10-year intervals. After 1970, the incidence of rubella declined markedly and has stayed at a mean endemic rate of 4/100,000 population per year. This is an average of 1000 cases/year reported, range 237 to 2450. Many hundreds of cases of CRS occurred in North America in the prevaccine era. Rubella infection data for Canada are summarized in Table 1.

TABLE 1: Rubella cases reported to the Canadian Notifiable Disease Reporting System

Years of reporting*	Significant events	Average annual number of rubella cases	Average annual incidence of rubella per 100,000 population
1941-1958		14,953	109
	Vaccine introduced 1969		
1970-1983	Postvaccine era but before adoption of routine infant immunization by all provinces	6006	26
1984-1996	Postuniversal routine infant immunization	1166	4

**No national data from 1959 to 1968 are available*

Although sporadic cases continue to occur in Canada, the implementation of a vaccination program has reduced the magnitude and frequency of epidemic peaks that were associated with an increase in CRS.

HOW COMMON IS VACCINE FAILURE, AND DOES VACCINE FAILURE CONTRIBUTE TO CRS?

Primary failure of the rubella vaccine occurs in less than 5% of immunizations. Infection in a previously immune mother is rare. Although repeat infections may occur in vaccinated pregnant women, these infections have only very rarely resulted in CRS (6).

WHY DOES CRS CONTINUE TO OCCUR IN CANADA?

Rubella virus continues to circulate in the community, and not all pregnant women are immune. Some segments of the population are not immunized against rubella because they are missed, refuse immunization or come from countries where rubella vaccination is not part of the routine immunization program.

Large rubella outbreaks occurred in Canada in the 1990s. The outbreaks are a reflection of past Canadian immunization policies in the 1970s and 1980s, and current international immunization policy (7). A rubella outbreak in Manitoba from October 1996 to December 1997 involved over 3800 cases, the majority of which occurred in young adult males, with 400 cases occurring in women of childbearing age. In Manitoba, selective immunization of prepubertal girls and rubella-susceptible women of childbearing age was adopted, and universal infant immunization was not instituted until 1983. This outbreak acts as a reminder that rubella is not only a disease of unimmunized immigrants. Epidemics do occur in Canada, and pregnant women born in Canada are at risk of infection.

CAN MORE BE DONE?

Yes, more can be done. There are missed opportunities to prevent this disease. Rubella vaccine is not consistently administered to susceptible women postpartum and not all women are being screened during pregnancy. The immunization status of women new to Canada is not consistently reviewed. The elimination of CRS depends not only on effective childhood immunization, but also on identification and immunization of susceptible women of childbearing age.

ARE THERE ANY COMPLICATIONS OF RUBELLA IMMUNIZATION OF SERONEGATIVE WOMEN IN THE POSTPARTUM PERIOD?

The actual vaccine-related frequency of acute arthritis or arthralgia in nonimmune women is in the order of 5% each. In contrast, acute and persistent forms of arthritis after natural infection are more common, with up to 30% of naturally infected individuals experiencing recurrent joint manifestations for up to two years (8). There is no evidence of any increased risk of new onset chronic arthropathies or neurological conditions in women receiving the RA27/3 rubella vaccine (9).

RECOMMENDATIONS

To prevent congenital rubella syndrome, the following steps are recommended.

- Universal infant immunization to decrease circulation of virus (instituted in all provinces by 1983)
- Use of measles, mumps and rubella or measles-rubella vaccine as the immunizing agent in catch-up campaigns and as the second dose in the new two-dose routine immunization program for measles (This may expedite the elimination of rubella)
- Ensuring the immunity of women of childbearing age at every opportunity through the assessment of their immunity and vaccination if necessary
- Screening of antibody status of all pregnant women to determine susceptibility and postpartum immunization of all women found to be susceptible on prenatal screening. Breastfeeding is not a contraindication to immunization
- Screening for immunity and vaccination, if necessary, of all health care personnel, including students in training
- Immunizing all immigrant and refugee women at their first encounter with the Canadian health care system, unless they have documentation of effective vaccination or natural immunity

REFERENCES

1. Division of Immunization, Bureau of Infectious Diseases, Laboratory Centre for Disease Control. Mumps and Rubella Consensus Conference. Can Commun Dis Rep 1994;20:165-76.
2. Division of Disease Surveillance, Bureau of Infectious Diseases, Laboratory Centre for Disease Control. Notifiable Diseases Annual Summary 1995. Can Commun Dis Rep 1997;23(Suppl 9):96.
3. Canadian Paediatric Surveillance Program, 1996 Results. Ottawa: Canadian Paediatric Society, 1997.
4. Canadian Paediatric Surveillance Program, 1997 Results. Ottawa: Canadian Paediatric Society, 1998.
5. Pelleitier L. Surveillance of congenital rubella syndrome and other rubella-associated adverse pregnancy outcomes. Can Commun Dis Rep 1996;22:35-7.
6. Robinson J, Lemay M, Vaudry WL. Congenital rubella after anticipated maternal immunity: two cases and a review of the literature. Pediatr Infect Dis 1994;13:812-5.
7. Furesz J, Varughese P, Acres S, et al. Rubella immunization strategies in Canada. Rev Infect Dis 1985;7(Suppl 1):S191-3.
8. Tingle AJ, Mitchell LA, Grace M, et al. Randomized double-blind placebo-controlled study on adverse effects of rubella immunization in seronegative women. Lancet 1997;349:1277-81.
9. Ray P, Black S, Shinefield H, et al. Risk of chronic arthropathy among women after rubella vaccination. JAMA 1997;278:551-6.

INFECTIOUS DISEASES AND IMMUNIZATION COMMITTEE

Members: *Drs Gilles Delage, Laboratoire de santé publique du Québec, Sainte-Anne-de-Bellevue, Québec (chair); François Boucher, Département de pédiatrie, Centre Hospitalier Universitaire de Québec, Pavillon CHUL, Sainte-Foy, Québec; H Dele Davies, Division of Infectious Diseases, Alberta Children's Hospital, Calgary, Alberta; Joanne Embree, The University of Manitoba, Winnipeg, Manitoba; David Speert, Division of Infectious and Immunological Diseases, University of British Columbia, Vancouver, British Columbia; Ben Tan, Division of Infectious Diseases, Royal University Hospital, University of Saskatchewan, Saskatoon, Saskatchewan*

Consultants: *Drs Noni MacDonald, Division of Infectious Diseases, Children's Hospital of Eastern Ontario, Ottawa, Ontario; Victor Marchessault, Cumberland, Ontario*

Liaisons: *Drs Neal Halsey, The Johns Hopkins University, Baltimore, Maryland (American Academy of Pediatrics); Susan King, Division of Infectious Diseases, The Hospital for Sick Children, Toronto, Ontario (Canadian Paediatric AIDS Research Group); Scott Halperin, Department of Pediatrics, IWK-Grace Health Centre, Halifax, Nova Scotia (IMPACT); Monique Landry, Direction de la santé publique de Laval, Laval, Québec (Public Health); John Waters, Provincial Health Officer, Alberta Health, Edmonton, Alberta (Epidemiology)*

Prinicpal authors: *E Lee Ford-Jones, The Hospital for Sick Children, Toronto, Ontario; Theresa Tam, Division of Immunization, Laboratory Centre for Disease Control, Health Canada, Ottawa, Ontario*
