

CPSP 2002 Results: What have we learned?

To date, the Canadian Paediatric Surveillance Program (CPSP), a joint project of the Canadian Paediatric Society and Health Canada's Centre for Infectious Disease Prevention and Control, established in 1996, has studied 19 different rare diseases or conditions. The year 2002 has been very successful, resulting in a questionnaire completion rate of 95% for the 398 case reports. Main highlights for the 12 current studies follow.

Ongoing surveillance for **acute flaccid paralysis (AFP)** has not isolated any cases of wild poliovirus since the CPSP began. AFP surveillance reached the World Health Organization's prediction of one case per 100,000 people in 1999 and 2000; however, for the past two years, the number of confirmed cases has been slightly below expectations. On the other hand, the number of duplicate and discarded reports (33 and 10, respectively) exceeded the number of confirmed cases (39), reaffirming that CPSP participants are actively searching for cases. This finding may be indicative of a new trend in the epidemiology of AFP in Canada. This year, several cases of AFP were reported in adolescents over 15 years of age that had to be discarded on the basis that they exceeded the age limitation in the case definition. Guillain-Barré syndrome remained the most frequent cause of AFP, accounting for 77% of confirmed cases. Although *Campylobacter* is the most commonly reported etiology for Guillain-Barré syndrome, none was detected in the stool specimens examined. To better define the etiological agents causing AFP in Canada, stool specimens for bacterial and viral cultures, including poliovirus and *Campylobacter*, remain essential.

The two-year study on **cerebral edema in diabetic ketoacidosis (CE-DKA)** identified fewer cases than expected. The mortality rate (5 of 23) was comparable to other reported studies; however, the morbidity rate was lower than previously reported with only two children showing evidence of mild neurological sequelae. As risk factors for CE-DKA included patients with new onset diabetes having more severe acidosis and dehydration, the thrust of research should be in primary prevention.

After 16 months of surveillance for **CHARGE association/syndrome**, the study confirmed that 35% (27 of 78) of cases had all four major criteria present (coloboma, choanal atresia, characteristic ear anomalies and cranial nerve dysfunction); 67% (18 of 27) of these cases were female. The facial nerve (VII) was identified more frequently in association with other cranial nerve anomalies and in individuals who were more severely affected. Preliminary evidence also supported involvement of the trigeminal nerve (V). Because

several of the anomalies in the surveillance case definition are difficult to detect in infancy and the major criteria are rare in other conditions, paediatricians should consider the diagnosis of CHARGE association/syndrome in any individual who has one or two major criteria and several minor characteristics.

Since the CPSP added the **congenital rubella syndrome** study in 1996, nine infants have been reported. Of the two confirmed cases in 2002, one infant was born abroad and one was born in Canada to a mother who travelled abroad during pregnancy. Canada's very low incidence of rubella and congenital rubella syndrome reflects the impact of rubella elimination strategies that aim at assuring at least 85% herd immunity and immunizing all rubella susceptible women in the immediate postpartum period.

The two-year surveillance of **hemolytic uremic syndrome (HUS)** ended in March 2002 and found that 34% (41 of 121) of children with diarrhea-associated HUS required dialysis during the acute phase of the illness. The isolation of *Escherichia coli* O157 or *E coli* O157:H7 was noted in 67% (81 of 121). This includes one case with a mixed infection due to *E coli* O157 and *Clostridium difficile*. Diarrhea-associated HUS also occurred in one case each with *Campylobacter*, *Shigella* and *Salmonella* group B. The mortality rate was 4% (5 of 121). All cases of *Streptococcus pneumoniae*-associated HUS, one definite and three possible, also required dialysis. This study reinforced the importance of providing educational material on proper food preparation, handling and cooking (especially in the barbecue season) and demonstrated the need for preventative measures to circumvent future water-borne epidemics.

The **hepatitis C virus (HCV) infection** study concluded in January 2003, after a two-year surveillance period. Overall, 58 cases were confirmed, with a further 17 possible cases. Nearly one half of the infections (45%) were acquired through mother to child transmission. Blood transfusions were responsible for 35% of the cases, and intravenous drug use for another 12%. These results help better define the population at risk needing targeted public health interventions.

After 15 months of surveillance for **necrotizing fasciitis (NF)**, 23 cases were confirmed. In type II NF cases, 57% were related to group A streptococcal infection. It is important to note that nearly 40% of the NF cases were preceded by varicella, a vaccine-preventable disease. Excellent outcomes may have been related to high rates of surgical interventions, early use of antibiotics and the addition of intravenous immunoglobulins. Paediatricians are reminded

of the importance of varicella vaccination in the prevention of NF and are encouraged to continue treating NF aggressively.

In the first six months of **neonatal severe hyperbilirubinemia** surveillance, 45 cases were confirmed, demonstrating the timeliness of this study for term newborns. Results showed inadequate or incomplete laboratory evaluation for determining the etiology of the hyperbilirubinemia. Educational resources will be disseminated to address this concern. Jaundiced newborns require a complete hematological workup before discharge for adequate diagnosis, treatment and prevention of kernicterus.

Now in its third year, the **neonatal herpes simplex virus (HSV) infection** study documented how devastating disseminated infections can be, with a case fatality rate of 16% (7 of 43). Although 71% (5 of 7) of fatal cases were type HSV-2, the majority of cases (62% [27 of 43]) were HSV-1 infections, which has implications for herpes vaccine development. More than one-third of women were unaware of a history of HSV infection before delivery, posing a challenge for public health prevention.

The two-year surveillance for **neonatal liver failure/perinatal hemochromatosis (NLF/PH)** ended in January 2003. Out of 10 NLF cases, only one definite case of PH was confirmed. 'Chronic-pattern' liver failure accounted for 60% of cases with the remaining 40% being 'acute-pattern', caused by viral or bacterial infections. No tyrosinemia type I patient was identified, demonstrating the success of early identification and treatment. Overall, the prognosis was better than expected with a survival rate of 50%. Study results demonstrated a spectrum of etiologies causing NLF in the Canadian paediatric population, and attested to the importance of intensive medical and surgical management to improve survival rates.

Three years of surveillance for **Smith-Lemli-Opitz syndrome**, which concluded in December 2002, captured 35 cases, all of which were Caucasian of European ancestry.

The estimated incidence in this population is one in 29,700. Three new DHCR7 mutations were identified. To avoid delay in diagnosis of this syndrome, paediatricians should investigate all possible cases to initiate early cholesterol supplementation and offer prenatal screening for future pregnancies.

Six months of surveillance for **vitamin D deficiency rickets (VDDR)** identified 20 nutritional rickets cases, which had significant morbidity at diagnosis, including fractures, limb deformities, poor growth and delayed gross motor milestones. In most instances, the infants were darker-skinned and breast-fed without vitamin D supplementation. Their mothers were often veiled, had poor dietary intake of vitamin D, with no vitamin D supplementation, during pregnancy and while breast-feeding. This study reinforced the Canadian Paediatric Society's recommendation that totally breast-fed infants need vitamin D supplementation. This study will provide comprehensive Canadian data on the incidence and epidemiology of VDDR to support the development of better public health policies to prevent this condition.

In uniquely different ways, each study has brought new knowledge and insight into rare conditions that will improve the quality of the day-to-day lives of affected children. But it is just the tip of the iceberg of what future studies could do! This active epidemiological surveillance tool offers great flexibility for advancing research. Sincere thanks are offered to all those who help make the CPSP work: the members of the Steering Committee who oversee the program and provide wise guidance; the investigators who initiate new proposals, bring them to fruition and publish their results; and most importantly, the 2350 paediatricians and paediatric subspecialists who voluntarily respond each month.

The Canadian Paediatric Surveillance Program (CPSP) is a joint project of the Canadian Paediatric Society and Health Canada's Centre for Infectious Disease Prevention and Control that undertakes the surveillance of rare diseases and conditions in children. For more information visit our Web site at <www.cps.ca/english/cpsp> or <www.cps.ca/francais/psp>.