

## Cost of fetal alcohol spectrum disorder in Canada

Brenda Stade PhD Wendy J. Ungar PhD Bonnie Stevens PhD Joseph Beyen PhD Gideon Koren MD FRCPC

### ABSTRACT

**QUESTION** I have heard that thousands of Canadian kids are affected by fetal alcohol spectrum disorders. Has there been any attempt to estimate what it costs our society?

**ANSWER** In a recent Canadian study, the lifetime cost of fetal alcohol spectrum disorders was estimated at \$1 million per case. With an estimated 4000 new cases yearly, this translates to \$4 billion annually.

### RÉSUMÉ

**QUESTION** J'ai entendu dire que des milliers d'enfants canadiens souffrent des troubles causés par l'alcoolisation foétale. A-t-on tenté d'estimer ce qu'il en coûte à notre société?

**RÉPONSE** Dans une récente étude canadienne, on estimait que le coût de l'ensemble des troubles causés par l'alcoolisation foétale durant toute la vie d'une personne atteinte était de 1 million \$ par cas. Si on estime à 4 000 le nombre de nouveaux cas par année, ceci veut dire 4 milliards \$ annuellement.

The economic impact of fetal alcohol syndrome (FAS)<sup>1</sup> was measured in 4 US-based studies.<sup>2-5</sup> Abel and Sokol estimated the economic cost of FAS to the health care system in the United States to be \$321 million (US) in 1984, based on an average incidence of 1.9 FAS cases per 1000 live births.<sup>2</sup> The incidence rate was an average, drawn from several prospective and retrospective studies.

In 1991, Abel and Sokol again estimated the cost of FAS to the health care system and produced a much lower annual cost estimate of \$74.6 million (US), based on an incidence of 0.33 FAS cases per 1000 live births.<sup>3</sup> This conservative estimate was derived entirely from prospective studies, which yield lower estimates of FAS incidence than do retrospective studies, in part because, unlike the retrospective studies, there are no prospective data for Native Americans and other racial or ethnic groups that might face risks of FAS. In addition, the cost of semi-independent supervised support for mildly cognitively disabled patients ages 21 and younger was excluded from the later study, on the grounds that such care was generally required only after age 21. Neither of the Abel and Sokol studies<sup>2,3</sup> included costs beyond age 21.

Harwood and Napolitano used a societal perspective and generated cost estimates of \$1.95, \$3.2, and \$9.69 billion (US) using alternative FAS incidence rates of 1.0, 1.67, and 5.0 per 1000 live births in the United States.<sup>4</sup> Incidence was based on a review of prospective studies. Costs included estimates of the value of productivity lost as a result of cognitive disabilities, as well as the cost of treatment and residential care for patients of all ages with FAS.


Finally, Rice et al estimated the cost of FAS to the health care system and placed the annual cost of treating the birth defects associated with FAS in the United States at \$1.6 billion (US), based on an incidence of 1.9 FAS cases per 1000 live births.<sup>5</sup> The incidence was based on a review of several prospective and retrospective studies. Components of costs included the cost of care for FAS-related birth defects and cognitive disability, as well as the cost of residential care for patients older than 21 years. The cost of residential care accounted for 80% of the total estimate.

Past estimates of costs have been strictly limited to FAS and do not reflect costs of the full range of FASD, which is more common. Thus, these results likely underestimate the economic burden associated with prenatal exposure to alcohol.

In a cross-sectional survey, 148 parents of children with FASD aged 1 to 21 years, living in urban and rural communities throughout Canada, were recruited.<sup>1</sup> Participants completed the Health Services Utilization Inventory. Key cost components were elicited: direct costs (ie, medical, education, and social services), out-of-pocket costs, and indirect costs (ie, productivity losses). Total average expenditures per child were calculated by summing the costs for each child in each cost component and dividing by the sample size. Costs were extrapolated to 1 year. A stepwise multiple regression analysis was used to identify important determinants of costs and to calculate the adjusted annual costs associated with FASD.

The total adjusted annual expenditure per child with FASD was \$14342 (95% confidence interval [CI], \$12986-\$15698). Severity of the child's condition, age

of the child, and geographical setting were important determinants of costs ( $P < .001$ ). Cost of FASD annually to Canada of those 1 to 21 years old was \$344 208 000 (95% CI, \$311 664 000-\$376 752 000).

The survey results demonstrated the cost of FASD is profound. It is an estimated \$4 billion a year based on a rate of 1 FASD cases in 100 pregnancies. 

### References

1. Stade B, Ungar WJ, Stevens B, Beyene J, Koren G. The burden of prenatal exposure to alcohol: measurement of cost. *J FAS Int* 2006;4:e5. Available from: [http://www.motherisk.org/JFAS\\_documents/JFAS\\_6005\\_e5.pdf](http://www.motherisk.org/JFAS_documents/JFAS_6005_e5.pdf). Accessed 2007 Jun 4.
2. Abel E, Sokol R. Incidence of fetal alcohol syndrome and economic impact of FAS-related anomalies. *Drug Alcohol Depend* 1987;19(1):51-70.
3. Abel E, Sokol R. A revised conservative estimate of the incidence of FAS and its economic impact. *Alcohol Clin Exp Res* 1991;15(3):514-24.
4. Harwood H, Napolitano D. Economic implications of the fetal alcohol syndrome. *Alcohol Health Res World* 1985;10(1):38-43.
5. Rice D, Kelman S, Miller L. The economic cost of alcohol abuse. *Public Health Rep* 1991;106:307-16.

## MOTHE RISK

Motherisk questions are prepared by the **Motherisk Team** at the Hospital for Sick Children. **Dr Ungar** is a member and **Dr Koren** is Director of the Motherisk Program. **Dr Stade** is Director of the Fetal Alcohol Spectrum Disorder Clinic at St Michael's Hospital in Toronto, Ont. **Dr Ungar** is Senior Scientist in the Department of Health Policy, Management, and Evaluation at the University of Toronto. **Dr Stevens** is Director of Nursing Research at the Hospital for Sick Children. **Dr Beyen** is a Scientist at the Hospital for Sick Children. **Dr Koren** is supported by the Research Leadership for Better Pharmacotherapy during Pregnancy and Lactation and, in part, by a grant from the Canadian Institutes of Health Research. He holds the Ivey Chair in Molecular Toxicology at the University of Western Ontario in London.

Do you have questions about the effects of drugs, chemicals, radiation, or infections in women who are pregnant or breastfeeding? We invite you to submit them to the **Motherisk Program** by fax at 416 813-7562; they will be addressed in future Motherisk Updates.

Published Motherisk Updates are available on the College of Family Physicians of Canada website ([www.cfpc.ca](http://www.cfpc.ca)) and also on the Motherisk website ([www.motherisk.org](http://www.motherisk.org)).