

COSTS OF FETAL ALCOHOL SPECTRUM DISORDER IN THE CANADIAN CRIMINAL JUSTICE SYSTEM

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ABSTRACT

We reviewed literature to estimate the costs of Fetal Alcohol Spectrum Disorder (FASD) in the Canadian Criminal Justice System (CJS), and to update the total costs of FASD in Canada. The results suggest FASD is costlier than previous estimates. The costs of FASD associated with the CJS are estimated at \$3.9 billion a year, with \$1.2 billion for police, \$0.4 billion for court, \$0.5 billion for correctional services, \$1.6 billion for victims, and \$0.2 billion for third-party. The updated total costs of FASD in Canada are \$9.7 billion a year, of which CJS accounts for 40%, healthcare 21%, education 17%, social services 13%, and others 9%.

Key Words: *FASD, criminal justice, cost, Canada*

Fetal alcohol spectrum disorder (FASD), a lifelong disability that results from prenatal exposure to alcohol, can come with a number of mental and physical health problems. People with FASD often need a wide range of services including medical treatment and special education, as well as justice, correctional, family, and community support services. Therefore, the full cost of FASD is difficult to assess.

Several studies on the costs of FASD have been published.¹⁻⁹ These previous studies often include two types of cost: 1) cost per person with FASD (either annual or lifetime); and 2) cost per population such as a country or province (annual, based on incidence or prevalence). These studies include costs specific to health care, education, and social services, but not all costs specific to the Criminal Justice System (CJS).

In a systematic review of such literature¹⁰, the cost per person with FASD was estimated at CA\$ 25,000 per year (2009 price level), and at CA\$ 1.8 million for a lifetime. The annual cost of FASD per population was estimated at CA\$ 6.2 billion for Canada, and at CA\$ 520 million for Alberta. The review also estimated that of the total annual costs of FASD, health services accounted for 30%, educational services for 24%,

social services for 19%, and others for 13%. The remaining 14% of total annual costs of FASD was attributed to correctional services specifically, estimated at \$700 million for Canada and \$70 million for Alberta.

However, correctional services constitute only a part of the CJS. Therefore, to our knowledge, costs for police and court services as well as costs for victims of crime have not been included in any previously published studies.

In this report, based on the published literature, we estimate costs of FASD associated with CJS, which include costs for police, court, correctional services, victims, and costs for third-party. Following this, we also provide an updated estimate of the total costs of FASD in Canada.

METHODS

First, we systematically reviewed literature and performed a meta-analysis to estimate the prevalence of FASD in the CJS. We searched electronic databases (Medline, Embase, PsycINFO, and Google) to find publications relating to FASD in CJS. The search included numerous subject headings and keyword terms for the concepts of FASD, CJS, and Canada. We did

not limit the search by year but only English studies were included. Reference lists of included studies were also searched in order to identify further studies. After scanning titles and abstracts, we selected studies examining the prevalence/rate of FASD in Canadian CJS for review and data extraction. We applied a fixed effect meta-analysis to estimate the inverse variance pooled effect size using Stata MP 13.1 (www.stata.com). Second, we reviewed literature about the costs of crime, as well as expenditures for the Canadian CJS. This includes costs for policing, court (judges, prosecutors, legal aid, and youth justice), and corrections (including parole), costs for victims of crime (health care, productivity losses, and stolen/damaged property, and costs for others (third-party) suffering from crime, such as family members who take time off from their daily activities to accompany/take care of victims who are wounded by criminal acts and governments for providing various victim services and compensation programs to help victims. Of note, the cost for productivity losses was estimated by the human capital approach.

Finally, we applied the prevalence of FASD in the CJS to the costs of the CJS to get the costs of FASD for the CJS, or the costs of the CJS that can be attributed to FASD. Due to data unavailability and for simplification, we assumed the same proportion of FASD for every cost item. We also assumed that all costs are the same for the FASD and non-FASD individual and that the nature of the crime is the same for either the FASD or non-FASD individual. We used a societal perspective and one-year time horizon. The 95% confidence interval of prevalence of FASD in the CJS was used for sensitivity analysis. All costs were inflated to 2014 CA\$, using the Bank of Canada inflation calculator.¹¹ Of note, we used the consumer price index all-items category as the costs estimated in this study are not specific for any sector or item.

RESULTS

Prevalence of FASD in the CJS

In total, we found five studies estimating the prevalence of FASD in the CJS in Canada. Of these, one study was excluded for using the

prevalence of FASD in the general population.¹² Of the included four studies, three investigated the prevalence in youth, and one in adults.

Fast et al. (1999)¹³ assessed 287 youths aged 12-18 who were remanded to the Inpatient Assessment Unit of Youth Forensic Psychiatric Services in Burnaby, British Columbia between 1 July 1995 and 30 June 1996 for fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE). The sample represented approximately 2.5% of youth in custody in British Columbia and Yukon at the time of study. The authors found 3 FAS cases and 64 FAE cases, totaling 67 FASD cases. The prevalence of FASD among youth offenders was therefore estimated at 23.3% (67 out of 287).

Murphy et al. (2005)¹⁴ surveyed 137 youths aged 14-19 in custody in British Columbia in 2004. Of the sample, 90% were male, 47% were Aboriginal, 82% had a history of involvement with the youth justice system, and only 18% were in custody for the first time. As 16 of the youth surveyed (12 Aboriginals and 4 non-Aboriginals) were told by a health care professional that they had FAS or FAE, this study suggested a prevalence of FASD among youths in custody at 11.7%. The prevalence specific to Aboriginals and non-Aboriginals was 18.8% and 5.5%, respectively.

Rojas and Gretton (2007)¹⁵ examined the background, offence characteristics, and criminal outcomes of youths who sexually offend. The sample included 102 Aboriginal and 257 non-Aboriginal youths aged 12-18 who had been ordered by the courts or by their probation officers to attend the Youth Sexual Offence Treatment Program in British Columbia between 1985 and 2004. The presence or absence of FASD was based on formal diagnosis or suspicion from a physician that the adolescent suffered from FAS or FAE. Of the sample, information about the presence or absence of FASD was available for 67 Aboriginals and 163 non-Aboriginals. The authors found that the prevalence of FASD was 26.9% among Aboriginals, and 4.3% among non-Aboriginals. Based on these figures, we estimated the prevalence of FASD for both groups at 10.9%.

MacPherson and Chudley (2007)¹⁶ investigated the prevalence of FASD among adult offenders aged 19-30 in Stony Mountain

Institution, Manitoba between April 2005 and September 2006. Of 91 participants, 66% were Aboriginal. The authors found 1 partial FAS, 8 alcohol related neurodevelopmental disorder (ARND), and 16 FASD-suspicions (that is, not enough information to confirm or rule out a diagnosis). Excluding the suspected cases, the prevalence of FASD among adult offenders was estimated at 9.9%. A summary of the above

studies and results of the meta-analysis are presented in Table 1. Using a fixed effect model, the pooled prevalence of FASD among youth in the CJS was estimated at 14.8% (range: 12.2% to 17.5%). Based on a weight of 95% adults and 5% youths in custody on any given day¹⁷, the weighted average prevalence of FASD in the CJS (regardless of being youth or adult) was estimated at 10.1% (range: 5.0% to 17.9%).

TABLE 1 Prevalence of FASD in the CJS

Study	Sample	FASD cases	FASD rate	95% confidence interval	
				Low	High
Youth					
Fast et al. 1999 ¹³	287	67	23.3%	18.5%	28.2%
Murphy et al. 2005 ¹⁴	137	16	11.7%	6.3%	17.1%
Rojas and Gretton 2007 ¹⁵	230	25	10.9%	6.8%	14.9%
Pooled			14.8%	12.2%	17.5%
Adult					
MacPherson and Chudley 2007 ¹⁶	91	9	9.9%	4.6%	17.9%
Weighted average for both adult and youth			10.1%	5.0%	17.9%

Costs of Crimes

Story and Yalkin (2013)¹⁸ perform an expenditure analysis of the CJS in Canada, which includes estimates of expenditures of criminal justice for the federal government, provinces, and territories from 2002 to 2012. It includes policing, court (judges, prosecutors, legal aid, and youth justice), and corrections (including parole) expenditures. Using data from public accounts, Statistics Canada, and information received through direct request, the authors estimated that in the fiscal year 2011-2012, the federal, provincial, and territorial governments spent \$20.9 billion (in 2014 CA\$) on criminal justice. This was equal to 1.1% of nominal GDP (that is, a GDP figure that

has not been adjusted for inflation), making the CJS expenditures comparable to the budget of National Defence, half the size of the budget of Human Resources and Skill Development, and more than double the budget of Aboriginal Affairs and Northern Development Canada. Of the CJS expenditures, policing accounted for 57% (\$11.9 billion), court for 20% (\$4.2 billion), and corrections for 23% (\$4.8 billion). Using the prevalence of FASD in the CJS (estimated above) the costs of the CJS that can be attributed to FASD were estimated at \$2.1 billion (range: \$1.0 billion to \$3.7 billion) (Table 2). Of this, costs of FASD were \$1.2 billion for police, \$422.4 million for court, and \$485.7 million for corrections.

TABLE 2 Costs of FASD for the CJS in Canada, 2012 (million CA\$, 2014 price level)

Cost category	Total CJS costs*	CJS costs attributable to FASD		
		Mean	Low	High
Police	\$ 11,918.1	\$ 1,203.7	\$ 595.9	\$ 2,133.3
Court	\$ 4,181.8	\$ 422.4	\$ 209.1	\$ 748.5
Corrections	\$ 4,809.1	\$ 485.7	\$ 240.5	\$ 860.8
Total	\$ 20,909.0	\$ 2,111.8	\$ 1,045.5	\$ 3,742.7

*from Story and Yalkin 2013¹⁸ inflated to 2014 CA\$ using the Bank of Canada inflation calculator¹¹

That being said, the CJS constitutes only one side of the costs related to crimes, with the other side being the victims of the criminal incidents. Using data from the Police Administration Survey, the Adult Criminal Court Survey, the Integrated Correctional Services Survey, the Canadian Institute of Health Information, the 2004 General Social Survey, and various governmental publications, Zhang

(2008)¹⁹ estimated that criminal cost for victims was about \$15.8 billion in 2008 (Table 3). Applying the prevalence of FASD in the CJS to this cost, we estimated that \$1.6 billion (range: \$0.8 billion to \$2.8 billion) can be attributed to FASD. Of this, health care accounted for 10% (\$160 million), productivity losses for 47% (\$748 million), and stolen/damaged property for 43% (\$683 million).

TABLE 3 Costs of FASD for criminal victims in Canada, 2008 (million CA\$, 2014 price level)

Cost category	Total victim costs*	FASD costs		
		Mean	Low	High
Health care	\$ 1,587.3	\$ 160.3	\$ 79.4	\$ 284.1
Productivity losses	\$ 7,407.4	\$ 748.1	\$ 370.4	\$ 1,325.9
Stolen/Damaged property	\$ 6,757.3	\$ 682.5	\$ 337.9	\$ 1,209.6
Total	\$ 15,752.0	\$ 1,591.0	\$ 787.6	\$ 2,819.6

*from Zhang 2008¹⁹ inflated to 2014 CA\$ using the Bank of Canada inflation calculator¹¹

In addition, besides victims, others also suffer from crime. For example, family members may take time off from their daily activities to accompany/take care of victims who are wounded by criminal acts. Also, governments provide various victim services and compensation

programs to help victims. All these costs are reflected in the costs to the third-party, which were estimated at \$2.3 billion in 2008 (Table 4). Of this cost, \$234 million (range: \$116 million to \$414 million) can be attributed to FASD.

TABLE 4 Costs of FASD for third-party in Canada, 2008 (million CA\$, 2014 price level)

Cost category	Total third-party costs*	FASD costs		
		Mean	Low	High
Funeral and burial expenses	\$ 4.4	\$ 0.4	\$ 0.2	\$ 0.8
Other people harmed/threatened during the incidents	\$ 112.2	\$ 11.3	\$ 5.6	\$ 20.1
Lost production/services of other people	\$ 1,159.4	\$ 117.1	\$ 58.0	\$ 207.5
Victim services and compensation programs	\$ 496.1	\$ 50.1	\$ 24.8	\$ 88.8
Shelters for victims	\$ 279.4	\$ 28.2	\$ 14.0	\$ 50.0
Other expenditures related to crime	\$ 261.8	\$ 26.4	\$ 13.1	\$ 46.9
Total	\$ 2,313.3	\$ 233.6	\$ 115.7	\$ 414.1

*from Zhang 2008¹⁹ inflated to 2014 CA\$ using the Bank of Canada inflation calculator¹¹

Cost of FASD in the CJS

Based on Tables 2 to 4, the total costs of FASD associated with the CJS and crimes in Canada are \$2,111.8 million for CJS (police, court, and correctional services), \$1,591.0 million for victims, and \$233.6 million for third-party, which approximates \$3.9 billion in total (range: \$1.9 billion to \$7.0 billion).

DISCUSSION

It was previously estimated that the total cost of FASD for Canada was \$6.2 billion in 2009 CA\$ (about \$6.8 billion in 2014 CA\$). Of this, health care accounted for 30%, education 25%, social services 19%, correctional services 14%, and others 13%.¹⁰

As correctional services are only a part of the CJS, the previous estimate is likely to be underestimated. Based on new costs of the CJS estimated in this study (average: \$3.9 billion; range: \$1.9 billion to \$7.0 billion), we have updated the total cost of FASD in Canada; the

components of this new total are shown in Table 5. Accordingly, the total cost of FASD in Canada is \$9.7 billion (range: \$7.7 billion to \$12.8 billion), of which health care accounts for 21% (range: 16% to 26%), education for 17% (range: 13% to 21%), social services for 13% (range: 10% to 17%), criminal justice for 40% (range: 25% to 55%), and others for 9% (range: 7% to 11%). This updated total cost of FASD in Canada is comparable to the total cost of FASD estimated through the recent estimated annual health care cost of FASD (\$5,600)²⁰ and the recent health care proportion (21%) of the total cost of FASD (Table 5). Specifically, the total cost per person with FASD per year is estimated at \$27,000 (5,600*100/21) and the total cost of FASD for Canada will be approximately \$9.5 billion (if the previously estimated prevalence of FASD, 1% of population, is used) and \$11.3 billion (if the recently estimated prevalence of FASD, 1.2% of population²¹, is used) given the population of Canada is about 35 million.²²

TABLE 5 Updated total cost of FASD by cost component (billion 2014 CA\$)

Cost component	Previous estimate*		Updated					
			Average		Low		High	
	\$	%	\$	%	\$	%	\$	%
Health care	2.0	30%	2.0	21%	2.0	26%	2.0	16%
Education	1.6	24%	1.6	17%	1.6	21%	1.6	13%
Social services	1.3	19%	1.3	13%	1.3	17%	1.3	10%
Criminal Justice	1.0	14%	3.9	40%	1.9	25%	7.0	55%
Others	0.9	13%	0.9	9%	0.9	11%	0.9	7%
Total	6.8	100%	9.7	100%	7.7	101%	12.8	100%

*from Thanh et al. (2010)¹⁰ inflated to 2014 CA\$ using the Bank of Canada inflation calculator¹¹

Limitation

All studies on the prevalence of FASD in the CJS are from British Columbia and Manitoba, so that the prevalence may not be representative for Canada. However, the sensitivity analysis for the range of prevalence would minimize this bias.

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