

# Fetal Alcohol Spectrum Disorder Prevalence Estimates in Correctional Systems: A Systematic Literature Review

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## ABSTRACT

**Objectives:** The objective of this study was to conduct a systematic search of the literature for studies that estimated the prevalence/incidence of Fetal Alcohol Spectrum Disorder (FASD) in correctional systems in different countries and, based on these data, to estimate a) the number of people with Fetal Alcohol Syndrome (FAS)/FASD within the criminal justice system population, and b) the relative risk of becoming imprisoned for individuals with FAS/FASD compared with those without FAS/FASD.

**Method:** A systematic world literature review of published and unpublished studies concerning the prevalence/incidence of FASD in correctional systems was conducted in multiple electronic bibliographic databases.

**Synthesis:** Very little empirical evidence is available on the prevalence of FASD in correctional systems. There were no studies estimating the prevalence/incidence of FASD in correctional systems found for any country other than Canada and the USA. The few studies that have identified incarcerated individuals with FASD estimate that the number of undiagnosed persons in correctional facilities is high. Based on available Canadian data, this study estimates that youths with FASD are 19 times more likely to be incarcerated than youths without FASD in a given year.

**Conclusion:** More studies investigating the prevalence/incidence of alcohol-affected people in the criminal justice system are required. There is an urgent need to raise awareness about the prevalence and disabilities of individuals with FASD in the criminal justice system and about appropriate responses. The criminal justice system is an ideal arena for intervention efforts aimed at the rehabilitation and prevention or reduction of recidivism in this unique population.

**Key words:** Fetal alcohol syndrome; fetal alcohol effects; prevalence; crime

La traduction du résumé se trouve à la fin de l'article.

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Fetal Alcohol Spectrum Disorder (FASD) is a non-diagnostic umbrella term that covers several medical diagnoses associated with prenatal alcohol exposure, which include: fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related neurodevelopmental disorder (ARND), and alcohol-related birth defects (ARBD).

As has been discussed previously in the literature, FASD is associated with organic brain damage that has a detrimental impact on abstracting abilities, memory skills, information processing, the comprehension of social rules and expectations, the ability to connect cause and effect relationships, and the ability to learn from past experiences.<sup>1-4</sup> People with FASD often display characteristics such as hyperactivity, impulsivity, aggressiveness and poor judgement. Given these factors, if appropriate diagnosis, interventions and support services are not put in place early in life and maintained throughout the life-course, many people with FASD are at high risk for becoming involved in the legal system, either as offenders or as victims.

Influencing and contributing situational factors often exacerbate the cognitive difficulties and behavioural problems associated with FASD. Secondary disabilities, such as trouble with the law, are thought to be the result of the interaction between primary disabilities (neuropsychological and behavioural problems) and adverse environments.<sup>5</sup> Secondary disabilities are those that arise after birth and could, presumably, be reduced or eliminated through better understanding and appropriate intervention,<sup>6</sup> and

include: mental health problems, trouble with the law, difficulties in school, becoming unemployed, homeless, and/or developing alcohol and drug problems.<sup>7</sup> Such characteristics are considered risk factors for involvement with the criminal justice system.<sup>8-10</sup> It has been reported that among a sample of 253 FASD-affected individuals, 60% reported ever being charged, convicted, or in trouble with the authorities, and 42% of adults had been incarcerated for a crime.<sup>11</sup>

Today, provincial/territorial and federal correctional systems, provincial/territorial and federal departments responsible for justice matters, researchers, academics, and non-government associa-

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**Table 1.** FAS/FASD Prevalence Estimates From the Reviewed Studies

Reference	Country	Year of Study	Total Population of Offenders/Sample Size; Type of Institution	Method	# of FAS Cases	FAS Prevalence per 1000	# of FASD Cases	FASD Prevalence per 1000
Fast et al., 1999 <sup>18</sup>	Canada (British Columbia & Yukon)	1995-96	287 youths (12-18 years of age); IAU of Youth Forensic Psychiatric Services	Inpatient assessment	3 (1.0%)	10.45/1000	64 (22.3%) (FAE: 52 pFAS & 12 ARND)	233.5/1000
Burd et al., 2003 <sup>21</sup>	Canada (National)	2001-02	148,797; inclusive of all major correctional facilities	Survey	Actual (based on survey): 13; Estimated (based on existing prevalence estimates in general population): 49 & 417	0.087/1000; 0.33/1000 <sup>23</sup> & 2.8/1000 <sup>24</sup>	1354 (FAS & ARND)	9.1/1000 <sup>24</sup>
Burd et al., 2004 <sup>22</sup>	USA (National)	2001-02	3,080,904; Inclusive of all major correctional facilities	Survey	Actual (based on survey): 1; Estimated (based on existing prevalence estimates in general population): 1540 & 8627	0.50/1000 <sup>23</sup> & 2.8/1000 <sup>24</sup>	28,036 (FAS & ARND)	9.1/1000 <sup>24</sup>
Murphy & Chittenden, 2005 <sup>20</sup>	Canada (British Columbia)	2004	137 youths (14-19 years of age); Juvenile detention centres	Survey			16 (11.7%) (FAS/FAE)	116.8/1000
MacPherson & Chudley, 2007 <sup>5</sup>	Canada (Manitoba)	2005-06	91 adult male offenders (19-30 years of age); Male-only medium-security penitentiary for adults	Interview/Assessment			9 (9.9%) (1 pFAS & 8 ARND)	98.9/1000
Rojas & Gretton, 2007 <sup>19</sup>	Canada (British Columbia)	1985-2004	230 youths (12-18 years of age); Youth Sexual Offence Treatment Program	Client files reviewed			25 (10.9%) (FAS/FAE)	108.7/1000

ARND = alcohol-related neurodevelopmental disorder; FAE = fetal alcohol effects; FAS = fetal alcohol syndrome; IAU = inpatient assessment unit; pFAS = partial fetal alcohol syndrome

tions are asking for information regarding the prevalence of mental illness among offenders, particularly among those with cognitive/brain disorders and explicitly FASD.<sup>12</sup> Prevalence and incidence estimates in the correctional system are also necessary because they allow for more accurate and conclusive cost estimates. Law enforcement is an area that is often neglected in estimates of the cost of FASD.<sup>13-15</sup> Estimating the prevalence/incidence of inmates with FASD is a difficult task due to the lack of standardized screening and diagnostic tools, and because of the added difficulty of assessing adults with possible prenatal alcohol exposure.<sup>16,17</sup>

The purpose of this study was to conduct a systematic search of the literature for studies that have estimated the prevalence/incidence of FAS/FASD in correctional systems in different countries.

## METHODS

A systematic literature search was performed to identify published and unpublished studies that have estimated the prevalence/incidence of FAS/FASD in correctional systems. The search included articles in scholarly peer-reviewed journals, conference proceedings, publicly available unpublished research, government reports, and books.

The search was conducted in multiple electronic bibliographic databases, including: Ovid MEDLINE, PubMed, EMBASE, Web of Science (including Science Citation Index, Social Sciences Citation Index, Arts and Humanities Citation Index), PsychINFO, ERIC, Epscohost, CINAHL, Campbell Collaboration, the Cochrane Database of Systematic Reviews, Canadian Centre for Justice Statistics, Criminal Justice Abstracts, NCJRS National Criminal Justice Reference Service, CSA Sociological Abstracts, Social Work Abstracts, Encyclopedia of Crime and Justice, Canadian Centre on Substance Abuse Library Collection Database, Centre for Addiction and Mental Health Library Database, and Google Scholar. The Centre of Criminology Library of the University of Toronto was also searched

(<http://www.criminology.utoronto.ca/lib/>). The search was conducted using multiple combinations of the following key words: fetal alcohol spectrum disorder, fetal alcohol syndrome, partial fetal alcohol syndrome, fetal alcohol effects, alcohol-related neurodevelopmental disorder, alcohol-related birth defects, prenatal alcohol exposure, law enforcement, criminal justice system, correction(s), jail, prison, incarceration, imprisoned, prevalence, incidence, occurrence, frequency.

Moreover, other websites were searched for relevant literature: Canadian Mental Health Association, Canadian Institutes of Health Research, Canadian Public Health Association, Health Canada, Public Health Agency of Canada, Criminal Justice/Mental Health Consensus Project, Bazelon Centre for Mental Health Law, National Institute of Corrections, Bureau of Justice Assistance, the SAMHSA National GAINS Center, the Substance Abuse and Mental Health Services Administration, Canadian Paediatric Society, Centre of Excellence for Early Childhood Development, Centres for Excellence in Women's Health, Journal of Fetal Alcohol Research, National Center on Birth Defects and Developmental Disabilities, FASD Center for Excellence, Society of Obstetricians and Gynaecologists of Canada, Status of Women Canada, The Women's Addiction Foundation, Human Resources and Skills Development Canada Office of Disability Issues, Indian and Northern Affairs Canada, First Nations and Inuit Health Branch, Centres for Excellence for Children with Special Needs and Centers for Disease Control and Prevention.

In addition, manual reviews were conducted of the content pages of the major epidemiological and crime/justice journals, as well as citations in the relevant articles. The search was not limited geographically or to English language publications only. The search was conducted up to December 2010, inclusive.

A data extraction sheet was designed, piloted and revised. A member of the study team extracted the data and a second member checked table entries for accuracy against the original articles.

This study also aimed to estimate the number of people with FAS/FASD within the criminal justice system population in different countries based on available studies. Furthermore, we set out to calculate the relative risk of becoming incarcerated in individuals with FAS/FASD as compared to individuals without FAS/FASD.

## RESULTS

Initially, the literature search identified 54 studies. After reviewing these articles, 42 were excluded due to the absence of FAS/FASD prevalence/incidence data in correctional systems. Upon further screening, only 6 were retained for data extraction: 5 studies from Canada and 1 from the USA. There were no studies found for any other countries with regard to estimating the prevalence/incidence of FAS/FASD in correctional systems.

### FAS/FASD prevalence in the criminal justice system

The studies will be described below and in Table 1 in ascending chronological order.

As can be seen from Table 1, the existing studies used different methodologies: 1) active case ascertainment involving assessment of clients;<sup>5,18</sup> 2) passive method – client files reviewed;<sup>19</sup> 3) survey;<sup>20</sup> and 4) survey with subsequent estimation of prevalence based on existing data.<sup>21,22</sup>

A study by Fast and colleagues<sup>18</sup> investigated the prevalence of FAS/Fetal Alcohol Effects (FAE) among youths (12-18 years) who were remanded for a forensic psychiatric/psychological assessment in British Columbia (BC) and the Yukon Territory. All those committed to the Inpatient Assessment Unit (IAU) of Youth Forensic Psychiatric Services in Burnaby, BC during a one-year period were assessed. Of 287 youth, 67 (23.3%) got an alcohol-related diagnosis: 3 (1.0%) had FAS and 64 (22.3%) had FAE (using more recent terminology, 52 of those children would have pFAS and 12 would have ARND). These 287 youths represented about 2.5% of the youths in custody in BC and Yukon during that time. Of the 67, only 3 had a diagnosis prior to this assessment.

Burd et al.<sup>21</sup> conducted a questionnaire-based observational study in 148,797 offenders (92% male) in the Canadian correctional system. With responses from 11 Canadian provinces and territories, it was found that only 13 inmates had a diagnosis of FAS (0.087 per 1,000). Using a previously reported conservative prevalence rate of FAS in the general population of 0.33 per 1,000 (Abel<sup>23</sup>), Burd et al. estimated that the Canadian correctional system actually houses 49 people with FAS (thus, 36 undiagnosed cases). Using a higher estimate (Sampson et al.<sup>24</sup>) of 9.1 cases per 1,000 for FAS and FAE in the general population, Burd et al. determined that an estimated 417 cases of FAS (404 undiagnosed) and 937 cases of FAE could potentially exist, totaling 1,354 people in the Canadian correctional system with FASD.

A more recent study by Burd et al.<sup>22</sup> assessed American correctional facilities in 2001-2002. A total of 3,080,904 inmates (89.7% male) were assessed in 54 states and cities in the USA. The data for the 39 states and 3 cities that responded to the questionnaire showed only 1 person being reported as having FAS. However, the group estimated that the prevalence of inmates with FAS should actually range from 1,540 (based on an incidence of 0.50 per 1,000<sup>23</sup>) to 8,627 (2.8 per 1,000<sup>24</sup>). Moreover, they estimated a combined prevalence of FAS and ARND of 28,036 inmates (9.1 per 1,000<sup>24</sup>).

Murphy and Chittenden<sup>20</sup> conducted a population survey in 137 youth ages 14 to 19 years (64 Aboriginals and 73 non-Aboriginals) in custody in BC during 2003-2004. About 12% of the children had been told by a health care professional that they had FAS/FAE (12 Aboriginals and 4 non-Aboriginals).

MacPherson and Chudley<sup>5</sup> reported a preliminary result of a 10% prevalence of FASD among adult male offenders (66% of whom are Aboriginal) entering Stony Mountain Institution medium-security penitentiary in Manitoba, Canada.

Rojas and Gretton<sup>19</sup> retroactively extracted background information from the charts of 102 Aboriginal and 257 non-Aboriginal youths who were ordered by the courts or by their probation officers to attend a Youth Sexual Offence Treatment Program. Formal physician diagnosis or suspicion about the presence or absence of FASD was found for 67 Aboriginals and 163 non-Aboriginals (for a total of 230 youths). The authors reported that approximately 27% (18) of Aboriginal youths were either diagnosed or suspected to have FASD compared to 4.3% (7) of non-Aboriginal youths.

### Number of people with FASD within the criminal justice system population in Canada

Based on the few available studies, we estimated the number of people with FASD within the criminal justice system population in Canada. It was not possible to estimate the number of people with FASD within the criminal justice system population in the USA due to unavailability/limitations of the respective data.

According to recent data from Statistics Canada, the average number of persons in custody on any given day in 2008/2009 in Canada was 37,234 adults and 1,898 youth aged 12 to 17 (for a total of 39,132 inmates), with the overall point prevalence rate of incarceration being 117 persons in custody per 100,000 persons in Canada.<sup>25</sup> These figures include both provincial/territorial custody (those serving a sentence of less than 2 years) and federal custody (those serving a sentence of more than 2 years). It must also be noted that the figure for the number of adults in custody excludes the Northwest Territories. Using these data and data from the available research studies (Table 1), the following numbers of individuals with FASD in the Canadian correctional system were estimated.

#### *Estimated Number of Youth Offenders With FASD*

1,898 youth from the custodial correctional population<sup>25</sup> x 10.9% of youth with FASD (lowest estimate<sup>19</sup>) = 207 youth with FASD.

1,898 youth from the custodial correctional population<sup>25</sup> x 22.3% of youth with FASD (highest estimate<sup>18</sup>) = 423 youth with FASD.

Therefore, it is estimated that the number of youth offenders with FASD in the Canadian correctional system on any given day in 2008/2009 ranged from 207 to 423.

#### *Estimated Number of Youth Offenders With FAS*

1,898 youth from the custodial correctional population<sup>25</sup> x 1.0% of youth with FAS<sup>18</sup> = 19 youth with FAS in the Canadian correctional system on any given day in 2008/2009.

#### *Estimated Number of Adult Offenders With FASD*

37,234 adults from the custodial correctional population<sup>25</sup> x 9.9% of adults with FASD<sup>5</sup> = 3,686 adults with FASD in the Canadian correctional system on any given day in 2008/2009.

### Relative Risk Calculations

To calculate the prevalence of incarceration in youth with FASD, we take the estimated number of youth with FASD in the Canadian correctional system on any given day in 2008/2009, which is 315 (determined by the midpoint of the above-presented lowest and highest estimates), and divide it by the estimated total number of youth in Canada with FASD during the same period of time. There were 2,534,738 youth aged 12-17 residing in Canada in 2009 (Statistics Canada, CAMSIM, Table 051-0001) and the estimated prevalence of FASD in Canada is 1 in 100 people,<sup>26</sup> so we can estimate that there were about 25,347 youth with FASD in Canada. Thus, the prevalence of incarceration in youth with FASD in Canada in 2009 is estimated to be 12 per 1,000 persons ( $315 / 25,347 \times 1,000 = 12.4 \sim 12$  people per 1,000), or 1,200 per 100,000 persons.

Based on a report from Statistics Canada,<sup>25</sup> there were 1,898 youths incarcerated in the general population in 2008/2009. Therefore, given that 315 of the incarcerated youth had FASD and that the prevalence of FASD in the general population is 1%, the prevalence of incarceration in youth without FASD in 2009 in Canada is estimated to be:  $[(1,898 - 315) / (2,534,738 \times 0.99)] \times 1,000 = 0.63$  people per 1,000, or 63 per 100,000 persons.

The crude Relative Risk is calculated as follows:  $1,200 / 63 = 19.0$ .

This calculation shows that youths with FASD were 19 times more likely to be in prison than youths without FASD on any given day in 2008/2009.

## DISCUSSION

Very little empirical evidence is available on the incidence/prevalence of FASD in correctional systems. The few studies that have identified individual offenders with FAS/FASD estimate that the number of undiagnosed persons, both juveniles and adults, in correctional facilities is high.<sup>18,21,22</sup> More studies on the prevalence/incidence of people with FASD in the criminal justice system are required. There is an urgent need to raise awareness not only about the prevalence of FASD in the criminal justice system and the disabilities associated with FASD, but also the appropriate responses necessary to reduce the pervasiveness of this disorder in this setting.

The causal connection between FASD and involvement with the juvenile/criminal justice system has not yet been rigorously studied. However, the reported high prevalence of offenders with FASD in the justice system is evident from the studies discussed above. At the same time, it should be recognized that these individuals with diagnosed or suspected FASD could have alternative etiologies for their criminogenic behaviour.

The studies on the prevalence of FASD in correctional systems done to date lacked rigour, used different methodologies, and had small sample sizes, and therefore might not be generalizable. For example, Fast et al.<sup>18</sup> drew their sample from a specialized IAU and thus, this sample might contain more cases of FASD and might not be generalizable to the total prison population.<sup>17</sup> Rojas and Gretton<sup>19</sup> included *suspected* cases of FASD, which might have led to the overestimation of the prevalence of FASD in this study. Furthermore, the majority of the studies utilized surveys and interviews and not active case ascertainment methods with actual examinations.

It is possible that the crude relative risk calculated in this study is misestimated to some degree. First, the assumption that the prevalence of FASD in youths is the same as in the general popula-

tion (which includes both youths and adults) is likely incorrect, since it is probably higher in youths than it is in older people (due to selective survival). Second, the assumption that the estimates in the few existing small-scale studies<sup>18,19</sup> are representative of all incarcerated youth in Canada might not be true. Finally, normally the risk ratio would be calculated based on incidence rates, however, in our study, only the data on the prevalence rates were available; thus insofar as the risk ratio is to be interpreted as estimating the risk of becoming imprisoned, such an interpretation would require an additional assumption that FASD does not affect the duration of incarceration (because prevalence depends on both the incidence and duration).

The data from this study on the high prevalence of individuals with FASD in correctional systems and the estimated 19 times greater risk for individuals with FASD to be incarcerated emphasize the need to incorporate screening for FASD as early as possible in the criminal justice process.

It must be understood that precise evaluations are not yet feasible since there are no widely used screening and diagnostic tools to identify the number of FASD-affected persons within the justice system. However, some progress has been made in these areas. Specifically, the first *Canadian Guidelines for Diagnosis* of FASD have been developed,<sup>27</sup> and a few novel quick and easy-to-administer screening processes in the criminal population have been developed and validated, including the FASD checklist<sup>28</sup> and the Asante Centre for FAS Probation Officer Screening & Referral Form.<sup>29,30</sup> If data collection were combined with screening for FASD in criminal populations, thorough and exhaustive methodologies could be utilized to estimate as accurately as possible the prevalence of FASD in the criminal justice system. The criminal justice system is an ideal arena for intervention efforts aimed at rehabilitating FASD-affected individuals, with the intention of preventing/reducing recidivism rates in this unique population.

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## RÉSUMÉ

**Objectifs :** Procéder à une recherche documentaire systématique pour répertorier les études ayant estimé la prévalence/l'incidence de l'ensemble des troubles causés par l'alcoolisation foetale (ETCAF) dans les systèmes correctionnels de différents pays et, d'après ces données, estimer a) le nombre de personnes touchées par le SAF [syndrome d'alcoolisme foetal] ou l'ETCAF dans la population carcérale et b) le risque relatif d'être incarcéré, pour les sujets touchés par le SAF/l'ETCAF comparativement aux sujets non touchés.

**Méthode :** Nous avons mené, dans de nombreuses bases de données bibliographiques électroniques, une enquête bibliographique mondiale systématique des études publiées et inédites sur la prévalence/l'incidence de l'ETCAF dans les systèmes correctionnels.

**Synthèse :** Il existe très peu de preuves empiriques sur la prévalence de l'ETCAF dans les systèmes correctionnels. Sauf au Canada et aux États-Unis, nous n'avons trouvé aucune étude estimant la prévalence/l'incidence de l'ETCAF dans les systèmes correctionnels. Les rares études qui identifient les personnes incarcérées touchées par l'ETCAF estiment que le nombre de sujets non diagnostiqués dans les établissements de correction est élevé. D'après les données canadiennes disponibles, nous estimons que les jeunes touchés par l'ETCAF sont 19 fois plus susceptibles d'être incarcérés que les jeunes non touchés par l'ETCAF au cours d'une année donnée.

**Conclusion :** Il faudrait que plus d'études s'intéressent à la prévalence/l'incidence des sujets affectés par l'alcool dans le système de justice pénale. Il est urgent de prendre conscience de la prévalence et des handicaps des sujets touchés par l'ETCAF dans ce système, ainsi que des réponses appropriées. Le système de justice pénale est un milieu idéal pour les interventions qui visent à réhabiliter et à prévenir ou réduire le récidivisme dans cette population particulière.

**Mots clés :** syndrome d'alcoolisme foetal; effets de l'alcool sur le fœtus; prévalence; crime