

Understanding the impacts of Fetal Alcohol Spectrum Disorder (FASD) on child mental health

Dr. Sara McLean, 2019

Key Messages

- The prevalence of FASD amongst children living in the community is higher than previously recognised and occurs at levels that are comparable to other key mental health difficulties faced by children. FASD also occurs at much higher rates in some groups of children (for example those in out-of-home care and those in the youth justice system).
- There is considerable overlap between symptoms of FASD and symptoms of other mental health conditions (e.g. ADHD), and children living with FASD also often live with comorbid medical and mental health conditions such as anxiety, depression, ADHD, and suicidality.
- FASD is associated with a range of mental health disorders. Supportive evidence-based mental health interventions may be less effective when children also have FASD.
- There is a need to develop tailored interventions and supports for children living with FASD and comorbid mental health conditions, and for all practitioners to ask about maternal alcohol consumption during pregnancy.



What is this resource about?

This resource is intended to highlight the significance of Fetal Alcohol Spectrum Disorder (FASD) to practitioners working in child, family and/or adult-focused services. In particular, this resource outlines emerging understanding about the association between FASD and common mental health difficulties in children and young people. It is part of a series of Emerging Minds resources on FASD and its impact on children and families.

Who is this resource for?

This resource is suited to practitioners working in both child and adult-focused services, as well as general practitioners and allied health professionals working with pregnant women.

This resource may be of particular interest to practitioners who provide mental health support to children and young people. It is important for these practitioners to understand the likely impact of FASD on the mental health and wellbeing of children's lives.

What is FASD?

Fetal Alcohol Spectrum Disorder (FASD) is an umbrella term used to describe a range of distinct but related developmental disorders caused by exposure of the developing foetus to alcohol in utero. There are a range of possible diagnoses associated with prenatal alcohol exposure; therefore, the umbrella term FASD is typically used¹. FASD is sometimes referred to as an invisible disability, as the disorder is not always accompanied by any discernible physical characteristics.

Delivery partners:



RACGP

The National Workforce Centre for Child Mental Health is funded by the Australian Government Department of Health under the National Support for Child and Youth Mental Health Program

Visit our web hub today!

**Emerging
minds.
com.au**



How does FASD affect a child's life?

Understandings about the probable impact of FASD on child wellbeing and mental health have grown in recent years. It appears likely that exposure to alcohol during key fetal developmental phases can result in a range of physical and functional difficulties in the developing child ('primary difficulties'). When placed in the context of a child's caregiving environment, particularly an unsupportive environment, these difficulties contribute to the child's risk of developing mental health and behavioural difficulties later in life ('secondary difficulties'). Despite this growing knowledge, the pathways through which this risk is conveyed are still not fully understood.

Primary difficulties: Exposure to alcohol in utero results in primary changes to the development of numerous organ systems in the fetus, including the brain. Alcohol-induced changes to the developing architecture of the brain, its structure and neuronal networks are believed to result in damage to the various brain functions that control attention, communication, self-regulation, sensory processing and impulse control. This damage to neuropsychological functioning may lead to the later development of mood and behavioural regulation difficulties that are often associated with mental health difficulties.

These foundational changes in brain functioning are referred to as primary difficulties, as they reflect primary differences in the underpinning architecture of a child's physical and biological makeup.

Secondary difficulties: The broader ecology in which a child lives can be extremely influential in either supporting their mental health, or in magnifying the negative impacts of primary difficulties. Therefore, it is important to take into context the social environment in which a child with FASD lives.



Impact of the caregiving environment: A child's social ecology can influence their functioning and wellbeing. A child who is raised in a social and service context in which their needs are understood and responded to will be less vulnerable than a child whose difficulties are not well understood by others.

A child may be at risk of developing secondary difficulties (such as mental health difficulties) if the parenting techniques they experience are not suited to their needs; if educational services do not understand their additional needs; and/or if they are provided mental health supports that rely on cognitive or language skills.

While all children are influenced by the broader ecology in which they live, this impact is particularly acute for children living with FASD. They are more vulnerable than neurotypical children to the impact of a 'poor ecological fit' between their needs and the support they are offered.

Impact of early adversity: Many children living with FASD may also be living with other issues that increase their risk of developing mental health difficulties. These include difficulties associated with poor parental care (e.g. alcohol abuse), possibly due to attachment and behavioural issues that place them at increased risk of abuse (Clarke & Gibbard, 2003; Kully-Martens et al., 2007).

Children who are removed from their birth family due to abuse or neglect may suffer further instability, as their complex needs can often lead to multiple foster placements. This can compound and entrench the difficulties they are already experiencing (Paley & Auerbach, 2010).

It is likely that the mental health and wellbeing outcomes for children living with FASD reflect a combination of primary factors related to the severity of prenatal influences; and secondary, (postnatal) factors related to a child's complex family environment and the inability of wider social environment and services to support them adequately (Clarke & Gibbard, 2003). Since these factors all vary between children, it is not surprising that the impact of FASD on children's mental health and developmental trajectories can vary. Early diagnosis, access to appropriate interventions, and placement in a stable, nurturing and structured environment are all believed to minimise the likelihood of poor mental health outcomes over time (Clarke & Gibbard, 2003; McLean & McDougall, 2014; Parkinson & McLean 2013b Streissguth et al., 2007).

How common is FASD?

Recent estimates place the prevalence of FASD in Western societies as ranging from 1 per 100 live births (Stade et al., 2008; Thanh, Jonsson, Salmon, & Sebastianski, 2014) to as high as 2–5% of the population (May et al., 2009; Roozen et al., 2016) – a variation partly due to research methodology. Based on a synthesis of research conducted in Western countries, the most recent estimate proposed a community prevalence of 4% in Western countries* (Flannigan, Unsworth & Harding, 2018).

In addition to being more common than previously acknowledged, there is also increasing awareness that FASD is associated with a range of mental health difficulties. The most recent edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM, 2013) has flagged the neurodevelopmental impact of prenatal alcohol exposure as a condition that warrants further consideration¹ for inclusion as a mental health condition in its own right (DSM, 2013).

FASD appears to be almost as common as more well-known mental health conditions. If the suggestion that the prevalence of FASD may be as high as 4% in the community is to be accepted, FASD appears to occur at a similar rate to many other mental health conditions (e.g. prevalence of anxiety disorders has been estimated at 6.9%; depression at 2.8%; and ADHD at 7.4% [Lawrence et al., 2015]).

Indeed, FASD is actually more common than many other significant health conditions in Western societies. It is approximately two-and-a-half times more common than Autism (estimated to occur in 1.52% of the population) and 28 times more common than Downs Syndrome (estimated to occur in 0.14% of the population) (Flannigan et al., 2018; Nash & Davies, 2017; Popova 2017). These figures suggest FASD should be a priority for community-focused efforts directed at early intervention and prevention.

There are some populations in which FASD appears more common. Children living in foster and residential care (Fuchs & Burnside, 2014; Lange et al., 2013) and young people in forensic and youth justice settings (Bower et al., 2018; Fast, Conry & Looch, 1999) have shown higher rates of both FASD and mental health concerns. There is also considerable overlap between the two groups, with children who are living in care also being more likely to come into contact with the justice system.



Out-of-home care: The prevalence of FASD amongst children in out-of-home care settings is likely to be much higher than the general population. It is estimated that on average around 17% of children in all forms of out-of-home care placements have FASD (Lange et al., 2013; McLean, 2018). Around 6% of those children were diagnosed with Fetal Alcohol Syndrome (FAS), a more severe form of FASD (Lange et al., 2013).

It seems that FASD occurs in out-of-home care at a level that is broadly comparable to other significant mental health concerns in this population (e.g. between 11–26% of children and adolescents in care are thought to have an anxiety disorder; between 3–23% have depression, and between 3–68% have ADHD [McLean, 2018]). Distinguishing between FASD and other mental health conditions in this population is often complicated because of the lack of clear documentation in relation to maternal alcohol consumption.

Youth Justice: Another population in which FASD and mental health concerns appear common is amongst children and adolescents in contact with the justice system. A review of the needs of young people involved in the Australian youth justice system identified mental health, disability, FASD, substance use and trauma as significant concerns in this group (AIHW, 2017).

Children and adolescents living with FASD are more likely to come into contact with the legal system, either as perpetrators or victims (Parkinson & Mclean, 2013). Early work in this area indicated that 60% of adolescents over the age of 12 who were living with FASD had had contact with the legal system; and 40% of adults living with FASD had experienced incarceration (Streissguth et al., 1996).



¹ See description of Neurobehavioral Disorder Associated with Prenatal Alcohol Exposure [Section III].

It has been estimated that within child and adult correctional facilities, between 11–23% of residents meet criteria for FASD (Fast and Conry, 2011); but more recent research suggests that this may be as high as 36% (Bower et al., 2018). Children and adolescents living with FASD were 19 times more likely to have been incarcerated compared to those without FASD (Popova, Lange, Bekmuradov, Mihic, & Rehm, 2011).

This population also displays significant mental health concerns. A recent study of lower risk juvenile offenders on diversionary programs found that 17.1% had a current mood, anxiety or psychotic disorder (Kang et al., 2017).

A recent meta-analysis of research conducted on this issue found that overall, children in the youth justice system experienced mental health conditions at approximately six times the rate of adolescents in the general population (Na & Cho, 2019).

Children and adolescents living with FASD may also be less able to effectively navigate and understand child welfare and forensic systems, due to their underlying neuropsychological issues. In particular, language, memory and planning difficulties can disadvantage children in counselling and mediation environments; settings in which they are required to express their views, generate a coherent narrative, set abstract goals, and engage in verbal contracts (McLean, McDougall & Russell, 2014; Parkinson & McLean, 2013a).

Similarly, the cognitive, language and mental health difficulties of these children may mean that they are unable to participate effectively in legal decision making; and neurodevelopmental impairments may predispose them to ongoing contact with the forensic system (Bower et al., 2018; Lansig et al., 2014; Parkinson & Mclean, 2013a).

What is the link between FASD and risk of mental health concerns?



FASD appears to co-occur with a range of persistent mental health difficulties. Adults living with FASD reported a significant retrospective history of mental health concerns (over 90% of these adults reported experiencing mental health concerns at some stage of their life; Streissguth, Barr, Kogan, & Bookstein, 1996), making mental health concerns the most commonly experienced ‘secondary disability’ associated with FASD (Streissguth, et al., 1996).

Although the relationship between FASD and mental health problems is not yet fully understood, some aspects of this relationship are clear:

FASD is associated with cognitive vulnerabilities, that are also known to contribute to mental health conditions: FASD results in cognitive difficulties and inefficient brain processes, leading to less flexible and adaptive social information processing and emotional regulation. Poor executive functioning has been associated with a range of common mental health conditions, including conduct disorder, ADHD, depression and anxiety (e.g., Diamond, 2013; Malloy-Diniz, Miranda, & Grassi-Oliveira, 2017). In other words, FASD may result in more profound damage to the pathways involved in executive control, rendering a child more likely to develop some

form of mental health condition. This argument is consistent with a growing recognition amongst researchers of the association between underlying cognitive functioning, particularly executive functioning, and a range of mental health conditions (NIMH, n.d.)

There is considerable overlap between the features of FASD and some mental health difficulties: The behavioural, attentional and social difficulties reported amongst children living with FASD share considerable overlap with other more well-understood childhood mental health conditions. The profiles of many children suspected of having FASD could meet the screening criteria for conditions such as Attention Deficit Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), language or communication difficulties, Autism Spectrum Disorder or learning difficulties (Anderson et al., 2017; APA, 2013; Nash, Koren, & Rovet, 2009; Nash et al., 2006).

Many children diagnosed by mental health practitioners with common childhood mental health disorders could also meet the diagnostic criteria for FASD. A study of 547 foster and adoptive children referred to a FASD clinic found that 80.1% met the criteria for FASD, but the diagnosis had previously been missed (Chasnoff, Wells, & King, 2015). In this same study the rate of misdiagnosis (i.e. children that had been incorrectly diagnosed with another mental health condition) was 6.4%. The flow-on implications of misdiagnosis may be considerable, as diagnosis will often determine the level and type of support offered to children and families throughout their lives (Anderson et al., 2017).

FASD co-occurs with a range of mental health disorders: FASD is associated with a range of mental health and physical conditions that are also associated with poorer mental health. A recent systematic review of mental health

comorbidity in this area showed that there was considerable comorbidity amongst those living with FASD (Weyrauch et al., 2017). For example, 50% of children living with FASD diagnosis also had a diagnosis of ADHD (10 times the expected population rate); 23% had an intellectual disability (ID) (23 times the expected population rate); and rates of other mental health disorders also occurred at rates that exceeded those expected in the community. Following ADHD and ID, the most common comorbid diagnoses were:

- Learning Disorder (19.9%)
- Oppositional Defiant Disorder (ODD) (16.3%)
- Depression (14.1%)
- Psychotic Disorder (12.3%)
- Bipolar Disorder (8.6%)
- Anxiety Disorder (7.8%)
- Post-Traumatic Stress Disorder (PTSD) (6.0%)
- Obsessive Compulsive Disorder (OCD) (4.9%); and
- Reactive Attachment Disorder (4.7%) (Weyrauch et al., 2017).

The average age of the participants in these research studies in this systematic review was 10 years. Collectively, the rates of comorbid disorders in these children ranged between 1.5 times and 24.5 times those expected in the population, suggesting a significant, albeit not yet understood, relationship between prenatal alcohol exposure and early onset mental health difficulties.

FASD co-occurs with physical conditions that contribute to mental health difficulties: FASD is also associated with a diverse range of physical health conditions and disabilities that may increase a child's risk of developing mental health difficulties over time. Indeed, a recent meta-analysis of comorbid medical and associated conditions identified 428 conditions that could co-occur with FASD.

Amongst these were congenital malformations, deformities, chromosomal abnormalities, and a range of mental and behavioural disorders (Popova et al., 2016). Some of the most common were abnormalities of the peripheral nervous system and senses, conduct disorder, language disorders and chronic serious otitis media.

It appears, therefore, that FASD can also be associated with a range of medical conditions associated with significant stress that could contribute to the development of mental health difficulties over time.

Other difficulties commonly associated with FASD

One of the common outcomes of prenatal alcohol exposure is intellectual disability (ID). Many, although not all, children with FASD have significant and global cognitive impairment (McLean & McDougall, 2014). While the relationship between IQ and mental health difficulties has not been well explored in regard to FASD, the relationship between intellectual disability and mental health difficulties is generally well-established (Munir, 2016). A recent review concluded that around 40% of children and adolescents living with intellectual disability also experience a mental health condition, with 30% of these experiencing persistent mental ill health (Munir, 2016).

There are other serious mental health conditions associated with FASD. It is estimated that the rate of alcohol and substance use disorder in this group is five times higher than that expected in the community (Anderson et al., 2017; Streissguth et al., 1996; Yates, Cadoret, Troughton, Stewart, & Giunta, 1998). Studies suggest that 53% of males and 70% of females who were exposed to alcohol prenatally have substance use concerns as adults (Anderson et al., 2017; Streissguth et al., 1996).



It also appears that there is a strong correlation between diagnosis of FASD and suicidality (Anderson et al., 2017). Early research indicated that around 43% of adults living with FASD had threatened suicide and approximately 23% had attempted suicide sometime during their life (Streissguth et al., 1996). More recent research exploring the rate of suicidal attempt by age in the FASD population found that 3% of children aged 6–11 years, 12% of youths aged 12–20 years, and 23% of adults aged 21–51 years had attempted suicide (Huggins, Grant, & Streissguth, 2008).

Taken altogether, this body of work suggests it is critically important for practitioners to consider FASD as a possible contributor to or cause of a child's current mental health difficulties; and that many behavioural and mental health presentations in affected children may in fact be influenced by underlying neurocognitive issues stemming from prenatal alcohol exposure. Diagnostic overshadowing is a potential concern, especially amongst high risk populations. Where mental health difficulties are significant, there is a risk the potential contribution of FASD may be overlooked; and where FASD is known, there may also be a risk of minimising any comorbid mental health concerns. Therefore, it is always important for practitioners to be mindful of the potential for significant mental health concerns when working with children and families living with FASD.

Key challenges for service providers

There is considerable overlap of FASD with other issues of social and economic significance, such as lifelong mental health difficulties; suicidality and substance use; difficulty with meeting vocational or educational goals; and vulnerability to victimisation and/or offending behaviours. Given this, it is essential for all professionals working with children to have a good understanding of the impact FASD has on children's lives.

There are factors to consider in order to make services more responsive to the needs of children living with FASD.



● **Responding to the complexity of FASD:**

Services that are funded to address one particular need may be poorly placed to address the multiple needs and complex comorbidity of children and families living with FASD. Referral pathways that revolve around diagnostic categories may not be enough to meet the needs of children living with FASD and comorbid mental health conditions. Studies have repeatedly identified barriers for children living with FASD receiving appropriate services. These include difficulty getting a diagnosis; inability to meet criteria for disability services; lack of services suited for individuals with FASD, and a scarcity of knowledgeable providers to diagnose and provide services (see review by Petrenko et al., 2014).

There is a need to develop, fund and trial new service models, particularly for those groups at increased risk (i.e. child welfare and youth justice populations). Existing ways of working, although effective for neurotypical children, may lack effectiveness entirely if comorbid or underlying FASD and cognitive challenges are not taken into consideration (Anderson et al., 2017; Grant, Brown, Dubovsky, Sparrow, and Ries, 2013; Rutman, Poole, Hume, Hubberstey, and Van Bibber 2014). The nature of a child's social supports and social network is also likely to play a critical role in their adaptation and functioning.

● **Asking about prenatal alcohol exposure:**

Practitioners need to consider the impact of prenatal factors as part of their assessment and formulation (McLennan, 2015). As a starting point, it seems important for all practitioners, whether in adult-facing or child and family-facing services, to be open to the possibility that prenatal alcohol exposure may be a contributor or companion to a child's current mental health concerns. It is also important to record this information once obtained, as this information can be vital to a child's ability to obtain a diagnosis later in life. This information can be useful in informing interventions, especially for those families with complex support needs; and for children and young people in out-of-home care, for whom accurate records may not otherwise be available (Anderson et al., 2017; McLean & McDougall, 2014).

● **Increase workforce capacity regarding FASD:**

There appears to be a lack of knowledge and understanding of FASD in trainees and professionals across the medical, mental health, educational, legal, and child welfare fields (Eyal & O'Connor, 2011; Fast & Conry, 2009; Koren et al., 2010; Payne et al., 2005; Ryan et al., 2006; Wedding et al., 2007). While some professionals may have adequate knowledge of FASD (Johnson et al., 2010; Gahagan et al., 2006), these providers often have difficulty applying this information when implementing services (Brems et al., 2010; Gahagan et al., 2006; Petrenko, et al., 2014). This may be especially problematic for mental health professionals, who may have never received training in how to recognise the impact of FASD in their clinical mental health interventions (O'Connor & Paley, 2009; Petrenko et al., 2014).

This lack of recognition could mean that in some cases FASD is either misdiagnosed or left undiagnosed (Anderson et al., 2017).

Taken as a whole, the literature suggests the need for workforce development in relation to understanding and responding to the impact of neurocognitive difficulties and mental health comorbidity, especially in the out-of-home care, mental health, and forensic workforces (Anderson et al., 2017; Chapman, 2008).

Summary

Though there currently does not appear to be any way to reverse the impact of prenatal alcohol exposure for the developing fetus, there are nonetheless some important ways in which practitioners can support children. By helping to create a better 'fit' between a child's ability and their social and learning environment, practitioners can minimise the risk of educational disengagement, social and peer relationship difficulties, and behavioural and emotional concerns. Two strategies for this – 'universal accommodations' and 'targeted strategies' – are discussed in more depth in the resource, [How to support children living with Fetal Alcohol Spectrum Disorder \(FASD\)](#).

References

- American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington: APA.
- Anderson, T., Mela, M., Stewart, M., (2017). The implementation of the 2012 Mental Health Strategy for Canada through the lens of FASD. *Canadian Journal of Community Mental Health*, 36(4), 67–81. doi:10.7870/cjcmh-2017-031.
- Australian Institute of Health and Welfare. (2018). National data on the health of justice-involved young people: a feasibility study. Cat. no. JUV 125. Canberra: AIHW.
- Australian Bureau of Statistics (2017). Causes of death Australia. Retrieved from: [http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/3303.O~2017~Main%20Features~Intentional%20self-harm,%20key%20character2017\).istics~3](http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/3303.O~2017~Main%20Features~Intentional%20self-harm,%20key%20character2017).istics~3)
- Bower, C., Watkins, R., Mutch, R., Marriott, R., Freeman, J., Kippin, N., et al...Giglia, R. (2018). Fetal alcohol spectrum disorder and youth justice: A prevalence study among young people sentenced to detention in Western Australia. *BMJ Open*, 8(2), e019605.
- Brems, C., Boschma-Wynn, R.V., Dewane, S.L., Edwards, A.E., & Robinson, R.V. (2010). Training needs of healthcare providers related to centers for disease control and prevention core competencies for fetal alcohol spectrum disorders. *Journal of Population Therapeutics and Clinical Pharmacology*, 17, e405–e417. Retrieved from: <https://www.ncbi.nlm.nih.gov/pubmed/21063036>
- Brown, J., Sigvaldson, N., & Bednar, L. (2005). Foster parent perceptions of placement needs for children with Fetal Alcohol Spectrum Disorder. *Children and Youth Services Review*, 27(3), 309–327.
- Chasnoff, I. J., Wells, A. M., & King, L. (2015). Misdiagnosis and missed diagnoses in foster and adopted children with prenatal alcohol exposure. *Pediatrics*, 135(2), 264–270.
- Chapman, J. L. (2008). Fetal Alcohol Spectrum Disorder (FASD) and the criminal justice system: An exploratory look at current treatment practices. Unpublished master's thesis. School of Criminology, Simon Fraser University. (Cited in Anderson et al., 2017).
- Chudley, A. E., Conry, J., Cook, J. L., Looock, C., Rosales, T., & LeBlanc, N. (2005). Fetal alcohol spectrum disorder: Canadian guidelines for diagnosis. *Canadian Medical Association Journal*, 172(Suppl. 5), S1–S21.
- Clarke, M.E., & Gibbard, W.B. (2003). Overview of Fetal Alcohol Spectrum Disorders for mental health professionals. *Canadian Child and Adolescent Psychiatric Review*, 12(3), 57–63.
- Cook, J. L., Green, C. R., Lilley, C. M., Anderson, S. M., Baldwin, M. E., Chudley, A. E., ... Lutke, J. (2016). Fetal alcohol spectrum disorder: A guideline for diagnosis across the lifespan. *Canadian Medical Association Journal*, 188(3), 191–197. doi:10.1503/cmaj.141593.
- Courtney, M., & Dworsky, A. (2006). Early outcomes for young adults transitioning from out-of-home care in the USA. *Child and Family Social Work*, 11(3), 209–219.
- Courtney, M., Dworsky, A., Brown, A., Cary, C., Love, K., & Vorhies, V. (2011). Midwest evaluation of the adult functioning of former foster youth. Outcomes at age 26. Chicago: Chapin Hall at the University of Chicago.
- Diamond, A. (2013). Executive functions. *Annual Review Psychology*, 64, 135–168. 10.1146/annurev-psych-113011-143750
- Eyal, R., & O'Connor, M.J. (2011). Psychiatry trainees' training and experience in fetal alcohol spectrum disorders. *Academic Psychiatry*, 35(4), 238–240. doi: 10.1176/appi.ap.35.4.238
- Fast, D.K., & Conry, J. (2009). Fetal alcohol spectrum disorders and the criminal justice system. *Developmental Disabilities Research Reviews*, 15(3), 250–257. doi: 10.1002/ddrr.66
- Fast, D., & Conry, J. (2011). Understanding the similarities and differences between Fetal Alcohol Spectrum Disorder and Mental Health Disorders. Vancouver: Department of Justice, Canada.
- Fast, D., Conry, J., & Looock, C. (1999). Identifying Fetal Alcohol Syndrome among youth in the criminal justice system. *Journal of Developmental and Behavioral Pediatrics*, 20(5), 370–372.
- Flannigan, K., Unsworth, K., & Harding, K. (2018). The prevalence of Fetal Alcohol Spectrum Disorder. Canadian FASD Research Network. Retrieved from: <https://canfasd.ca/wp-content/uploads/2018/08/Prevalence-1-Issue-Paper-FINAL.pdf>
- Fuchs, D., & Burnside, L. (2014). Study on the prevalence of FASD in Canadian child welfare settings: Final report.
- Gahagan, S., Sharpe, T.T., Briacombe, M., Fry-Johnson, Y., Levine, R., Mengel, M., O'Connor, M., ... Brennehan, G. (2006). Pediatricians' knowledge, training, and experience in the care of children with fetal alcohol syndrome. *Pediatrics*, 118(3), e657–e668.
- Grant, T. M., Brown, N. N., Dubovsky, D., Sparrow, J., & Ries, R. (2013). The impact of prenatal alcohol exposure on addiction treatment. *Journal of Addiction Medicine*, 7(2), 87–95.
- Huggins, J. E., Grant, T., & Streissguth, A. P. (2008). Suicide attempts among adults with fetal alcohol spectrum disorders: Clinical considerations. *Mental Health Aspects of Developmental Disabilities*, 11(2), 33–42.
- Jones, K., & Smith, D. (1973). Recognition of the fetal alcohol syndrome in early infancy. *The Lancet*, 302(7836), 999–1001.
- Johnson, M.E., Robinson, R.V., Corey, S., Dewane, S.L., Brems, C., & Casto, L.D. Knowledge, attitudes, and behaviors of health, education, and service professionals as related to fetal alcohol spectrum disorders. *International Journal of Public Health*, 55(6),

- Kang, T., Wood, J. M., Eno Loudon, J., & Ricks, E. P. (2017, March 13). Prevalence of Internalizing, Externalizing, and Psychotic Disorders Among Low-Risk Juvenile Offenders. *Psychological Services*. Advance online publication. Retrieved from: <http://dx.doi.org/10.1037/ser0000152>
- Koren, G., Fantus, E., & Nulman, I. (2010). Managing fetal alcohol spectrum disorder in the public school system: a needs assessment pilot. *Canadian Journal of Clinical Pharmacology*, 17(1), 79–89.
- Kully Martens, K., Deny, S., Treit, S., Tamana, S., & Rasmussen, C. (2012). A review of social skills deficits in individuals with Fetal Alcohol Spectrum Disorders and prenatal alcohol exposure: Profiles, mechanisms, and interventions. *Alcoholism, Clinical Experimental Research*, 36(4), 568–576. Retrieved from: <https://doi.org/10.1111/j.1530-0277.2011.01661.x>
- Lange, S., Shield, K., Rehm, J., & Popova, S. (2013). Prevalence of Fetal Alcohol Spectrum Disorders in child care settings: A meta-analysis. *Pediatrics*, 132, 980–995.
- Lansing, A. E., Washburn, J. J., Abram, K. M., Thomas, U. C., Welty, L. J. & Teplin, L. A. (2014). Cognitive and academic functioning of juvenile detainees: Implications for correctional populations and public health. *Journal of Correctional Health Care*, 20(1), 18–30. doi: 10.1177/1078345813505450.
- Lawrence, D., Johnson, S., Hafekost, J., Boterhoven De Haan, K., Sawyer, M., Ainley, J., & Zubrick, S. R. (2015) The mental health of children and adolescents. Report on the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. Canberra: Department of Health.
- Linnet, K., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen, T., Rodriguez, A., Kotimaa, A., ... Jarvelin, M. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviors: Review of the current evidence. *American Journal of Psychiatry*, 160(6), 1028–1040.
- Malloy-Diniz, L., Miranda, D. M., & Grassi-Oliveira (2017). Editorial: Executive functions in psychiatric disorders. *Frontiers in Psychology*, 8, 1461. doi: 10.3389/fpsyg.2017.01461
- May, P. A., Gossage, J. P., Kalberg, W. O., Robinson, L. K., Buckley, D., Manning, M., & Hoyme, H. E. (2009). Prevalence and epidemiologic characteristics of FASD from various research methods with an emphasis on recent in school studies. *Developmental Disabilities Research Reviews*, 15(3), 176–192.
- McLean, S. (2018). Therapeutic residential care: An update on current issues in Australia. CFCA Paper 49. Melbourne: Australian Institute of Family Studies. Retrieved from: <https://aifs.gov.au/cfca/publications/therapeutic-residential-care-update-current-issues-australia>
- McLean, S., & McDougall, S. (2014). Fetal alcohol spectrum disorders: Current issues in awareness, prevention and intervention. CFCA Issues Paper, Australian Institute for Family Studies. Retrieved from: <https://aifs.gov.au/cfca/publications/fetal-alcohol-spectrum-disorders-current-issues-awareness-prevention-and>
- McLean, S., McDougall, S., & Russell, V. (2014). Supporting children living with FASD: practice principles. CFCA Practice Paper, Australian Institute for Family Studies. Retrieved from: <https://aifs.gov.au/cfca/publications/supporting-children-living-fetal-alcohol-spectrum-disorders-practice-princ>
- McLennan, J. D. (2015). Misattributions and potential consequences: The case of child mental health problems and fetal alcohol spectrum disorders. *Canadian Journal of Psychiatry*, 60(12), 587–590. doi: 10.1177/070674371506001210.
- Munir, K. (2016). The co-occurrence of mental disorders in children and adolescents with intellectual disability/intellectual developmental disorder. *Current Opinion in Psychiatry*, 29(2), 95–102. doi:10.1097/YCO.0000000000000236.
- Na, K-S., & Cho, S-E. (2019). Prevalence of mental disorders among juvenile offenders: Systematic review and meta-analysis. Retrieved from: <https://ssrn.com/abstract=3321503>
- Nash, A., & Davies, L. (2017). Fetal Alcohol Spectrum Disorders: What pediatric providers need to know. *Journal of Pediatric Health Care*, 31(5), 594–606. doi: 10.1016/j.pedhc.2017.04.002.
- Nash, K., Koren, G., & Rovet, J. (2009). Neurobehavioural Screening Tool (NST): Guidelines and scoring. Retrieved from: <http://c-cluster-110.uploads.documents.cimpress.io/v1/uploads/094de51c-1e50-432e-b40e-27e95300e034-110/original?tenant=vbu-digital>
- Nash, K., Rovet, J., Greenbaum, R., Fantus, E., Nulman, I., & Koren, G. (2006). Identifying the behavioural phenotype in fetal alcohol spectrum disorder: Sensitivity, specificity and screening potential. *Archives of Women's Mental Health*, 9(4), 181–186. doi: 10.1007/s00737-006-0130-3.
- National Institute of Mental Health [NIMH](n.d.). Definitions of the RDoC Domains and Constructs. Retrieved from: <https://www.nimh.nih.gov/research/research-funded-by-nimh/rdoc/definitions-of-the-rdoc-domains-and-constructs.shtml>
- O'Connor, M. J., & Paley, B. (2009). Psychiatric conditions associated with prenatal alcohol exposure. *Developmental Disabilities Research Reviews*, 15(3), 225–234. doi: 10.1002/ddrr.74.
- Parkinson, S. & McLean, S. (2013). Fetal alcohol spectrum disorder in children: implications for Judicial Administration. *Journal of Judicial Administration*, 22(3), 138–145.
- Parkinson, S., & McLean, S. (2013). Social cognition in children with Fetal Alcohol Spectrum Disorders. *Children Australia*, 38(3), 124–128. doi:10.1017/cha.2013.16.
- Payne, J., Elliott, E., D'Antoine, H., O'Leary, C., Mahony, A., Haan, E., & Bower, C. (2005). Health professionals' knowledge, practice, and opinions about fetal alcohol syndrome and alcohol consumption in pregnancy. *Australian and New Zealand Journal of Public Health*, 29(6), 558–564.
- Paley, B., & Auerbach, B.E. (2010). Children with Fetal Alcohol Spectrum Disorders in the dependency court system: challenges and recommendations. *Journal of Psychiatry and Law*, 38(4), 507. Retrieved from: <https://doi.org/10.1177/009318531003800407>

- Parkinson, S., & McLean, S. (2013). Foetal alcohol spectrum disorder in children: Implications for judicial administration. *Journal of Judicial Administration*, 22, 138–146.
- Petrenko, C. L. M., Tahir, N., Mahoney, E. C., & Chin, N. P. (2014). Prevention of secondary conditions in Fetal Alcohol Spectrum Disorders: Identification of systems-level barriers. *Maternal and Child Health Journal*, 18(6), 1496–1505. Retrieved from: <http://doi.org/10.1007/s10995-013-1390-y>
- Popova, S., Lange, S., Bekmuradov, D., Mihic, A., & Rehm, J. (2011). Fetal alcohol spectrum disorder prevalence estimates in correctional systems: A systematic literature review. *Canadian Journal of Public Health/Revue Canadienne de Santé Publique*, 102(5), 336–340.
- Popova, S., Lange, S., Poznyak, V., Chudley, A.E., Shield, K.D, Reynolds, J.N., Murray, M. & Rehm, J. (2019). Population-based prevalence of fetal alcohol spectrum disorder in Canada. Retrieved from: <https://bmcpublichealth.biomedcentral.com/track/pdf/10.1186/s12889-019-7213-3>
- Popova, S., Lange, S., Probst, C., Gmel, G., & Rehm, J. (2017). Estimation of national, regional, and global prevalence of alcohol use during pregnancy and fetal alcohol syndrome: A systematic review and meta-analysis. *The Lancet Global Health*, 5(3), 290–299.
- Popova, S., Lange, S., Shield, K., Mihic, A., Chudley, A., Mukherjee, R., Bekmuradov, D., & Rehm, J. (2016). Comorbidity of fetal alcohol spectrum disorder: a systematic review and meta-analysis. *The Lancet*, 387(10022), 978–987. Retrieved from: [https://doi.org/10.1016/S0140-6736\(15\)01345-8](https://doi.org/10.1016/S0140-6736(15)01345-8)
- Roizen, S., Peters, G. J. Y., Kok, G., Townend, D., Nijhuis, J., & Curfs, L. (2016). Worldwide prevalence of fetal alcohol spectrum disorders: A systematic literature review including meta analysis. *Alcoholism: Clinical and Experimental Research*, 40(1), 18–32.
- Rutman, D., Poole, N., Hume, S., Hubberstey, C., & Van Bibber, M. (2014). Building a framework for evaluation of Fetal Alcohol Spectrum Disorder prevention and support programs: A collaborative Canadian project. *International Journal of Alcohol and Drug Research*, 3(1), 81–89.
- Ryan, D.M., Bonnett, D.M., Gass, C.B. (2006). Sobering thoughts: town hall meetings on fetal alcohol spectrum disorders. *American Journal of Public Health*, 96(12), 2098–2101. doi: 10.2105/AJPH.2005.062729
- Stade, B., Ali, A., Bennett, D., Campbell, D., Johnston, M., Lens, C., ... Koren, G. (2008). The burden of prenatal exposure to alcohol: Revised measurement of cost. *Canadian journal of clinical pharmacology/Journal canadien de pharmacologie clinique*, 16(1), e91–102.
- Streissguth, A., Barr, H., Kogan, J., & Bookstein, F. (1996). Understanding the occurrence of secondary disabilities in clients with fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE). Final report to the Centers for Disease Control and Prevention (CDC). Seattle: University of Washington.
- Thanh, N. X., Jonsson, E., Salmon, A., & Sebastianski, M. (2014). Incidence and prevalence of fetal alcohol spectrum disorder by sex and age group in Alberta, Canada. *Journal of Popular Therapeutics and Clinical Pharmacology*, 21(3), 395–404.
- Wedding, D., Kohout, J., Mengel, M.B., Ohlemiller, M., Ulione, M., Cook, K., Rudeen, K., & Braddock, S. (2007). Psychologists' knowledge and attitudes about fetal alcohol syndrome, fetal alcohol spectrum disorders, and alcohol use during pregnancy. *Professional Psychology: Research and Practice*, 38(2), 208–213.
- Weyrauch, D., Schwartz, M., Hart, B., Klug, M. & Burd, L. (2017). Comorbid mental disorders in Fetal Alcohol Spectrum Disorders: A systematic review. *Journal of Developmental and Behavioral Pediatrics*, 38(4), 283–291.
- Yates, W. R., Cadoret, R. J., Troughton, E. P., Stewart, M., & Giunta, T. S. (1998). Effect of fetal alcohol exposure on adult symptoms of nicotine, alcohol, and drug dependence. *Alcoholism: Clinical and Experimental Research*, 22(4), 914–920.

*Footnote: There are many challenges to establishing a prevalence rate for FASD, including lack of consensus on how to recognise, screen or diagnose FAS, and developmental variations in the presentation of this condition. FASD may be generally underreported due to the stigma associated with this condition, or diagnostic overshadowing of other conditions. There are three methods used to estimate prevalence, each with strengths and limitations and resulting in variations in prevalence estimates. 1) Passive surveillance involves reviewing files that already exist (e.g. birth certificates, hospital charts) and recording how many have diagnosis documented. 2) Clinic-based that track maternal drinking and follow child developmental outcomes. 3) Active case ascertainment studies in which researchers actively examine participants in large geographical regions who may have FASD (Flannigan, Unsworth & Harding, 2018).

Acknowledgments

Dr. Sara McLean (BSc, Hons [Neuropsych]. M, Clin Psychology, PhD) is a registered psychologist who has been working in the area of child and adolescent mental health for over 20 years. She has a special interest in supporting the behavioural and mental health needs of children who have experienced early adversity, or who are living in out-of-home care.

Emerging Minds would like to thank Sue Miers for her input into early drafts of this resource.

Delivery partners:



RACGP

The National Workforce Centre for Child Mental Health is funded by the Australian Government Department of Health under the National Support for Child and Youth Mental Health Program

Visit our web hub today!

**Emerging
minds.
com.au**

