

An updated systematic review of the literature on fetal alcohol spectrum disorder and the criminal legal system

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ABSTRACT

People with fetal alcohol spectrum disorder (FASD) can experience a range of individual, social, and systemic challenges that may increase the likelihood of life adversity, including contact with the criminal legal system (CLS). The purpose of this article was to update a 2018 systematic review of literature on this intersection of FASD and the CLS. We searched ten academic databases for studies with people with FASD involved in the CLS, as well as caregivers and service providers who support them. A total of 54 studies were identified, published between April 2017 and March 2024, which is more than double what was present in 2018. Most of this research was conducted in Canada and Australia with individuals with FASD across the lifespan. These studies indicate growth in the literature on FASD prevalence in CLS settings ($n = 3$), CLS-related trajectories for people with FASD ($n = 15$), the needs and strengths of people with FASD involved in the CLS ($n = 9$), FASD-informed CLS responses ($n = 17$), and CLS professional knowledge, attitudes, and practices related to FASD ($n = 10$). Despite these advancements, there remain limitations in the evidence base such as a lack of specific and rigorous intervention studies; longitudinal research on outcomes and trajectories; generalizable prevalence estimates; the unique ways in which needs, risk, and protective factors may be experienced by people with FASD; how socio-cultural factors impact people with FASD and the research conducted in this area; as well as training opportunities for professionals supporting those with FASD in the CLS. These findings are integrated with results reported in the 2018 review to identify priority areas for future research.

1. Introduction

Fetal alcohol spectrum disorder (FASD) is a diagnostic term that refers to the neurodevelopmental impacts of prenatal alcohol exposure (PAE), including physical, cognitive, behavioural, and learning challenges (Cook et al., 2016). Many individuals with FASD face difficulties with daily living, including a greater risk of experiencing intersections with the criminal legal system (CLS; McLachlan, Flannigan, et al., 2020; Streissguth et al., 2004). Researchers suggest that the global prevalence of FASD is close to 0.8 %, but this rate varies widely from country to country (Lange et al., 2017), with recent estimates of 3–7 % in Canada and the United States (May et al., 2021; Popova et al., 2019). In recent years, researchers have made efforts to better understand the

experiences of individuals with FASD as they navigate the CLS (Flannigan, Pei, Stewart, & Johnson, 2018; Gilbert, Allely, Hickman, et al., 2023; Mukherjee et al., 2023), and to equip professionals working within legal systems to identify and appropriately respond to individuals with FASD (Heanue et al., 2022). The experiences of people with FASD in the CLS can differ widely from person to person, where presentations are often variable and can evolve over time. A clear understanding of the experiences and needs of people with FASD in the CLS is crucial to responding appropriately and effectively through practice and policy. However, there remain gaps in understanding and knowledge in this area which continue to impede evidence based decision-making and frontline activities (Flannigan, Pei, Stewart, & Johnson, 2018).

Much of the FASD research previously conducted has focused on

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deficits and challenges of people with FASD and their families. However, more recent literature clearly trends toward the recognition that individuals with FASD possess many strengths and abilities that can be leveraged to optimize overall wellness and support healthy outcomes (Flannigan, Wrath, et al., 2021; Kautz-Turnbull et al., 2023; Olson & Sparrow, 2021). There is also growing awareness that interpersonal and intergenerational trauma experiences are prevalent among people with FASD (Flannigan, Kapasi, et al., 2021), as well as within incarcerated populations (Wolff et al., 2014). Undoubtedly, the need for strengths-based and trauma-informed practices in the FASD field are mirrored in the CLS (Branson et al., 2017). As such, there is a need to continually update and synthesize information related to FASD and the CLS in an accessible manner that will continue to support advancement in policy and practice.

Information that is generated from systematic reviews can provide useful information to inform policy and guide practice, as they present comprehensive evidence in a way that is succinct and accessible (Chien & Khan, 2023). To this end, Flannigan, Pei, Stewart, and Johnson (2018) published a systematic review of the literature to synthesize the available evidence relevant to individuals with FASD or PAE who were involved in the CLS. At that time, 25 studies were identified, published between 1996 and 2017, spanning a range of research areas including FASD prevalence, screening, cost, profiles and perspectives of CLS-involved individuals with FASD; knowledge and awareness of FASD among CLS professionals; and the impacts of FASD in the courtroom. Based on this review, Flannigan, Pei, Stewart, and Johnson (2018) suggested that, although individuals with FASD appear to be over-represented in the CLS, accurate prevalence rates remained largely unknown due to barriers related to data collection and diagnosis. Furthermore, due to the varied presentations and life experiences of individuals with FASD, no specific profile of needs could be established. However, several factors were identified that may increase risk for offending among people with FASD, including trauma, FASD diagnosis later in life, cognitive difficulties, substance abuse and mental health challenges, lack of access to structured and FASD-informed supports, and service gaps (Currie et al., 2016; Pei et al., 2016; Stinson & Robbins, 2014; Streissguth et al., 1996; Tait et al., 2017). When introduced as neuroscientific evidence in court, information about FASD did not necessarily lead to clarity or more predictable outcomes. Rather, this evidence was often used in a way that created more questions about treatment and responsibility instead of providing better understanding (Chandler, 2015; Douds et al., 2013). Moreover, at the time of the 2018 review, there was general and emerging basic knowledge of FASD among criminal legal professionals. Despite this emerging knowledge, most professionals reported that they wanted more research, resources, and diagnostic information to better inform their practices.

Several subsequent literature reviews have been completed. The broadest review was conducted in 2022 focused on the relationship between individuals with FASD and the CLS, specifically considering brain impairment in FASD, Indigenous individuals with FASD, and CLS involvement of those with FASD (Sessa et al., 2022). Based on 20 published papers from 2004 to 2020, the authors concluded that more intervention for children with FASD was needed to better improve individual outcomes, to lessen economic burden, and to protect individuals from being victimized within the CLS. Gilbert et al.'s (2022) systematic review and narrative synthesis identified five studies related to vulnerabilities faced by individuals with FASD when involved in the CLS. They concluded that awareness about FASD within the CLS is low, potentially resulting in unintentional miscarriages of justice due to the presence of FASD being unrecognized, unsupported, or misattributed. Khalifa et al. (2022) also completed a systematic review focused on the neurocognitive profiles of people with FASD in the CLS. Although only nine cross-sectional studies met inclusion criteria, emerging evidence suggested higher rates of significant impairment across a greater number of cognitive domains, in contrast to comparison groups. Most recently, Jewell et al. (2024) completed a targeted realist review of evidence

related to FASD screening and identification in CLS contexts. They found limited evidence to support the psychometric properties of available FASD screening tools, though some instruments were reported to be promising, and the authors identified numerous potential indicators of FASD that may be considered in these contexts.

As literature evolves and new studies are completed, systematic reviews often warrant adjustment and updating to be most useful to decision makers (Cumpston & Chandler, 2022). Within the context of FASD and the CLS, recent systematic reviews have highlighted important research progress and produced valuable knowledge. However, these reviews have been focused on specific areas (i.e., FASD screening, neurocognitive profile), potentially leaving out updates that have emerged when a more inclusive framing is applied. Moreover, these reviews highlight that significant research gaps remain. For instance, there is still a clear lack of research on evidence-based criminal legal interventions for individuals with FASD. There is also limited information on offending profiles among those with FASD, and a lack of conceptualization regarding how the neurocognitive profiles identified in FASD can be best understood in relation to risk (Flannigan, Pei, Stewart, & Johnson, 2018; Khalifa et al., 2022). There is a continued need for evidence-based criminal legal responses that include perspectives of individuals with lived and living experience, as well as risk and protective factors that may influence whether or how individuals with FASD interact with the CLS (Sessa et al., 2022).

1.1. Rationale and objectives

Given recent advancements and growing interest in CLS involvement and FASD among researchers, practitioners, and policy makers, an updated review of the academic literature is warranted. Updating our understanding of the trends and gaps in the literature can help with prioritizing research directions, programs, policies, and training initiatives for individuals with FASD and CLS professionals that are rooted in empirical evidence. Using a broad umbrella approach also ensures that a wide range of studies are captured in up-to-date reviews of the field. As such, the objectives of the current paper were to provide an update to the Flannigan, Pei, Stewart, and Johnson (2018) review and: 1) identify newly peer-reviewed published research related to individuals with PAE and FASD who have experienced contact with the CLS; 2) synthesize evidence published since 2017 with findings of our previous review and describe recent advances in the field; and 3) identify current research gaps, and make recommendations for future work.

2. Material and methods

2.1. Eligibility criteria

Studies were included in this review if they: (a) involved individuals of any age and gender with confirmed PAE or a diagnosis of FASD and involvement (current or prior) in the CLS¹, OR individuals with experience supporting individuals with PAE/FASD involved in the CLS, such as caregivers or service providers; (b) were published in English² between April 2017 to March 2024; and (c) were original peer-reviewed studies that contributed new empirical evidence (qualitative or quantitative) to the FASD research field.

Studies were excluded if they involved individuals with PAE/FASD who engaged in troublesome or problematic behaviour not resulting in formal CLS involvement. Also excluded were studies related to the criminalization of alcohol during pregnancy, family law, and studies focused on child welfare/custody issues, which were deemed to be

¹ CLS involvement was defined broadly, at any stage from police contact to conviction and sentencing, and in any forensic and/or correctional context.

² Publications were limited to English to ensure consistency with our previous review (Flannigan, Pei, Stewart, & Johnson, 2018).

Table 1
Study characteristics.

Author(s) and year	Country	Sample/Population Characteristics	Age Range	Study Design and Method(s)
FASD Prevalence (n = 3)				
Bower et al. (2018)	Australia	99 youth aged 13 to 17 years (no mean age reported); 93 % male; 74 % Australian Aboriginal background	Youth	Cross-sectional study with interviews, clinical testing, and record review
McLachlan et al. (2019)	Canada	80 adults aged 18 to 40 years (mean = 29.4); 85 % male; 78 % Indigenous background	Adults	Case ascertainment study with interview, clinical testing, and record review
Mela et al. (2022)	Canada	26 adults aged 23 to 57 years (mean = 32.2); 77 % male; 77 % Indigenous background	Adults	Cross-sectional study with interviews, clinical testing, and record reviews
Criminal Legal System-Related Trajectories (n = 15)				
Criminal Outcomes and Associated Factors				
Burns et al. (2021)	Canada	665 clinical records of children and youth up to 17 years (mean age = 10.6) with FASD; 60 % male	Children and youth	Secondary analysis of data from diagnostic records
Tan et al. (2022)	Australia	211 clinical records of children and youth 2 to 21 years (mean = 11; 94 % under 18 years); 71.6 % male; 77 % Australian Aboriginal background	Children and youth	Retrospective file review and secondary analysis of data from diagnostic records
Brownell et al. (2019)	Canada	Children and youth aged 1 to 25 years (mean age not reported); 743 Indigenous participants with FASD (65 % male), 2229 Indigenous participants without FASD (66 % male), 315 non-Indigenous children with FASD (65 % male) matched on age, sex, and SES	Children and youth	Retrospective population-based cohort study of linked administrative data
Banerji and Shah (2017)	Canada	49 Indigenous children and youth <18 years (median age 9); 71 % male	Children and youth	Retrospective case review of diagnostic records
McLachlan, Flannigan, et al. (2020)	Canada	726 records from individuals aged 12 to 60 years (mean = 20) assessed for FASD; 43 % female	Youth and adults	Secondary analysis of data from diagnostic records
Flannigan, Cook, and Unsworth (2023)	Canada	2574 records from individuals aged 1 to 61 years (mean = 15.2) assessed for FASD; 41.7 % female	Lifespan	Secondary analysis of data from diagnostic records
Popova et al. (2021)	Canada	161 records from individuals aged 3 to 52 years (mean = 15.7) assessed for FASD; 53.4 % male	Lifespan	Retrospective chart review and cross-sectional analysis of diagnostic records
Lynch et al. (2017)	US	236 young adults (mean age = 23 years); three groups with PAE (48 with physical effects [48 % male], 37 with cognitive effects [30 % male], 38 with no physical or cognitive effects [37 % male]) and two comparison groups with no PAE (59 SES-matched [39 % male], 54 demographically matched and enrolled in special education [54 % male]); 96 % African American background	Adults	Prospective outcomes study
Rangmar et al. (2017)	Sweden	20 adults aged 18 to 41 years (mean = 30) with FAS, and age- and gender-matched control group; 65 % female	Adults	Cohort study with interviews and rating scales
Criminogenic Risk and Offense Patterns				
Hafekost et al. (2017)	Australia	10,211 mothers with AUD and 47,688 without (age not reported); 18,740 "exposed" children (48.8 % female) and 48,543 comparison children (48.9 % female), all aged 10 to 17 years	Children	Population cohort record linkage study
Tan et al. (2023)	Australia	100 youth with FASD and 500 youth without matched on sex (82 % male), cultural background (88 % Australian Aboriginal), and age at most recent offense; age range 10 to 24 years (mean = 15.6)	Youth	Retrospective cohort design with review of diagnostic and police records
Gilbert, Allely, Hickman, et al. (2023)	UK	10 individuals with FASD aged 12 to 46 years (mean = 20.1); 9 male, 1 female	Youth and adult	Qualitative semi-structured interviews
Richer and Watson (2018)	Canada	8 caregivers of 10 adults with PAE aged 19 to 42 years (mean = 30); sex/gender not reported	Adults	Qualitative semi-structured interviews
Reil et al. (2022)	New Zealand	33 child welfare and judicial professionals, and 5 family members of children with a history of offending	Children and youth	Qualitative semi-structured interviews
McLachlan et al. (2018)	Canada	100 youth aged 12 to 23 years (mean = 17.5), 50 with FASD and 50 without; 81 % male; 70 % Indigenous background	Youth	Prospective study with 1-year follow-up including record review, testing, and interviews
Psychosocial Needs and Strengths (n = 9)				
Flannigan et al. (2019)	Canada	81 youth aged 12 to 20 years (mean = 16), 38 with FASD and 43 without; 24 % female	Youth	Retrospective file review of clinical data
Russell et al. (2023)	Australia	64 youth with FASD aged 10 to 17 years (mean = 14.7); 81.2 % male	Youth	Retrospective cross-sectional descriptive study
Kerry et al. (2024)	Australia	85 young people (mean = 15.7); 46 with PAE and 39 in a no-PAE comparison group; 92 % male	Youth	Cross-sectional study with interviews, clinical testing, and record reviews
Kippin et al. (2018)	Australia	98 young people aged 14 to 18 years (mean = 16.2); 38 (37 %) diagnosed with FASD; 93 % male	Youth	Cross-sectional study with interviews, clinical testing, and record reviews
Kippin et al. (2022)	Australia	95 young people aged 14 to 18 years (mean = 16.2); 45 (47 %) with confirmed PAE; 91 % male	Youth	Cross-sectional study with interviews, clinical testing, and record reviews
Mela et al. (2020)	Canada	45 adults aged 19 to 66 years (mean = 42), 12 with FASD and 33 without; 82.2 % male	Adults	Cross-sectional study with clinical testing
Flannigan et al. (2022)	Canada	16 adults with FASD aged 20 to 42 years (mean = 27); 75 % male	Adults	Community-based study including clinical record review and interviews
Tan et al. (2018)	New Zealand	79 youth aged 13 to 17 years (mean = 15.6), 3 (4 %) with FASD; 89 % male	Youth	Cross-sectional observational study including record reviews
Gilbert, Allely, Gudjonsson, et al. (2023)	UK	52 youth aged 11 to 17 years, 27 with FASD (mean age = 12.7; 52 % female) and 25 without (mean age = 12.8; 56 % female)	Youth	Case-control study design
FASD-Informed Criminal Legal System Responses (n = 17)				
Screening & Identification				
McLachlan, Amlung, et al. (2020)	Canada	Charts from 151 adults (mean age 39 years); 80 % male; follow-up interviews with subset of 41	Adults	Quasi-cohort, cross-sectional design with chart review and interviews

(continued on next page)

Table 1 (continued)

Author(s) and year	Country	Sample/Population Characteristics	Age Range	Study Design and Method(s)
Mullally et al. (2020)	Canada	80 adults aged 19 to 40 years (mean = 29), 25 with confirmed/possible FASD and 55 without FASD; 85 % male	Adults	Subset of data from study with interviews, clinical testing, record review
Assessment & Diagnosis				
Freeman et al. (2019)	Australia	88 mothers or relatives of youth aged 13 to 17 years (mean = 16; 92 % male) in detention who participated in an FASD prevalence study	Youth	Interviewer-administered questionnaire and document review
Hamilton, Reibel, Maslen, et al. (2020)	Australia	38 youth aged 13 to 17 years (mean = 15.4); 92 % male; 9 diagnosed with FASD	Youth	Qualitative study with social yarning and research topic yarning
Hamilton, Maslen, Best, et al. (2020)	Australia	38 youth aged 13 to 17 years (mean = 15.4); 92 % male; 9 diagnosed with FASD	Youth	Qualitative study with social yarning and research topic yarning
Hamilton, Maslen, Watkins, et al. (2020)	Australia	17 caregivers of youth diagnosed with FASD	Youth	Qualitative study with yarning and vignettes
Hamilton et al. (2019)	Australia	46 non-custodial youth detention staff	Youth	Case study with semi-structured interviews and focus groups
Intervention				
Longstaffe et al. (2018)	Canada	1048 youth aged 12 to 18 years (mean not reported), with and without FASD; sex/gender not reported	Youth	Descriptive paper with some pilot program evaluation
Brintnell et al. (2019)	Canada	49 adult aged 19 to 50 years (mean = 29.6) with possible FASD; all male	Adults	Prospective intervention study with 6-month follow-up including record review, questionnaires, and interviews
Flannigan, Pei, Rasmussen, et al. (2018)	Canada	18 service providers supporting adults assessed for FASD in an Indigenous community	Adults	Community-based qualitative study with focus groups
Flannigan, Rollans, et al. (2023)	Canada	12 Indigenous adults with FASD aged 21 to 42 years (mean = 27.7); 67 % male	Adults	Community-based qualitative study with oral surveys and interviews
Courtroom Impacts				
Brown et al. (2022)	US	4 habeas corpus cases; age not specified; all male	Adults	Multiple-case design with qualitative comparative analysis
Hashmi et al. (2021)	Canada	61 cases of people >18 years with intellectual disabilities; 1.6 % female; 44 % Indigenous background	Adults	Descriptive analysis of criminal judgments in court
Mullally et al. (2023)	Canada	350 criminal cases mentioning evidence of PAE/FASD; specific age not reported (87 % adult); 92.3 % male; 77 % Indigenous background	Youth and adult	Retrospective review and content analysis of trial and appellate level decisions for criminal cases
Systems-Level				
Blagg et al., 2017, Blagg & Tulich, 2018	Australia	122 professionals from policing, health, CLS, education, and Indigenous and youth services	Youth	Community-based action research with comparative legal analysis, literature review, interviews, focus groups, and round tables
Fitzpatrick et al. (2020)	Australia	35 organizations with vested interest in FASD assessment and support	Youth	Community participatory action research with environmental scan, interviews, and advisement from community reference group
Professional Knowledge, Attitudes, Practice, and Training Needs (n = 10)				
Gibbs (2022)	New Zealand	11 youth CLS practitioners (6 female, 5 male)	Youth	Qualitative semi-structured interviews
Chu et al. (2024)	New Zealand	56 CLS professionals; 80.4 % female; 91 % reported to be lawyers	Unspecified	Cross sectional online survey
Passmore et al. (2018)	Australia	112 custodial officers; 65.2 % male	Youth	Cross sectional survey (online or paper)
Heanue et al. (2022)	Australia	81 CLS professionals; 15 % male	Youth	Cross sectional online survey
Pedruzzi et al. (2021)	Australia	29 legal, health, employment and welfare, and disability support professionals from 14 organizations	Youth	Qualitative semi-structured interviews
Passmore et al. (2021)	Australia	117 staff (most aged 30 to 49 years) working with youth in detention settings, 109 of whom completed pre-/post-surveys; 64 % male	Youth	Description of a training intervention, using the Template for Intervention Description and Replication checklist
Brown et al. (2017)	US	135 public defenders (46.7 % male; age not reported)	Unspecified	Cross sectional online survey
Brown et al. (2019)	US	33 professionals (mean age 47 years, range not reported) who provide sexual offending treatment; 65.6 % female	Youth and adults	Cross sectional online survey
McLachlan et al. (2021)	Canada	81 forensic mental health clinicians (mean age 47 years), primarily psychologists; 56 % female	Youth and adults	Cross sectional online survey
Dunbar Winsor (2021)	Canada	7 CLS and health care professionals	Lifespan	Qualitative semi-structured interviews

Note. AUD = alcohol use disorder; CLS = criminal legal system; FAS = fetal alcohol syndrome; FASD = fetal alcohol spectrum disorder; PAE = prenatal alcohol exposure; UK = United Kingdom, US = United States.

outside the scope of the *criminal* legal context. Review articles, evaluation reports, conference proceedings, legal reviews, case law, grey literature, dissertations and theses, book reviews, commentaries, and editorials were also excluded in alignment with our previous review.

2.2. Information sources and search strategy

A total of 10 databases were searched for relevant records: Cochrane Database of Systematic Reviews, Criminal Justice Abstracts, Cumulative

Index to Nursing and Allied Health Literature, Education Resources Information Center, Law Journal Library, PsycINFO, PubMed, Social Services Abstracts, Sociological Abstracts, and Web of Science. Reference lists of relevant articles were also checked for additional information sources not identified in the structured database search. Our initial search was conducted in September 2022, and then re-run in April 2023 and March 2024 to ensure all new articles were captured. Search terms included word related to both FASD and the criminal legal system (see

Supplemental Table for full list).

Search Terms (including truncations)	
"Fetal Alcohol Spectrum Disorder" OR "FASD" OR "Foetal Alcohol Spectrum Disorder" OR "Fetal Alcohol Syndrome" OR "Foetal Alcohol Syndrome" OR "FAS" OR "prenatal alcohol exposure" OR "PAE" OR "alcohol related neurodevelopmental disorder" OR "ARND" OR "alcohol related birth defect" OR "alcohol related brain damage" OR "maternal alcohol consumption" OR "partial fetal alcohol syndrome" OR "sentinel facial features" OR "fetal alcohol effect" OR prenatal exposure to alcohol"	AND "justice" OR "crime" OR "offend" OR "victim" OR "witness" OR "legal" OR "law" OR "police" OR "judicial" OR "court" OR "sentence" OR "mitigating" OR "correction" OR "forensic" OR "detention" OR "prison" OR "inmate" OR "convict" OR "felon" OR "incarcerat" OR "probation" OR "parole" OR "remand" OR "bail" OR "penal"

2.3. Selection process

All articles identified through database searches were uploaded to Covidence (www.covidence.org), with duplicates automatically removed. At both title/abstract and full text review stages, three researchers (KF, PB, JP) independently reviewed records and removed those that were unrelated to our research purpose or that did not meet inclusion criteria. At both stages, a second reviewer (KH) then independently screened 20 % of titles to verify exclusions as per the Quality Control Tool for Screening Titles and Abstracts by Second Reviewer (QCTSTAR) approach (Nevis et al., 2015). Interrater agreement was adequate at the title/abstract stage (96.7 %, Cohen's Kappa = 0.52, $p < .001$, for the initial search and 91.7 %, Cohen's Kappa = 0.45, $p < .001$, for the final search) and full-text stage (87.5 %, Cohen's Kappa = 0.753, $p < .001$, for the initial search and 100 % for the final search). Disagreements about eligibility were discussed between all reviewers until agreement was reached. Reasons for exclusion were recorded at both stages of screening.

2.4. Data collection and items

Once a final list of full text articles was identified, data was extracted systematically and independently by four researchers (KF, PB, JP, KH) and 20 % of extractions were checked for accuracy by an additional author (KF and PB checked each other's initial extractions; JP and KH checked each other's initial extractions). A structured form was used to extract study/participant details (Table 1) and key findings related to our research objectives (Table 2). Study variables included title, year, full citation, location, study purpose, setting, design/approach, methodology, analytic procedures, and theoretical framework; participant variables included information related to FASD diagnosis (confirmed, possible, diagnostic system used), presence of control or comparison group, sample size, participant demographics (age, gender, ethnicity), and recruitment strategy.

2.5. Risk of bias

No formal measures for risk of bias or confidence were used, given the diversity of studies we examined in terms of their methods, findings, and scope. Moreover, no risk of bias assessment was conducted in the 2018 review because of the exploratory nature of the research, thus we maintained the same method in the current review for consistency. Consideration for the unique and valued contributions of all research methodologies were incorporated through inclusion of a wide range of research designs and approaches such as community-based research, population-based studies, qualitative interviewing, and clinical research.

2.6. Synthesis

As in Flannigan, Pei, Stewart, and Johnson (2018), data synthesis for this study was largely descriptive and conceptual. Extracted data was used to develop two tables, the first to outline study characteristics, and the second to describe contributions and organize studies into conceptual categories. Studies were first organized aligning with the 2018 review in broad categories based on their stated research purpose and type of evidence offered.³ Then, as synthesis progressed and novel evidence was integrated across different areas, studies were re-categorized and adjusted iteratively and collaboratively in discussion between four authors (KF, PB, JP, KH) based on substantive conceptual updates in the literature. In the discussion section below, we synthesize this new evidence and integrate it with the key findings from 2018 to identify recent advances, emerging ideas, and remaining gaps in the literature.

3. Results

3.1. Study selection

From our initial database searches, 5843 records were imported into Covidence for screening and 1313 duplicates were removed. Of the remaining studies, 189 articles met the preliminary inclusion criteria at the title/abstract stage and were moved to full text screening. Of these articles reviewed at full-text, 51 were included, and three papers were added manually for a final total of 54 (see Fig. 1).

Notably, several studies ($n = 4$) related to ethics and the stigma surrounding FASD and CLS involvement were considered at the full text stage and ultimately excluded. Although these studies were relevant and contributed new evidence (i.e., portrayals of FASD in the media, Aspler et al., 2019), they were ultimately determined not to meet inclusion criteria because they did not directly involve people with FASD and/or those who support them.

3.2. Study characteristics

Fifty-four articles were included in the final review, most of which were conducted in Canada ($n = 23$, 42.6 %) and Australia ($n = 20$, 37.0 %). Four (7.4 %) were from New Zealand, four (7.4 %) were from the United States, and three (5.6 %) were from Europe. Of note, 11 articles were all part of a larger project on FASD prevalence in an Australian youth detention centre (Bower et al., 2018).

Articles were organized into five broad categories: 1) **FASD prevalence** in CLS settings ($n = 3$, 5.6 %); 2) **CLS-related trajectories** ($n = 15$, 27.8 %), including i) criminal outcomes and associated factors, and ii) criminogenic risk and offense patterns; 3) **psychosocial needs and strengths** of CLS-involved individuals with FASD ($n = 9$, 16.7 %); 4) **FASD-informed responses** for identifying and supporting individuals with FASD in the CLS ($n = 17$, 31.4 %), including i) FASD screening, ii) assessment/diagnosis, iii) intervention, iv) courtroom impacts, and v) systems-level initiatives; and 5) **professional knowledge, attitudes, practice, and training needs** related to FASD in CLS contexts ($n = 10$, 18.5 %).

3.3. Study findings

3.3.1. FASD prevalence in CLS settings

Three studies were identified that contribute evidence related to FASD prevalence in CLS contexts, including one conducted with youth and two with adults. The first study was completed in a youth detention center in Western Australia, where 99 participants completed multi-

³ Some studies provided evidence in more than one area; these articles were organized by their primary research purpose, and additional findings are reported in relevant sections.

disciplinary assessment and 36.3 % were diagnosed with FASD (Bower et al., 2018). Another study involved active case ascertainment in a northern Canadian territory with 80 adults under legal supervision orders, of whom 17.5 % were diagnosed with FASD (McLachlan et al., 2019). Last, 26 adults in a Canadian forensic mental health hospital were assessed to determine rates of FASD and other co-occurring needs, and 46 % of participants were diagnosed with FASD; many also experienced co-occurring substance use, ADHD, and depression, with ADHD being more common for adults with FASD (Mela et al., 2022).

3.3.2. CLS-related trajectories

Evidence related to CLS trajectories was presented in 15 identified studies, specifically with respect to i) *criminal outcomes and associated factors*, and ii) *offending risk and patterns*, among individuals with FASD. Most ($n = 8$, 53.3 %) of these studies were conducted with children and/or youth, three (20.0 %) were with adults, and four (26.7 %) were with individuals across age groups.

3.3.2.1. Criminal outcomes and associated factors. In nine studies, general outcomes of individuals with FASD were explored, including findings specific to CLS contact and associated factors. In one Canadian study of 665 children and youth with FASD, participants who lived in foster or group care and those with biological parents were found to have higher rates of problems with offending compared to those who lived with adoptive or other family members, and rates of these difficulties were higher among adolescents than children (Burns et al., 2021). Next, in an Australian study of adverse childhood experiences (ACEs), stressors, and outcomes of 211 young people diagnosed with FASD, 40 % of study participants had contact with the CLS, and rates of criminal legal involvement were positively correlated with total ACE scores (especially exposure to domestic violence; Tan et al., 2022).

Brownell et al. (2019) investigated various experiences of Indigenous children and youth with ($n = 743$) and without ($n = 2229$) FASD, and non-Indigenous children with FASD ($n = 315$) in Canada. Indigenous children and youth with FASD were more likely than non-Indigenous children/youth with FASD and Indigenous children without FASD to experience CLS involvement and to be charged with a crime. In another Canadian study at an urban Indigenous community health center with 49 children and youth assessed and diagnosed with FASD, 12 % of participants had been involved in the CLS (Banerji & Shah, 2017).

In an examination of difficulties in daily living among Canadian adolescents, transition-aged youth, and adults with PAE ($n = 726$), 30 % of participants were reported to have had experienced legal problems through offending and 3 % had a history of incarceration (McLachlan, Flannigan, et al., 2020). Living situation, gender, age, and neurodevelopmental impairment were all linked to criminal legal problems in this study. In another study with 2574 individuals assessed for FASD from the same Canadian database, males experienced higher rates of offending and incarceration, and females experienced higher rates of criminal victimization and custody-related issues (Flannigan, Cook, & Unsworth, 2023). Through a chart review at an urban Canadian FASD clinic with a specialized CLS referral stream, 29.8 % of 161 participants were found to be involved in the CLS (Popova et al., 2021). CLS involvement was associated with substance use, but not with child welfare involvement or gender.

In a 2017 follow-up study with 236 young adults with and without PAE in the US, participants with PAE who did *not* have cognitive or physical symptoms experienced more criminal legal concerns than all other groups (Lynch et al., 2017). The authors suggested that because of relatively higher IQ scores, the exposed but unaffected group may be more vulnerable to environmental influence and less likely to be recognized as requiring protective supports.

Last, in Sweden, self-reports of physical and mental health, substance use, and criminality among 20 adults with fetal alcohol syndrome (FAS) were compared to an age- and gender-matched group (Rangmar et al.,

2017). Although higher rates of psychiatric concerns were found in those with FAS, there were no significant group differences in criminal convictions or victimization.

3.3.2.2. Criminogenic risk and offense patterns. In an Australian population cohort study, children 10 years and older whose mothers were diagnosed with an alcohol use disorder ($n = 18,740$) were reported to have significantly higher rates of later CLS contact than a comparison group of children ($n = 48,543$), even after controlling for a range of demographic factors (Hafekost et al., 2017). Within this cohort, only a very small proportion of children (0.12 %) were identified as having a documented FASD diagnosis, which was not a significant predictor of CLS contact. The authors suggested that risk for CLS contact in their cohort was likely related to behavioural and cognitive challenges associated with “alcohol exposure during development,” but acknowledged they could not confirm when or for whom exposure to alcohol occurred during pregnancy (p. 1456). In another Australian study of offense characteristics and trends among youth with ($n = 100$) and without ($n = 500$) FASD (Tan et al., 2023), offending in the FASD group were based on *charges*, whereas offending characteristics in the matched control group were based on *convictions*. No significant differences were found in the total number of *charges* for youth with FASD compared to the number of *convictions* for youth in the control group. However, differences were reported in offense *types*, with offenses of youth with FASD more likely to involve dangerous or negligent acts, breaches, property damage, and disorderly behaviour, and offenses of youth without FASD more likely to involve fraud and burglary/theft. Given the methodological differences in the way offenses were quantified for each group (i. e., charges vs. convictions) the authors cautioned that offending may have been overestimated in the FASD group as “it was not possible to establish the proportion of charges in this sample that lead to a conviction” (Tan et al., 2023, p. 15).

In three qualitative studies, researchers explored perspectives about factors that may predispose individuals with FASD to encounter the CLS. In a study of 10 adults with FASD in the United Kingdom (UK), participants reported their CLS encounters were “fueled” by personality and individual characteristics such as impulsivity and suggestibility, as well as societal factors such as exploitation, interactions with police, and limited FASD knowledge among CLS professionals (Gilbert, Allely, Hickman, et al., 2023). Participants were also described as having self-awareness related to their strengths, needs, and actions (Gilbert, Allely, Hickman, et al., 2023). Next, through interviews with eight caregivers of 10 adults with FASD in Canada four themes associated with risk for criminality were identified, including challenges with behavioural and emotional regulation, negative peer group influences, substance use, and multiple transitions in living situations (Richer & Watson, 2018). Protective factors were also identified, including environmental structure and supervision, strengths-based educational and employment opportunities, access to resources for the individuals with PAE and their family members, and exposure to positive influences. Similarly, interviews with five caregivers and 33 professionals from New Zealand supporting children who offend (some of whom have FASD) revealed that the hardships and harm experienced by children and families contribute to child welfare involvement and subsequent offending behaviour, and that systems-level failures and socio-structural problems perpetuate these behaviours (Reil et al., 2022). Challenges stemming from neurocognitive differences such as FASD were believed to further exacerbate these difficulties and needs.

Finally, in a Canadian study of risk assessment with CLS-involved youth with ($n = 50$) and without ($n = 50$) FASD, youth with FASD received their first official charges earlier, had a higher number of previous charges, and were more likely to recidivate during the one-year follow-up period than youth without FASD (McLachlan et al., 2018). Both risk assessment tools examined in this study yielded higher risk scores and lower protective scores for youth with FASD versus the

Table 2
Research purposes and key findings.

Study	Research Purpose	Context	Key Findings
FASD Prevalence (n = 3)			
Bower et al. (2018)	Estimate the prevalence of FASD among youth in Australia sentenced to detention	Youth sentenced to detention underwent multidisciplinary FASD assessments	<ul style="list-style-type: none"> - 36.3 % of youth were diagnosed with FASD (95 % CI 27 % to 46 %) - Almost half (47 %) of all youth had confirmed PAE - Most (89 %) youth had at least one domain of severe neurodevelopmental impairment, most commonly academic achievement, attention, and executive functioning, regardless of FASD diagnosis - Prevalence was suggested to be an underestimate - Most (93.7 %) participants had at least one domain of severe neurodevelopmental impairment - 25 % of participants had confirmed PAE - 14 people were diagnosed with FASD at a prevalence estimate of 17.5 % (95 % CI 9.2 % to 25.8 %) - An additional 11 (13.8 %) were deferred for later assessment because they met diagnostic criteria for impairment, but PAE could not be confirmed
McLachlan et al. (2019)	Estimate the prevalence of FASD among CLS-involved adults in a northern Canadian correctional jurisdiction	Adults under legal supervision orders underwent multidisciplinary FASD assessments	<ul style="list-style-type: none"> - 12 participants (46 %) were diagnosed with FASD - 11 more participants (42.4 %) had complex needs and were impaired on 3+ neurodevelopmental domains but did not meet full diagnostic criteria - The most common neurodevelopmental impairments were in cognition, memory, and academic achievement - Rates of co-occurring substance use (77 %), ADHD (41 %), and depression (27 %) were high for all participants; ADHD was more common in those with FASD (70 %) than those without (17 %); anxiety was more common in those without FASD (8 %) than those with (0 %)
Mela et al. (2022)	Identify the prevalence of FASD among CLS-involved adults being released from a forensic mental health hospital and describe neurocognitive profiles and co-occurring conditions to inform intervention and support post-release transition to the community	Adults in a secure forensic mental health hospital sentenced to two or more years underwent comprehensive multidisciplinary FASD assessments	<ul style="list-style-type: none"> - 11 more participants (42.4 %) had complex needs and were impaired on 3+ neurodevelopmental domains but did not meet full diagnostic criteria - The most common neurodevelopmental impairments were in cognition, memory, and academic achievement - Rates of co-occurring substance use (77 %), ADHD (41 %), and depression (27 %) were high for all participants; ADHD was more common in those with FASD (70 %) than those without (17 %); anxiety was more common in those without FASD (8 %) than those with (0 %)
Criminal Legal System-Related Trajectories (n = 15)			
Criminal Outcomes and Associated Factors			
Burns et al. (2021)	Explore differences in outcomes between youth and adolescents with FASD living in child welfare (CW) care versus those living with biological parent(s), adoptive, or other family members	Data was analyzed from Canada's National FASD Database, a clinical dataset of clients who complete FASD assessments across the country	<ul style="list-style-type: none"> - Participants living in CW and those living with their biological parent(s) had comparable rates of problems with offending (13.3 % and 12.7 %), victimization (4.5 % and 2.6 %), and general difficulties with the law (11 % and 9.4 %) - Participants living in CW were significantly more likely than those living with adoptive/other family members to have problems with offending (13.3 % vs 5.7 %) and general difficulties with the law (11 % vs 4.9 %) but not problems with victimization (4.3 % vs 1.4 %) - Differences in CLS-related outcomes were especially apparent for adolescents 12 to 17 years old: participants in CW had higher rates of problems with offending (32 %), victimization (11.5 %), and general legal difficulties (25.9 %) compared to those living with adoptive/other family members (12.1 %, 2.6 %, 10.1 %, respectively) - Rates of CW involvement (70 %) and CLS involvement (40 %) were high for the whole group of participants - Participants involved in CW and the CLS had significantly higher ACE scores than those not involved - After controlling for multiple comparisons, the only category of ACEs that remained significantly associated with CLS involvement among participants 10 years and older^a was exposure to domestic violence
Tan et al. (2022)	Explore differences in ACEs and stressors among children and youth assessed for FASD, and associations between ACEs and child welfare and CLS outcomes, and co-occurring disorders	Participants were assessed for FASD at a multidisciplinary assessment clinic in Western Australia	<ul style="list-style-type: none"> - Health service use was comparable across groups, but significant differences were found in social, educational, and CLS related outcomes - Among children and youth with FASD, Indigenous participants were more likely than non-Indigenous participants to have any form of CLS contact (as an accused, victim, or witness) and to have criminal charges (40 % vs 29 %, and 28 % vs 20 %, respectively) - Among Indigenous children and youth, participants with FASD were more likely than
Brownell et al. (2019)	Examine health and social service use, CLS, and education outcomes among First Nations children and youth with FASD	Review and linkage of data from FASD assessments with hospital and medical records, income assistance and child welfare data, CLS records, and school and special education records	<ul style="list-style-type: none"> - Health service use was comparable across groups, but significant differences were found in social, educational, and CLS related outcomes - Among children and youth with FASD, Indigenous participants were more likely than non-Indigenous participants to have any form of CLS contact (as an accused, victim, or witness) and to have criminal charges (40 % vs 29 %, and 28 % vs 20 %, respectively) - Among Indigenous children and youth, participants with FASD were more likely than

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
Banerji and Shah (2017)	Characterize the epidemiology of Indigenous children assessed for FASD at an urban health clinic and discuss diagnostic and resource challenges	Cases were reviewed at a community health center for children and youth assessed and diagnosed with FASD	<ul style="list-style-type: none"> - participants without FASD to have any form of CLS contact and to have criminal charges (40 % vs 33 %, and 28 % vs 19 %, respectively) - 49 children/youth (61 %) assessed were diagnosed with FASD - Among children and youth with FASD, 12 % were reported to be involved with the CLS at the time of assessment
McLachlan, Flannigan, et al. (2020)	Profile difficulties in daily living among adolescents, transition-aged youth, and adults with PAE assessed for FASD, and explore difficulty profiles based on possible risk factors for those diagnosed with FASD	Data was analyzed from Canada's National FASD Database, a clinical dataset of clients who complete FASD assessments across the country	<ul style="list-style-type: none"> - 30 % of participants reportedly experienced legal problems with offending, 4 % experienced problems with victimization; 3 % had history of incarceration - Age did <i>not</i> predict problems with victimization or offending; fewer adolescents (2 %) were incarcerated compared to adults (10 %) but not transition-aged youth (5 %) - More participants living in CW or independently (30 %) than those living with parents or adoptive families (12 %) had problems with offending (3.9× odds) - More males (39 %) than females (21 %) had problems with offending (2.8×), and more females (7 %) than males (2 %) were incarcerated (0.3×) - Analyzed by age group, female adolescents were more likely than males to have problems with victimization (8 % vs 4 %), and male transition aged youth and adults were more likely to have problems with offending than females (47 % vs 12 %, and 34 % vs 14 %, respectively) - Participants with postnatal trauma were more likely to have problems with victimization (8 %) than those without history of trauma (2 %) - Neurodevelopmental impairment increased odds of legal problems with victimization (1.6× increase per domain of impairment), and impaired adaptive/social functioning significantly predicted problems with offending
Flannigan, Cook, and Unsworth (2023)	Investigate sex-based differences in clinical presentation and experiences among individuals assessed for FASD across the lifespan	Data was analyzed from Canada's National FASD Database, a clinical dataset of clients who complete FASD assessments across the country	<ul style="list-style-type: none"> - CLS-related outcomes differed for males and females, with males experiencing significantly higher rates of offending and incarceration (OR = 2.38) and females experiencing higher rates of victimization and custody-related issues (OR = 1.61) - By age group, transition-aged youth (17 to 24 years) had the greatest sex-based difference in CLS outcomes, with 49 % of males and 16 % of females experiencing problems with offending or incarceration
Popova et al. (2021)	Characterize individuals assessed for FASD in British Columbia, Canada; examine whether diagnostic outcomes relate to child welfare or CLS involvement; investigate associations between child welfare involvement, CLS interaction, and mental health	Reports were reviewed from individuals assessed and determined to have, or at be at risk for, FASD at an urban FASD clinic	<ul style="list-style-type: none"> - 30 % of participants were reported to have CLS involvement and 75 % had previous or current CW involvement - Diagnostic categories were not associated with CLS outcomes - Rates of CLS involvement varied by age: no participant <10 years old, 47 % of participants aged 10–19 years, and 22 % of participants +20 years - Participants with reported CLS involvement had significantly higher rates of past substance use compared to those without (66.7 % vs 29.9 %) - More participants with reported CLS involvement than those without were referred for assessment due to behavioural issues (50 % vs 22.4 %) - Among participants 10 years and older, there was no association between child welfare involvement and CLS involvement
Lynch et al. (2017)	Examine the occurrence of self-reported mental health problems, substance use, and difficulties with the legal system among adults with PAE during their transition to adulthood	Young adults enrolled in a longitudinal study of the impacts of PAE on development among children born at a low SES urban hospital in the US serving primarily African American patients	<ul style="list-style-type: none"> - Adults with PAE showed more problems with mental health, substance use, and CLS involvement than participants from the SES-matched control group - Participants with PAE who had cognitive effects were more likely to experience challenges across areas compared to those with PAE who had physical effects - Participants with PAE and <i>no</i> cognitive or physical effects had the highest rates in most areas of CLS

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
			<ul style="list-style-type: none"> involvement, including number of arrests and charges, convictions, and total time incarcerated - Across the whole group, 43 % reported ever having been incarcerated (49 % PAE with physical effects, 37 % PAE with cognitive effects, 45 % PAE no effects, 52 % special education group, 31 % control group) - Of participants who had a history of being incarcerated, the average length of time of incarceration was 6.3 months (range 0.1 to 20.4). - Many participants were on probation or parole at the time of the study (13 % PAE with physical effects, 14 % PAE with cognitive effects, 21 % PAE no effects, 13 % special education group, 12 % control group), however were no significant group differences in these areas - No group differences were found in physical health or substance use (neither group reported substance use) but adults with FAS reported higher rates of psychiatric concerns; no group differences were found in terms of being taken into custody or being charged (10 % FAS vs 5 % no-FAS), or criminal victimization (70 % FAS vs 65 % no-FAS)
Rangmar et al. (2017)	Investigate self-reported physical and psychiatric challenges, substance use, and criminal behaviour among adults with FAS	Adults with FAS from a cohort diagnosed in childhood	
Criminogenic Risk and Offense Patterns			
Hafekost et al. (2017)	Investigate whether children whose mothers have an alcohol use disorder diagnosis have increased risk of CLS contact compared to other children, and if so, whether the association remains after controlling for sociodemographic and risk factors	Review of data from midwifery, hospital morbidity, mental health, drug and alcohol office, corrective services, literacy and numeracy, intellectual disability, developmental anomalies registry, and child protection databases	<ul style="list-style-type: none"> - CLS contact was significantly higher in the exposed cohort (16.1 %) versus the comparison cohort (7.7 %) - This association remained significant after controlling for ethnicity, marital status and age at birth, SES, parity, maternal or child mental health record, child gender, and contact with child protection - Only 78 children (0.12 %) had a confirmed FASD diagnosis, which was not a significant predictor of CLS contact - CLS contact was more likely among male and Indigenous children versus female and non-Indigenous children - Lower numeracy and literacy were also associated with CLS contact
Tan et al. (2023)	Compare offense characteristics among youth with FASD to demographically matched controls	Clinical records were reviewed from youth assessed for FASD who had CLS involvement in the previous year; comparison youth were matched from police records	<ul style="list-style-type: none"> - Offending characteristics in the FASD group were based on <i>charges</i>, whereas offending characteristics in the comparison group were based on <i>convictions</i>; no significant differences were found between groups (10 charges for the FASD group, 9 convictions for the comparison group) - Theft was the most common offense type in both groups (59 % FASD, 59 % comparison), and homicide was least common (3 % FASD, 0.2 % comparison) - Dangerous/negligent acts, offenses against CLS procedures, property damage, and public order offenses were more common in youth with FASD - Fraud, burglary, and theft were more common in the comparison group
Gilbert, Allely, Hickman, et al. (2023)	Explore perspectives of individuals with FASD about factors they perceive predispose them to contact with the CLS, and about their experience with investigative interviews	Participants were recruited (from the UK, US, and NZ) for a larger study of individual and caregiver experiences, as well as over social media	<p>Researchers identified themes based on participants discussions of:</p> <ul style="list-style-type: none"> - Personality characteristics or individual factors that trigger CLS encounters, such as impulsivity, behavioural challenges, and vulnerability to suggestion - Societal level factors that 'fueled' encounters, such as CLS service provider approaches, lack of FASD knowledge among CLS professionals, and exploitation by friends of acquaintances (however, some reported that not all interactions with police have been bad, as "some officers are nice") - Awareness of themselves and their actions, sometimes acknowledging strengths and challenges, feeling apologetic and remorseful for their actions, and having determination to change
Richer and Watson (2018)	Better understand factors that increase or decrease criminality among adults with PAE, according to their caregivers	Families connected to various FASD groups for caregivers in Ontario, Canada	<ul style="list-style-type: none"> - Four themes were identified with respect to risk: 1) challenges with behavioural and emotional regulation, 2) negative peer group influences, 3)

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Study	Research Purpose	Context	Key Findings
Reil et al. (2022)	Understand the experiences and backgrounds of children who criminally offend before the age of 14 years	Caregivers of children who offend, and child welfare and judicial professionals who work with children who offend in New Zealand	<ul style="list-style-type: none"> - substance use, and 4) multiple transitions in living situations. - Perceived protective factors included: 1) environmental structure and supervision, 2) strengths-based educational and employment opportunities, 3) access to resources for the individual with PAE and their family members, and 4) exposure to positive influences - Of the five family members who shared their perspectives, two had children with FASD who had offended before age 14 - Themes identified in interviews included: 1) extreme hardship and harm (e.g., multiple placements, trauma and its impacts on mental health, peer associations, and social determinants/trajectories) experienced by children and families that lead to CW involvement and offending; and 2) failure of the CW system to engage with families to prevent childhood offending - Participants suggested that some children with neurocognitive differences (like FASD) may experience increased impressionability and vulnerability to offending behaviour
McLachlan et al. (2018)	Evaluate the predictive validity of the Structured Assessment of Violence Risk in Youth (SAVRY) and the Youth Level of Service/Case Management Inventory (YLS/CMI) in CLS-involved youth with FASD	CLS-involved youth from Canadian FASD diagnostic and support centers, probation offices, and correctional facilities	<ul style="list-style-type: none"> - Youth with FASD received their first official charges at a younger age (14 vs 15 years) and had a higher number of previous charges (40 vs 28) than those without FASD; they were also more likely to recidivate during the follow-up period (72 % vs 52 %), sooner (165 vs 238 days), and with greater likelihood (47 % vs 26 %) and number (1.5 vs 0.5) of violent offenses - Higher risk and lower protective ratings were found on both tools for youth with FASD; no significant group differences were found in predictive validity of either tool; the SAVRY protective factors domain was negatively associated with time to re-offend
Psychosocial Needs and Strengths (n = 9)			
Flannigan et al. (2019)	Explore the neurocognitive profile of CLS-involved youth with FASD compared to those without FASD	Data from clinical records of youth who attended an offending treatment program in Canada	<ul style="list-style-type: none"> - Youth with FASD had lower scores in verbal ability, reading and spelling, simple processing speed, working memory, and cognitive flexibility than youth without FASD; they showed relatively strengths in motor skill, inhibition, and visual processing - Youth with FASD had lower scores on an indicator of overall mental health, and higher rates of CD and ID
Russell et al. (2023)	Describe the clinical profile and therapeutic recommendations made by diagnostic team for CLS-referred youth with FASD	Subset of youth referred for FASD assessment through the CLS	<ul style="list-style-type: none"> - The most common neurocognitive impairment among participants was executive functioning (83 %); most common comorbidities were sleep disturbances (36 %) and ADHD (36 %) - The most common recommendations were disability funding (75 %), education planning and support (67 %), occupational therapy intervention (56 %), mentorship services (47 %) and substance use services (45 %) - Significant correlations were found between comorbidities and recommendations in the areas of sleep (sleep management strategies), ADHD (family arrangements), anxiety (psychiatrist), depression (occupation support), CD (psychologist), and ODD (education support)
Kerry et al. (2024)	Compare the neuropsychological profiles of youth, with and without PAE, sentenced to detention	Youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - Across participants, youth with and without PAE scored below the normative mean across measures, with weakest performance in verbal comprehension and math computation and relatively higher performance in visual scanning and number sequencing - Although youth with PAE scored lower than youth without on most measures, no significant group differences were identified
Kippin et al. (2018)	Examine language skills and diversity among youth sentenced to detention	Youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - Youth reported eight first languages, and 19 different languages overall; 32 % of youth identified as multilingual - Across participants, 46 % met criteria for a language disorder, 56 % of whom had FASD; youth

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
Kippin et al. (2022)	Characterize orofacial, oromotor, speech, and voice anomalies among adolescents with and without PAE in a youth detention centre	Youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> with FASD had lower language scores than those without - 67 % of the overall group had one or more orofacial anomalies (59 %) and/or speech/voice anomalies (18 %) - Presence and number of total orofacial, oromotor, speech, and voice anomalies were comparable for youth with and without PAE, but types of anomalies differed across PAE groups
Mela et al. (2020)	Examine life experiences, neurocognitive profiles, and FASD diagnosis among adults involved in the CLS	Adults in a Canadian outpatient forensic psychiatric clinic	<ul style="list-style-type: none"> - High rates of adversity were reported, including problems with employment (53 %), school (75 %), social service access (40 %), and CW involvement (30 %) - Participants also had complex mental health and neurocognitive needs, particularly anxiety, depression and substance use, as well as difficulties with executive functioning, visual memory, and processing speed - There were no significant differences between participants with and without FASD in mental health or neurocognitive needs - Most participants had a history of multiple offenses (mean = 3.7)
Flannigan et al. (2022)	Explore the clinical, social, and criminogenic needs of adults who participated in an Indigenous FASD-informed restorative justice program	Clients who completed multidisciplinary FASD assessments and feedback interviews regarding their participation in an FASD justice program	<ul style="list-style-type: none"> - Neurodevelopmental function varied widely across participants, with more challenges with math skills and relative strengths in perceptual reasoning - Co-occurring medical concerns were pervasive, and mental health diagnoses included depression, anxiety, substance use, learning disorder, and PTSD - Criminogenic risk varied widely, and female participants generally had higher levels of risk; across participants, the area with highest criminogenic need was financial problems, and the area with highest protection was prosocial attitude toward criminality
Tan et al. (2018)	Examine how fitness to stand trial (FST) is addressed in youth court and compare how evaluator opinions relate to court findings	FST reports from a youth court were reviewed and matched with records of court determinations of unfitness and dispositional data	<ul style="list-style-type: none"> - The most common diagnoses reported were ID (32 %) and CD (30 %); FASD was reported for three (4 %) youth - ID, but no other diagnosis, was significantly related to evaluator opinions and court findings of FST - There was 75 % agreement between evaluator opinions and court findings
Gilbert, Allely, Gudjonsson, et al. (2023)	Investigate the interrogative suggestibility of youth with FASD, and the correlation between immediate and repeat suggestibility	Youth recruited through social media and UK FASD charities	<ul style="list-style-type: none"> - The FASD group had significantly poorer memory recall, more impairment in teacher- and parent-rated impulsivity, and lower FSIQ than control group - Total suggestibility was higher in the FASD group compared to the control group; there was a large group difference in the correlation between immediate and repeat suggestibility, with youth with FASD showing a much higher correlation - Youth with FASD were more likely to accept leading questions
FASD-Informed Criminal Legal System Responses (n = 17)			
Screening & Identification			
McLachlan, Amlung, et al. (2020)	Explore the feasibility, and complete a preliminary evaluation, of FASD screening tools in a forensic mental health setting	Adult inpatient and outpatient forensic mental health program in Canada	<ul style="list-style-type: none"> - 4 % of participants had a previous FASD diagnosis, and PAE was documented for an additional 3 % of adults; exploratory evaluation showed possible FASD in 10–33 % of cases - Very few charts included details about previous FASD queries/assessments - Tools varied in the degree to which they were easy and efficient to use, and none had “ideal” sensitivity and specificity
Mullally et al. (2020)	Investigate the utility of performance validity tests with CLS-involved adults with diagnosed or possible FASD	Cognitive testing data from an FASD prevalence study with CLS-involved adults in Canada	<ul style="list-style-type: none"> - Participants with FASD performed substantially worse on PVT measures than control and reference groups with and without cognitive impairment; they were more likely to fail any test and failed a higher number of tests overall than control participants
Assessment & Diagnosis			
Freeman et al. (2019)	Explore the process and challenges of obtaining accurate information regarding PAE for young people in detention	Mothers and relatives of youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - In general, obtaining accurate information on PAE was challenging

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
Hamilton, Reibel, Maslen, et al. (2020)	Explore experiences of youth in detention who complete FASD assessment; identify potential harms and benefits	Youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - For most youth (63 %), PAE confirmation came from their birth mother; other sources were relatives (31 %) and documentary evidence (6 %) - All participants were very or fairly confident in their recollection of PAE - Some mothers experienced stress related to interview questions - Researchers reported that the yarning approach required language adaptations, consideration of silences, use of flexibility and visual cues, and encouragement of conversation by building partnership, trust, and interest - The process of yarning helped youth to recall, retell, and better understand their assessment experiences
Hamilton, Maslen, Best, et al. (2020)	Engage with hopes, relationships, and experiences of youth detained and assessed for FASD	Youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - Youth were reported to experience complex adversity, including mental health and substance use needs and difficulties with trauma and stability - Researchers reported that youth recovery capital included happiness and hope within their family relationships (though complicated at times); most youth expressed future aspirations and discussed school experiences
Hamilton, Maslen, Watkins, et al. (2020)	Examine caregiver perspectives, experiences, understandings, and perceived implications of FASD assessment among CLS-involved youth in detention	Caregivers of youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - Across caregivers, participants spoke of their youth's challenges but biomedical terms were not meaningful or helpful - Cultural patterns in response to FASD diagnosis were identified: <ul style="list-style-type: none"> o Impacts of diagnosis were considered in the context of family and community for Aboriginal participants whereas non-Aboriginal caregivers spoke more about what diagnosis means for the child o Aboriginal participants expressed that support needs should be met within the community whereas non-Aboriginal caregivers envisioned more institutional support o Aboriginal participants spoke often of the potential for shame and stigma following diagnosis
Hamilton et al. (2019)	Explore the perspectives of service providers regarding the value of FASD prevalence research in a youth detention setting	Non-custodial staff (in education, psychology, health, case management, and Aboriginal welfare) who were impacted by an Australian FASD prevalence study	<p>Three main themes were identified related to: 1) FASD assessments, 2) assessment results and reports, and 3) barriers to maximizing study benefits and ability to support youth needs:</p> <ul style="list-style-type: none"> - <i>Assessment:</i> Some staff expressed concern about the impacts of FASD assessment on youth, but no major problems were reported and some staff shared positive outcomes arising from the assessment; participants also reported concerns with the lack of communication and consultation between researchers and service providers - <i>Results and reports:</i> Many participants noted that results provided clarity and positive impacts on their own practice, however they also reported some limitations of reports and recommendations - <i>Barriers:</i> participants spoke of a lack of professional development opportunities, limited resources and staffing, and poor communication and access to information across services
Intervention Longstaffe et al. (2018)	Describe the history of the FASD Youth Justice Program, and report preliminary outcomes, statistics, and ongoing program challenges	Collaborative and multidisciplinary program developed to support CLS-involved youth in Manitoba, Canada	<ul style="list-style-type: none"> - Program goals were described as: 1) connect legally-involved youth with PAE to multidisciplinary assessment; 2) provide recommendations to the judiciary, 3) increase build family and community capacity, and 4) provide strengths-based client-centered support - Of 1048 youth referred, 94 were on the waitlist, 205 did not have confirmed PAE, 417 were removed from the waitlist for numerous reasons (e.g., aging out, refusing assessment) - Of 332 youth assessed, 234 (70.5 %) were diagnosed with FASD - Preliminary evaluation data with a subset of youth indicated reduced recidivism and institutional behavioural incidents

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
Brintnell et al. (2019)	Develop an approach for screening and diagnosing FASD in a correctional facility for adult men; strengthen participants' ability to transition from corrections to community; develop and document a system to support community transition for men with FASD	Research and service program involving FASD diagnosis and functional assessments, life skill building and referral, and follow-up	<ul style="list-style-type: none"> - 90 % of participants received an FASD diagnosis, and the majority had a concurrent psychiatric diagnosis - Independent living skills were low or moderate for 75 % of participants; most had good to excellent physical fitness - 67 % had youth criminal records - Over the course of the project, 65 % of participants reconnected with the CLS after having been released; connectors were more likely to have a juvenile record and less likely to have offended against persons - Participants reported many benefits of the treatment they received while in the program, such as stress management strategies, increased self-esteem and awareness, and improved relationships - Transition advocates spent most of their time helping participants with basic needs and personal support (e.g., coaching, advocacy)
Flannigan, Pei, Rasmussen, et al. (2018)	Explore the perspectives of FASD justice program service providers and identify perceived program impacts and challenges	FASD-informed restorative justice program in a small Indigenous community in Canada	<ul style="list-style-type: none"> - The program was perceived to be: 1) building capacity in professional practice, service delivery, and community understanding; 2) humanizing adults with CLS involvement; 3) building bridges between and among professionals and community members; and 4) in need of improvement in terms of overcoming systemic barriers and translating impacts
Flannigan, Rollans, et al. (2023)	Understand the experiences and perceptions of adults who participated in an FASD-informed restorative justice program	FASD-informed restorative justice program in a small Indigenous community in Canada	<p>Participant responses were organized into 11 categories related to four domains of recovery capital:</p> <ul style="list-style-type: none"> - <i>Physical</i> recovery capital was described in terms of the program helping clients to meet their basic needs, and connect with essential supports - <i>Human</i> recovery capital was interpreted as improved self-insight, increased knowledge of FASD, new skills and strategies, and looking to the future - <i>Family/social</i> recovery capital was described in terms of the ways in which participants spoke of their interactions and relationships with program staff, and impacts on their connection with family - <i>Community/cultural</i> capital were interpreted in terms of how participants described the program to help them feel better understood in court, though some described experiences of injustice and mistreatment, and aspects of their community and culture that impact supportive environments <p>More broadly, many clients described <i>turning points</i>, wherein accumulated recovery capital across domains translated into notable change in coping, adaptive choices, and community engagement</p>
Courtroom Impacts			
Brown et al. (2022)	Illustrate challenges common to defendants with FASD in legal contexts, particularly related to suggestibility	Summary of purposefully selected federal habeas corpus cases	<ul style="list-style-type: none"> - Parallels were drawn across cases, with authors arguing that when FASD and suggestibility are not considered, individuals can experience poor outcomes - Authors suggested that information about FASD and suggestibility may be used to inform training for CLS professionals, modifications to legislation, and diversion and case management to improve trajectories
Hashmi et al. (2021)	Examine the sentencing of people with diagnosed intellectual disabilities who have been convicted of a sexual offense	Analysis of judgments made in Canadian adult courts	<ul style="list-style-type: none"> - Several themes were identified: importance of identification and diagnosis of people with ID; impacts of ID on experiences and interactions with the court process; impacts on sentencing decisions; individuals with ID experiencing problematic social histories; high rates of co-occurring diagnoses; and over-representation of Indigenous peoples - 56 % of cases identified had confirmed/possible FASD; geographic barriers and lack of FASD-informed programs inhibit access to assessment/diagnosis

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
Mullally et al. (2023)	Assess the nature, frequency, relevance, and impact of evidence related to FASD in criminal cases	Analysis of Canada trial and appellate level decisions wherein FASD evidence was mentioned in relation to the defendant	<ul style="list-style-type: none"> - The most common index offenses were violent nonsexual (53 %) - FASD was mentioned between 1 and 56 times across cases and was only formally diagnosed in 53.1 % of cases - The nature of FASD evidence was varied, and for most cases (78.3 %) FASD was noted to have “no relevance” or “possible/some relevance” - In the remaining 21.7 % of cases, FASD evidence was assessed as having “great relevance” <ul style="list-style-type: none"> o Most (88.2 %) times FASD was discussed in relation to sentencing decisions (i.e., proportionality; mitigation, risk, and public safety; rehabilitation; deterrence/denunciation; judges needing more information; <i>Gladue</i> considerations; and youth sentencing); FASD evidence impacted sentencing decisions in 32.8 % of these cases o FASD was also discussed in relation to dangerous/long-term offender designation, determinations of guilt, and criminal responsibility/fitness to stand trial o The general consensus was that FASD can decrease an individual’s responsibility/ blameworthiness and is often considered to be a mitigating factor - The overrepresentation of Indigenous defendants in the case sample was discussed as an ongoing harmful impact of colonization and racism - Challenges in decision making were discussed related to judges weighing FASD evidence with risk, public safety, and rehabilitation
Systems-Level			
Blagg et al., 2017, Blagg & Tulich, 2018	Explore issues around CLS intervention for Indigenous children and youth with FASD, and develop diversionary pathways for those at risk of becoming enmeshed in the CLS	Partnership between researchers and three remote Indigenous communities in Western Australia	<ul style="list-style-type: none"> - Researchers described a “new diversionary paradigm” where youth are diverted from the CLS into a more therapeutic system - There was agreement that fresh diversionary alternatives are needed for the high number of Indigenous youth with FASD enmeshed in the CLS, though they agreed there were no reliable prevalence estimates at the time - Emphasis was placed on intergenerational trauma as an ongoing legacy of colonization and its role in creating conditions for FASD; identification of FASD, “needs focused” court, and centering country were all discussed as important for diversion and paradigm shift - Authors proposed a blend of reformative practice with mainstream systems to create Indigenous and non-Indigenous engagement and support for community owned diversionary options - This model may “create engagement spaces between Indigenous and non-Indigenous domains” and require “diversion not just out of one system but into another” (2017, p. 348–349) community owned and managed system, with the involvement of families, Elders, and culturally appropriate alternatives as well as training to recognize FASD and other disabilities
Fitzpatrick et al. (2020)	Map referral pathways and develop localised resources to enhance the journey to diagnosis, treatment, and support for FASD in a regional community setting	Initiative in Western Australia to support local service staff to develop a framework for early FASD diagnosis and support for children	<ul style="list-style-type: none"> - The pathway details a sequence of events from FASD referral to screening, assessment, service providers, diagnoses, potential services and funding, and local supports - A specific pathway was developed for the CLS to be used with children 10 years and older to support professionals identify key services, and engage in integrated diagnosis and management of FASD
Professional Knowledge, Attitudes, Practice, and Training Needs (n = 10)			
Gibbs (2022)	Explore views of CLS practitioners regarding helping youth with FASD who encounter the CLS	Interviews with multi-disciplinary CLS professionals, as part of a larger New Zealand study on youth wellbeing and systems change	<ul style="list-style-type: none"> - Themes identified in interviews included: a sense of “ignorance, intolerance, and incompetence” in both the general population and CLS sector professionals; the importance of CLS practitioners “lightbulb moments” for increased FASD knowledge and skill; consideration of what wellbeing may look like for youth with FASD who contact the CLS and their caregivers

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Table 2 (continued)

Study	Research Purpose	Context	Key Findings
Chu et al. (2024)	Examine FASD knowledge, attitudes, and practices among legal professionals	Legal professionals (mostly lawyers) working in the CLS in New Zealand	<ul style="list-style-type: none"> - Best practices were recommended for supporting youth: early diagnosis and intervention, professional training, wraparound teams with FASD navigators, various models and strategies, as well as CLS-specific priorities such as diversion, FASD-informed services, and speech language support - Participants spoke of needed systems change, including government recognition of FASD as a disability and targeted intervention, application of disability rights, education systems change, cross sectoral training on FASD, as well as societal level change to views about alcohol related harms, and stigma around FASD - The majority of respondents (91 %) reported to be lawyers, most of whom worked in criminal (31 %) or family (29 %) law - Almost all (98 %) participants reported they were aware of FASD, but only 3.6 % reported they had a “good understanding” of FASD and related effects in the legal system; most (65 %) underestimated the prevalence of FASD - Attitudes and beliefs about FASD were generally accurate, and 79 % of respondents reported that an FASD diagnosis may lead to stigma - 71 % of participants agreed that FASD is relevant to their work, and most reported they encountered FASD in their work; 91 % said they would change their practice if they knew someone they worked with had FASD - Only 5 % felt very prepared to support a client with FASD; most (59 %) had not received prior FASD training; 52 % acknowledged the need for training - Qualitatively, participants described challenges in working with someone with FASD including lack of FASD-informed knowledge and skills, and limited access to/availability of FASD assessment/ diagnosis
Passmore et al. (2018)	Explore FASD knowledge, attitudes, experiences, and practices among custodial officers working with youth in detention, and use this to develop workforce training resources	Custodial officers working with youth sentenced to detention and assessed as part of an Australian FASD prevalence study	<ul style="list-style-type: none"> - Most participants had heard of FASD (77 %) or fetal alcohol syndrome (96 %), understood its relevance in the CLS context (74 %), and would consider modifying their practice if they knew a young person had FASD (97 %) - Fewer participants (39.3 %) reported they had ‘good’ or ‘a lot’ of experience working with people with FASD - 51 % felt prepared to manage behaviours for youth with FASD; 23 % said their previous training influenced this preparedness - Almost all (92 %) said they would like more information about FASD (92 %), specifically around behaviour management guidelines, indicators of impairment with their institutional communication system, and identifying behaviours that may warrant an FASD assessment - Preferred training format was face-to-face workshops with FASD experts
Heanue et al. (2022)	Investigate current service needs, practices, processes, and knowledge among youth CLS professionals, and investigate factors that predict/ contribute to professionals’ behaviour	CLS professionals working in an Australian youth justice system	<ul style="list-style-type: none"> - Participants highly rated their motivation to engage in tailored/modified practice to support youth impairments, followed by their capability, and their opportunities - Both capability and motivation, as well as frequency of previous training, were predictive of service provider behaviours - Almost all (94 %) of participants agreed that FASD is relevant in the youth CLS, but 23 % were unaware that FASD is a lifelong disability and only 33 % reported adequate training in managing behaviours associated with NDDs; 95 % expressed interest in receiving training - Participants shared recommendations for improving the CLS to better support youth with NDDs, including more training, practical strategies and interventions, preventative and restorative practices, modified language, better resources in remote communities, and stronger communication

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Study	Research Purpose	Context	Key Findings
Pedruzzi et al. (2021)	Determine needs of a workforce providing care and support for CLS-involved youth	Staff from multiple organizations and government departments working with youth involved in the CLS	<p>within services and professionals supporting youth with NDDs</p> <ul style="list-style-type: none"> - Researchers identified four themes within a socio-ecological model: 1) issues related to <i>diagnosis and outcomes</i>, such as misdiagnosis, limited diagnostic pathways, complex and lengthy referral processes, reluctance among professionals to diagnose FASD because of stigma, and mixed thoughts about the benefits of diagnosis; 2) the <i>complex needs</i> and experiences of youth involved in the CLS; 3) the <i>complex roles</i> that CLS professionals must play to support youth; and 4) the process professionals must engage to <i>navigate the system</i> in its existing legal framework - Findings from this study reinforced the need for a model of care for CLS-involved youth with FASD, which the authors then developed and piloted
Passmore et al. (2021)	Describe the conception, implementation, and evaluation of an intervention aimed to upskill the custodial workforce in the management of youth with FASD and other neurodevelopmental impairments	Intervention study within an ongoing series of studies related to youth with FASD in the Australian CLS	<ul style="list-style-type: none"> - The intervention was designed to improve FASD knowledge and awareness among staff and build capacity with strategies for managing youth needs - Training sessions were practical and experiential, comprising presentations, videos, group discussions and activities, and an information handout about domains of brain function affected in youth with FASD and other NDDs - More than 100 staff completed the training - Surveys administered pre- and post-training showed that FASD knowledge and attitudes improved in almost all areas measured - Most (89 %) participants reported increased post-training confidence in using strategies and adapting practice approaches - Participants rated the training to be highly effective, understandable, and relevant and would recommend the training to others
Brown et al. (2021)	Explore knowledge among public defenders of FASD and related signs, symptoms, and psycholegal impairment	Public defenders practicing in the state of Minnesota	<ul style="list-style-type: none"> - Respondents identified impairments related to FASD, and estimated that an average of 46.7 % of individuals with FASD become involved in the CLS - 19 % of respondents reported having received training on FASD and psycholegal impairment; 97 % reported they would benefit from training - Almost all (90 %) respondents reported that they would likely benefit from receiving findings from clinically administered FASD screening tools
Brown et al. (2019)	Explore impressions and knowledge of FASD among professionals providing treatment for sexual offending	Professionals providing treatment for sexual offending in several US states	<ul style="list-style-type: none"> - Participants reported a range of symptoms and impairments in FASD that they perceive to contribute to inappropriate sexual behaviour, most commonly impulsivity, developmental immaturity, and social skills deficits - Most respondents estimated that between 26 and 50 % of individuals with FASD become involved in the CLS - Few respondents (16 %) had received training in the past on FASD and sexual behaviour, but 90 % reported they would benefit from such training and 78 % believed they would benefit from having an FASD screening tool - 71.9 % estimated that they see two or fewer clients per month with FASD - The most commonly reported strategies used in treatment with clients with FASD were role play, repetition, and art/music therapy
McLachlan et al. (2021)	Ascertain FASD and NDD-related training experiences and needs, practices, and knowledge among forensic clinicians	International survey of forensic mental health clinicians from the US, Canada, Australia, New Zealand, Europe, and Argentina	<ul style="list-style-type: none"> - Most participants were psychologists - Varied FASD training experiences were reported; although all reported at least some foundational training on NDD, few (23 %) felt their training left them at least moderately prepared to work with clients with FASD (vs other NDDs, 55 %), including identifying individuals with possible FASD, conducting forensic assessments, diagnosing FASD, or managing intervention - 93 % had previous practice experience (assessment and/or intervention) with clients with FASD and described barriers and modifications to practice

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Study	Research Purpose	Context	Key Findings
Dunbar Winsor (2021)	Capture in-depth information about professional knowledge and experiences of FASD	Interviews with seven health care and CLS professionals with varied experience working with people with FASD	<ul style="list-style-type: none"> - Most respondents (92 %) reported “some” or “moderate” knowledge of FASD and demonstrated accurate basic knowledge of FASD and PAE - Discussions centered on two themes: <ul style="list-style-type: none"> - Strengths and limitations of FASD diagnosis, and ways in which diagnosis can act as a “roadmap to services” and “a form of currency” in legal proceedings - Complexities and ethical considerations around the “visibility” of FASD in CLS contexts, highlighting the tensions between an individual's right to privacy, consent, barriers access to service access, and stigma

Note. ACE = adverse childhood experience; ADHD = attention deficit-hyperactivity disorder; AUD = alcohol use disorder; CD = conduct disorder; CLS = criminal legal system; FAS = fetal alcohol syndrome; FASD = fetal alcohol spectrum disorder; ID = intellectual disability; NDD = neurodevelopmental disorder; ODD = oppositional defiance disorder; PAE = prenatal alcohol exposure; PTSD = post-traumatic stress disorder; UK = United Kingdom, US = United States.

^a This cut-off was determined based on age of criminal responsibility in Western Australia.

comparison group but had similar predictive accuracy using total scores for both groups.

3.3.3. Psychosocial needs and strengths

Nine studies were identified where researchers examined the psychological, social, and criminal legal needs and strengths of CLS-involved youth (77.8 %) and adults (22.2 %) with FASD.

In a retrospective file review by Flannigan et al. (2019), youth with FASD ($n = 38$) who had attended an offending treatment program in Canada were reported to have significantly higher rates of conduct disorder and intellectual disability, as well as greater impairment in verbal ability, reading and spelling, simple processing speed, working memory, and cognitive flexibility, compared to a non-FASD comparison group ($n = 43$). Youth with FASD demonstrated relative personal strengths in motor ability, inhibition, as well as visual scanning, perception, and memory. In Australia, 64 CLS-referred youth with FASD were similarly reported to experience difficulties with executive functioning, language, memory, and academic achievement, as well as sleep disturbances and ADHD (Russell et al., 2023). A range of therapeutic recommendations were also made for youth in the study, most often disability-related funding, educational support, occupational therapy, referral to a general medical practitioner, and drug and alcohol services.

In another Australian study, youth with PAE ($n = 46$) scored lower than unexposed youth ($n = 39$) on most measures of neurocognitive functioning, but no significant group differences were identified (Kerry et al., 2024). Two related papers were published with the same group of 98 youth, who were reported to speak 19 different languages and 32 % were multilingual, though nearly half of participants ($n = 45$, 46 %) met the criteria for a language disorder, and youth with FASD had lower language scores than youth without FASD (Kippin et al., 2018). Additionally, 67 % of 95 youth in this research cohort had at least one orofacial, oromotor, speech, and voice anomaly (Kippin et al., 2022). There were no group differences in the number of anomalies, but the types of anomalies differed between groups, where youth with FASD most often presented with malocclusions and monotone voice, and those without FASD most often presented with reduced jaw strength and atypical resonance (Kippin et al., 2022).

Next, in an outpatient forensic psychiatric setting in Canada, adults with ($n = 12$) and without ($n = 33$) FASD were reported to have similar demographic characteristics, mental health profiles, and offense histories, but participants with FASD scored lower than those without on several measures of neurocognitive functioning (Mela et al., 2020). All participants in this study had high levels of life adversity, though most had at least a high school education, many were living independently, and some were employed or in school at the time of the study. In another Canadian study with 16 adults assessed and diagnosed as part of an

FASD-informed Indigenous restorative justice program, marked difficulties were identified in clients' math skills and relative strengths were found in perceptual reasoning and some aspects of executive functioning (Flannigan et al., 2022). Participants in this study presented with complex physical and mental health challenges, substance use concerns, and long histories of adversity and trauma. The greatest criminogenic need among participants was financial problems, and the greatest protective factor was prosocial attitude.

Two studies were identified related to psycholegal needs of individuals with FASD. In a study (not specific to FASD) of youth court cases in New Zealand, 58 % of participants ($n = 79$) were opined to have ‘mental impairment’; only 4 % ($n = 3$) of youth were identified as having FASD, and no associations were found between FASD diagnosis and court findings of youth being unfit to stand trial (Tan et al., 2018). Relatedly, in a UK study of interrogative suggestibility among adolescents, participants with FASD ($n = 27$) showed higher levels of suggestibility and were more likely to accept leading questions than adolescents without FASD ($n = 25$; Gilbert, Allely, Gudjonsson, et al., 2023).

3.3.4. FASD-informed CLS responses

The largest category of studies identified in this review ($n = 17$) focused on identifying and supporting CLS-involved youth ($n = 9$, 52.9 %) and adults ($n = 8$, 47.1 %) with FASD through screening, assessment/diagnosis, intervention, courtroom impacts, and systems-level responses.

3.3.4.1. Screening and identification. In a study involving chart review ($n = 151$) and interviews with 41 adults in Canada, FASD screening tools completed by researchers in forensic mental health contexts were found to be easy to use, but some required lengthy time investment, and all had room for improvement regarding sensitivity and specificity, pointing to the need for more research in the area (McLachlan, Amlung, et al., 2020). In another Canadian study, researchers examined performance validity test scores among CLS-involved adults with ($n = 25$) and without ($n = 55$) FASD, reporting that adults with FASD performed worse on most validity measures, almost all met criteria for non-credible responding, and more than half met criteria for suboptimal effort (Mullally et al., 2020). In light of their findings, the authors cautioned against using these performance validity measures with people with FASD and other severe cognitive impairment in the absence of more research to establish their appropriateness.

3.3.4.2. Assessment and diagnosis. Stemming from the aforementioned Australian prevalence research (Bower et al., 2018), interviews were conducted with 88 mothers and relatives of youth regarding the

5 Year Review

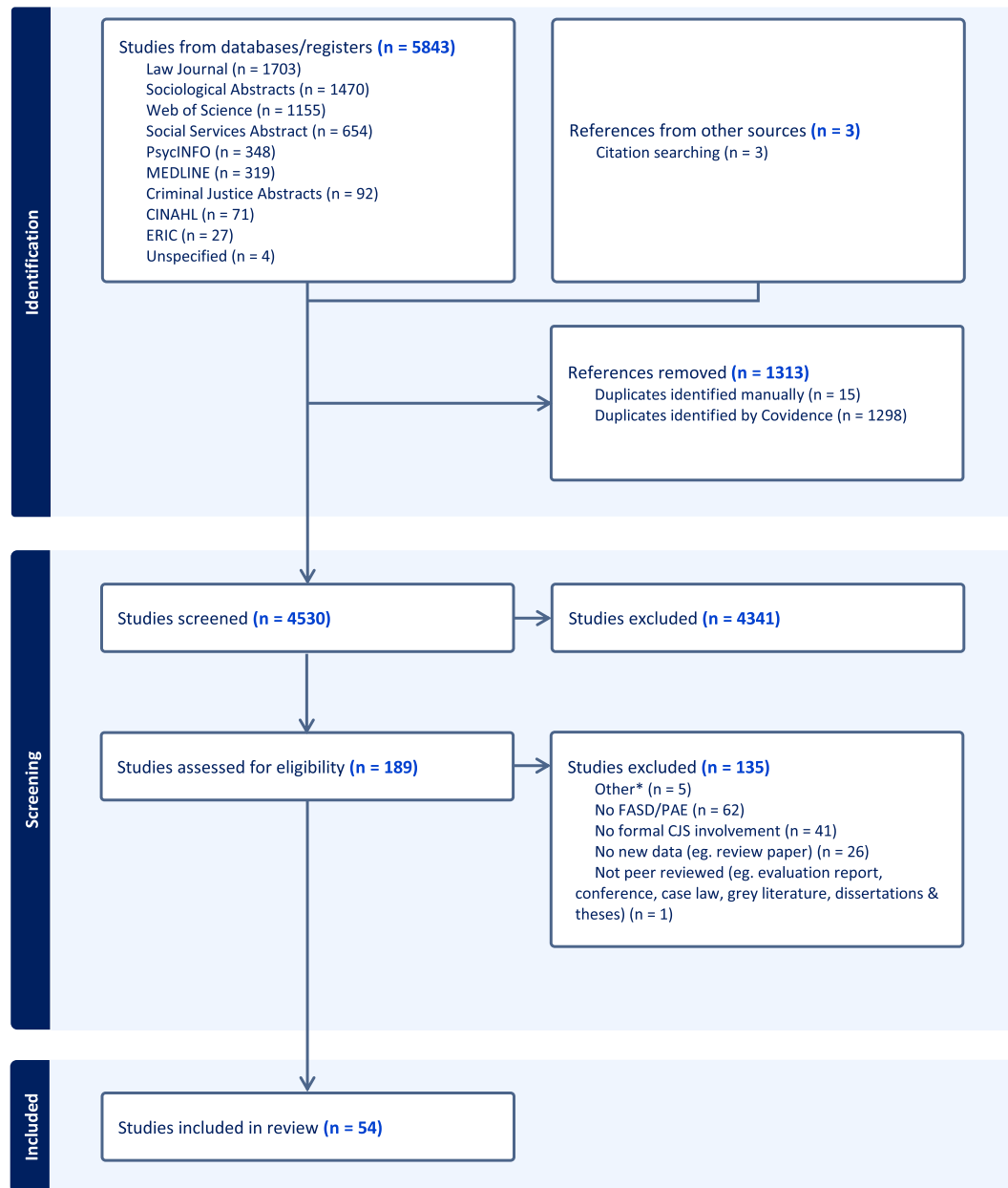


Fig. 1. PRISMA flow diagram.

challenges of assessing for PAE (Freeman et al., 2019). All participants were “very sure” or “fairly sure” of their recollections regarding PAE, but only 62 % of those reporting PAE were able to provide enough information to fully complete the interview questions, and researchers were unable to obtain information for several youth.

Another three qualitative studies based on this prevalence research were published related to the lived experiences of 38 youth participants⁴ (Hamilton, Maslen, Best, et al., 2020; Hamilton, Reibel, Maslen, et al., 2020) and 17 of their parents and caregivers (Hamilton, Maslen, Watkins, et al., 2020), all using a yarning approach. For some youth who participated, yarning provided a way to adapt language and share information about the assessment experience, and others benefited from

creative strategies such as fidgets or visual tools to maintain engagement in the process (Hamilton, Reibel, Maslen, et al., 2020). Additional benefits of yarning included flexibility, and opportunity to use different tools to help participants share their experiences, build trust and interest, and learn more about themselves (Hamilton, Reibel, Maslen, et al., 2020). Regarding youths' lived experiences of the FASD assessment, although many had complex challenges with adversity and trauma, most also shared stories of happiness and hope, expressed goals for the future, and yarned about connection with family and educational opportunities as sources of support (Hamilton, Maslen, Best, et al., 2020). Finally, a group of 17 caregivers were interviewed regarding their experiences having a child assessed for FASD, particularly with respect to cultural differences. Whereas Aboriginal caregivers seemed to understand a diagnosis and its impacts within the context of family and community, non-Aboriginal caregivers understood the diagnosis more in terms of its direct/individual impact on their child (Hamilton, Maslen, Watkins,

⁴ These youth are the same who participated in the Australian FASD prevalence study, 24 % of whom received a diagnosis (Bower et al., 2018).

et al., 2020).

Last, in another qualitative interview study based on Bower et al.' (2018) prevalence work, 46 non-custodial staff described the positive impacts of FASD assessment, the helpfulness of subsequent recommendations for youth, and a desire to provide appropriate services for youth with FASD (Hamilton et al., 2019). However, staff also described challenges and barriers related to limited consideration of staff opinions, how the study interfered at times with their ability to do their job, and low feasibility and accessibility of recommendations (Hamilton et al., 2019).

3.3.4.3. Intervention. In a Canadian descriptive study, the goals and outcomes of an FASD Youth Justice Program were reported, noting that over 1000 youth have been referred to the program, 332 youth assessed for FASD, and 234 diagnosed with FASD (Longstaffe et al., 2018). Preliminary evaluation data with some youth showed a reduction in post-program charges and institutional incidences, and various initiatives stemmed from the program, including FASD-related tools and resources for youth, caregivers, and service providers. Another intervention study was conducted with 49 adult males with FASD in a Canadian provincial correctional facility, and many participants reported psychosocial benefits from the intervention, though 41 % had re-connected with the CLS within 6 months post-release, which was more likely for participants who had youth criminal records and weaker verbal memory and independent living skills (Brintnell et al., 2019).

Another study based on Flannigan et al.' (2022) above mentioned research with an FASD-informed restorative justice program was conducted with program service providers. Participants ($n = 18$) reportedly perceived the program to build service and community capacity, humanize CLS-involved adults with FASD (i.e., viewing them as human beings instead of "offenders"), and create bridges across disciplines and backgrounds to support client outcomes; service providers also reported on potential areas of improvement to the program and broader system (Flannigan, Pei, Rasmussen, et al., 2018). Twelve clients from this program were later interviewed, and shared stories about how the program both increased and impeded their recovery capital, as well as the ways in which their experience with the program translated into changes in their life choices and wellbeing (Flannigan, Rollans, et al., 2023).

3.3.4.4. Courtroom Impacts. In several studies, researchers analyzed criminal cases and shed light on the ways in which FASD is addressed in criminal court. Brown et al. (2022) described four US cases involving defendants with FASD, emphasizing the importance of considering suggestibility in supporting fair adjudicative outcomes. Next, in a Canadian study of 61 cases of individuals with intellectual disabilities (ID) convicted of sexual offenses, more than half of whom (56 %) had diagnosed or possible FASD (Hashmi et al., 2021). These researchers concluded that early identification and diagnosis, impacts of an ID on a person's experience with the court process, defendants' social history, co-occurring diagnoses, and over-representation of Indigenous peoples in the court system are all important considerations in this context. Finally, in a recent analysis of 350 Canadian cases wherein FASD was mentioned as evidence, the frequency of mentions and relevance of FASD was highly variable across cases, though most often considered to have relevance to sentencing decisions, whereby FASD was generally perceived to decrease an individual's blameworthiness and often considered to be a mitigating factor (Mullally et al., 2023). However, clear information about formal FASD assessment was provided in very few cases, making it difficult for the courts to draw conclusions.

3.3.4.5. Systems-level responses. Several studies were identified that contribute knowledge about systems-level learning, pathways, and frameworks for better supporting individuals with FASD who are involved in the CLS. In one study, 122 professionals from three remote Indigenous communities were engaged to develop decolonized

diversionary pathways for Indigenous youth with FASD with consideration of the intergenerational trauma associated with colonial dispossession in Australia (Blagg et al., 2017; Blagg & Tulich, 2018). From this work, it was proposed that ending the cycle of Indigenous CLS involvement requires "return of land" (p. 347) and blending of existing innovative mainstream practices with Indigenous ways of doing and knowing in a hybrid model owned and managed by the community. In another Australian study, service providers and families from 35 organizations were interviewed and consulted about considerations for referral, screening, assessment, diagnosis, and multi-disciplinary service/support for youth and adults with FASD who encounter the CLS (Fitzpatrick et al., 2020). From this work, referral pathways and resources were developed for use in key systems for individuals with FASD, including the CLS.

3.3.5. Professional knowledge, attitudes, and practice

In the last category of studies, we identified 10 papers related to knowledge, attitudes, practice (KAP), and training needs among front-line service providers who support CLS-involved youth ($n = 5$) and adults (n unspecified) with FASD.

In one New Zealand study, 11 service providers were interviewed about their perspectives on supporting youth with FASD in CLS contexts, describing a sense of "ignorance, intolerance, and incompetence" (p. 9) about FASD in the public as well as among CLS professionals in general, and a needed systems change to shift attitudes to better support youth with FASD (Gibbs, 2022). As well, participants discussed the need for CLS service providers to increase their FASD knowledge and skills to support wellbeing in both youth with FASD and their caregivers through various best practice suggestions. Similarly, 56 CLS professionals recently surveyed in New Zealand expressed awareness of FASD and a strong willingness to change practice, but limited understanding of the effects of FASD in CLS contexts and preparedness to support clients with FASD (Chu et al., 2024).

Four studies were conducted with an Australian youth custodial workforce to investigate professional KAP and identify training needs around FASD. First, 112 custodial officers were surveyed, and although almost all (96.4 %) of respondents had heard of either FASD or FAS, most reported they only had some (38.3 %) or little (16.8 %) experience working with diagnosed youth (Passmore et al., 2018). Nearly all participants noted they would be willing to modify their practice if they knew they were working with a youth who had FASD (97.2 %) and would like to learn more about FASD (91.7 %). In a similar study, 81 professionals in the Australian youth CLS were surveyed about neurodevelopmental disabilities (NDDs) including FASD, reporting that participants were highly motivated to modify practice (Heanue et al., 2022). Almost all (93.7 %) participants reported that FASD is relevant in the context of the CLS, but only 33 % felt they had adequate training to manage behaviours associated with NDDs in general. Relatedly, in interviews with 29 professionals from 14 organizations supporting CLS-involved youth in Australia, participants discussed specific training needs related to FASD diagnosis, addressing the complex needs of youth involved in the CLS, improved skills, resources, and networks to work successfully with youth with FASD, and navigating work within the legal framework and associated bureaucratic structures (Pedruzzi et al., 2021). Building on Passmore et al.'s, 2018 KAP research, a training intervention was developed and implemented with 117 staff working with youth with FASD and other NDDs in Australian detention settings, resulting in significant improvements in staff FASD knowledge and attitudes, confidence in their practice, intent to use strategies, and self-reported preparedness to engage with youth with FASD and other difficulties (Passmore et al., 2021).

Next, in the US, 135 public defenders surveyed about FASD were able to describe various signs and symptoms of the disability, however, very few reported receiving FASD-related referrals or having had training on FASD and psycholegal impairment; nearly all agreed they would benefit from continuing education on FASD (97 %), and from receiving findings

from FASD screening tools (90 %; Brown et al., 2017). In a similar survey with 33 professionals providing treatment for sexual offending, very few reported receiving past training on FASD and sexual behaviour (16 %), but the majority (90 %) reported that they would likely benefit from training and having an FASD screening tool (Brown et al., 2019).

Finally, in an international survey with 81 forensic mental health clinicians, all participants had prior practice experience with clients with NDDs, but fewer reported that they provided assessment and intervention services to clients with FASD compared to other NDDs (McLachlan et al., 2021). Clinician-reported knowledge of FASD and FASD training was variable, and preparedness for working with clients with FASD was significantly lower than for other NDDs. Most respondents noted that they would benefit from additional training and resources on FASD and other NDDs. Last, seven Canadian health care and CLS professionals were interviewed about their knowledge and experiences of FASD and spoke to the strengths and limitations of FASD diagnosis, as well as the “visibility” and related ethical considerations around FASD in CLS settings (Dunbar Winsor, 2021).

4. Discussion

The current study provides an updated review of academic literature related to CLS involvement among individuals with FASD and identifies potential directions for future research. We aimed to describe recent advances in the field, identify remaining gaps, and integrate this new literature with what was found in our previous review (Flannigan, Pei, Stewart, & Johnson, 2018). A total of 54 studies were described, most conducted in Canada and Australia, involving individuals with FASD of all ages. Many studies also included caregivers and professionals supporting people with FASD in the CLS.

4.1. Identification and support

One of the greatest areas of growth in the literature was seen in new research on FASD-informed approaches for identifying and supporting individuals with FASD in the CLS. We identified 17 new studies in this area, which is a notable advancement considering FASD-informed CLS intervention was highlighted as a critical gap in our 2018 review (Flannigan, Pei, Stewart, & Johnson, 2018). Identifying people with NDDs, including FASD, who are involved in the CLS is imperative for informing appropriate intervention, rehabilitation, and diversion approaches (Holland et al., 2023). Once identified, a comprehensive assessment of needs and strengths can be undertaken, followed by tailored therapeutic intervention based on individual goals, skills, and ecological contexts to strengthen protective factors and support healthy outcomes (Holland et al., 2023). In the current review, most new studies involving FASD-informed approaches were focused on identifying people with FASD in the CLS through screening and assessment. Emerging evidence related to FASD screening aligns with focused syntheses indicating that some formal tools and indicators show promise in identifying individuals with FASD in CLS contexts, but more research is needed to hone this process (Jewell et al., 2024; McLachlan, Amlung, et al., 2020).

Beyond screening, capacity for comprehensive FASD assessment and diagnosis is often limited in criminal legal settings, and very little is currently known about best practices for diagnosing people with FASD in these contexts (Holland et al., 2023). Given the suspected overrepresentation and under-diagnosis of people with FASD in the CLS, more work is needed to increase capacity for FASD screening, assessment, and diagnosis in a way that is accessible, feasible, accurate, and helpful for people with FASD and their supporters (Flannigan, Pei, Rasmussen, et al., 2018; Hamilton et al., 2019; Jewell et al., 2024; Pedruzzi et al., 2021). Several qualitative studies shed light on the experience of engaging in FASD assessment in CLS settings from the perspectives of youth (Hamilton, Maslen, Best, et al., 2020; Hamilton, Reibel, Maslen, et al., 2020) and their caregivers (Hamilton, Maslen, Watkins, et al., 2020). This research begins to fill an important gap in

research on living experiences of CLS involvement for people with FASD (Flannigan, Pei, Stewart, & Johnson, 2018), highlighting the potential benefits and challenges of this process and improving our understanding of factors to consider when supporting individuals who are navigating this system. That said, additional work is needed to better understand the ways in which identification of FASD and associated needs in CLS contexts can inform effective diagnostic methods and practices and be translated into tailored interventions.

We identified four studies (based on three projects) that involved supporting people with FASD in the CLS through some form of intervention. *Intervention* in these studies was typically framed as broad adjustments to practice following identification, where individuals were referred for FASD assessment, and information and recommendations from assessments were shared with other professionals (e.g., judges, lawyers, correctional staff, transition advocates) to provide more appropriate support for individuals' needs and strengths (Brintnell et al., 2019; Flannigan et al., 2022; Longstaffe et al., 2018). Therapeutic treatment was provided in only one of these studies (Brintnell et al., 2019) which reveals another significant gap in the literature around whether and how specific therapies implemented in CLS settings may be used or adapted to better support people with FASD. Importantly, support efforts described across studies were often client- and human-centered, interdisciplinary, and strengths-based, and benefits included reduced offending behaviour, increased skill-building, better coping, improved relationships, and stronger capacity for support in communities and systems (Brintnell et al., 2019; Flannigan et al., 2022; Longstaffe et al., 2018). Systems-level responses identified in this review involved collaborative and community-rooted approaches including individuals with a range of experiences and vested interest to develop frameworks for diverting, referring, and supporting individuals with FASD within the CLS (Blagg et al., 2017; Blagg & Tulich, 2018; Fitzpatrick et al., 2020). These studies highlight the idea that bridging professions, communities, and sectors can create an environment where people with FASD involved in the CLS are better supported, and that the more systems involved in these efforts, the greater capacity to make changes required for improving outcomes. This new work advances the field by highlighting the importance of FASD identification in the CLS, the potential benefits and impacts of FASD assessment and diagnosis, opportunities for informing practice, and alternate pathways that may better suit the needs of people with FASD and their communities. However, gaps in the evidence remain, and more research that involves control groups, validated outcome measures, and robust longitudinal investigations on the long-term impacts of these efforts would all strengthen our understanding of the specificity of support approaches and reveal priorities for future work.

4.1.1. Needs and strengths

A related area of research that expands on findings from our 2018 review involved the examination of psychosocial needs and strengths among individuals with FASD who are in contact with the CLS. Most of the new studies in this area were focused on neurocognitive functioning and co-occurring neurodevelopmental and mental health needs. Across studies, common areas of neurocognitive difficulty were reported in executive functioning, language and verbal abilities, and academic achievement (Flannigan et al., 2019, 2022; Kippin et al., 2018; Mela et al., 2020, 2022; Russell et al., 2023). A wide range of co-occurring diagnoses and mental health needs were reported among CLS-involved individuals with FASD, especially ADHD, conduct disorder, anxiety, depression, and substance use (Flannigan et al., 2019, 2022; Mela et al., 2020, 2022; Russell et al., 2023). Complex medical needs (Flannigan et al., 2022) and issues with sleep (Russell et al., 2023) were also identified as potential areas of concern for this population. The complex needs associated with CLS involvement identified in this review are not unique to FASD. In fact, psychosocial factors like trauma history, mental illness, and substance use are all shown in the broader literature to be experienced at disproportionately high rates among people who are CLS

involved, including those with other NDDs (Dierkhising et al., 2013; Jones et al., 2023; Lunskey et al., 2024; Mental Health Commission of Canada, 2020). Although the current evidence improves our understanding of the complexity of needs experienced by people with FASD in the CLS, more research is needed to explore whether and how they may be unique to FASD, and how best to address these needs in a holistic way which also incorporates identified strengths to promote healthier outcomes for all people in the system.

4.2. Prevalence, trajectories, and outcomes

Three new studies on FASD prevalence in specific CLS contexts were identified, with researchers reporting varied rates depending on age group and setting. These novel estimates, ranging from 18 % (McLachlan et al., 2019) to 36 % (Bower et al., 2018) in correctional facilities, and 46 % in a Canadian forensic mental health hospital (Mela et al., 2022), were somewhat higher than previously reported estimates of 1–23 % (Popova et al., 2011). They are also substantially higher than prevalence estimates of 3–7 % in the general population, highlighting the overrepresentation of FASD in CLS contexts. These new studies contribute important information from specific contexts, but there continues to be wide variability in estimated rates depending on study setting and population. This variability may be explained in part by often modest samples sizes (e.g., 26 to 99 participants) and specific populations, where higher rates of complex needs, including FASD, are to be expected when factors such as mental disorders and substance use are present (such as in an adult forensic mental health center as in Mela et al., 2022). Moreover, these new prevalence studies were all conducted in settings where this research was identified as important and needed, which means that rates cannot be generalized broadly to all CLS-involved contexts. Other factors that may complicate the establishment of accurate prevalence rates are differences across the lifespan, where PAE may be more difficult to confirm among adults than youth, and adult FASD diagnosis is more complex and less resourced (Chudley et al., 2007; Mullally et al., 2023), especially once adults become enmeshed in the CLS. Together, these findings reflect an ongoing need for larger scale studies to establish more accurate estimates of FASD prevalence across populations, regions, and CLS settings. As well, in alignment with important elements identified in emerging research on FASD-informed responses, it is important that future research on FASD prevalence incorporates human-centered, interdisciplinary, and strengths-based perspectives to help create pathways toward better understanding and support.

Another new area of research that has emerged in recent years relates to CLS trajectories for people with FASD. Specifically, new research identified in this area was focused on criminal legal outcomes and associated factors, as well as criminogenic risk and offense patterns among people with FASD. In new Canadian and Australian research (McLachlan, Flannigan, et al., 2020; Popova et al., 2021; Tan et al., 2022), 30–47 % of individuals assessed for FASD were reported to have been involved in the CLS, which adds to earlier evidence from the US, where 14 % of children, 61 % of adolescents, and 58 % of adults with FASD were reported to have trouble with the law (Streissguth et al., 2004). Although this data suggests that rates of CLS involvement may be disproportionately high among people with FASD, these studies typically involve individuals who are clinically referred for FASD assessment, thus findings cannot be generalized to all people with PAE/FASD as health and social outcomes for all human beings are impacted by access to services (World Health Organization, 2024). Similarly, very little is known about whether FASD may be associated with a certain *pattern* of offending. Although some potential differences emerged in two studies (Mela et al., 2022; Tan et al., 2023), given the scarcity of research in this area and limitations around sample size and method in existing studies, further investigation is required to understand the trajectories and complexity of experiences faced by people with FASD in this regard.

Several studies provide new insight into factors that may influence CLS outcomes for individuals with FASD, which is a line of inquiry with very little evidence previously identified (Flannigan, Pei, Stewart, & Johnson, 2018). As in many other populations (e.g., Doerner, 2015), experiences of CLS involvement among people with FASD vary across demographic factors such as age, gender, and ethnic background (Brownell et al., 2019; McLachlan, Flannigan, et al., 2020; Popova et al., 2021). We also found that in some studies CLS contact was associated with living situation, whereby individuals assessed for FASD who were living in care (i.e., foster care, group homes) had higher rates of offending compared to those in family-based living situations (i.e., with biological and adoptive family members, Burns et al., 2021; McLachlan, Flannigan, et al., 2020). This heightened rate of CLS involvement among individuals with FASD with a history of being in care reflects the broader literature showing associations between child welfare involvement and later CLS contact in general (Goodkind et al., 2020; Modrowski et al., 2022). It may be that the life experiences associated with child welfare involvement, such as instability and exposure to trauma, could increase risk for later CLS involvement, however very little is known about this potential pathway in general, and even less is known specific to people with FASD, thus more research is needed.

Additional factors that may be associated with increased CLS contact among individuals with FASD included adaptive functioning difficulties (McLachlan, Flannigan, et al., 2020), exposure to maternal alcohol use (Hafekost et al., 2017), childhood trauma (particularly domestic violence; Tan et al., 2022), and past or present substance use (Popova et al., 2021). This all reflects trends found in the broader literature (Guina et al., 2022; Knecht et al., 2015; Reavis et al., 2013) and point to areas for early intervention and prevention and a need for future research to examine the ways in which these factors may uniquely impact people with FASD. Despite these advances, there remains a need for more long-term research to understand and monitor patterns and trajectories into, through, and beyond the CLS, and an equally rigorous focus on prevention and early intervention programming to reduce the risk of entrenched involvement.

The evidence on criminogenic risk among people with FASD is limited but growing. In two studies using risk assessment tools in research contexts, certain differences (McLachlan et al., 2018) and trends (Flannigan et al., 2022) in risk and protective factors emerged. Although this research is an important step toward better understanding and preventing criminality among people with FASD, risk assessment tools in these studies were not used in clinical or practical settings, and studies were limited in sample size and scope, thus conclusions cannot be generalized beyond a research context. Importantly, additional insight around risk for criminality among people with FASD was gained in emerging research with individuals with living experience, including people with FASD and their caregivers. In one study, caregivers perceived that risk of CLS-involvement increased with difficulties with regulation, substance use, peer influence, and multiple living situations, whereas structure, supervision, opportunity for school and work, resources, and positive peer influences may be protective against CLS involvement (Richer & Watson, 2018). These factors align with risk-related findings from our 2018 review, and those reported among people with other NDDs (Segeren et al., 2018). More research is needed to understand whether or how these factors may be experienced distinctly for people with FASD as important considerations for crime prevention and intervention. Additionally, this research underscores not only the personal and social challenges and systemic failures that may contribute to encounters with the CLS, but also the self-awareness, strengths, strategies and resiliencies that may protect against CLS involvement (Gilbert, Allely, Hickman, et al., 2023; Reil et al., 2022; Richer & Watson, 2018), which are equally important to inform programs and policies for reducing criminality and supporting healthy outcome.

There are still critical gaps in our knowledge about the nature, nuances, and complexity of CLS trajectories and outcomes for people with FASD. More high-quality research on the experiences of people with

FASD at various life stages and points of contact in the CLS is warranted for more nuanced understanding of trajectories and outcomes. For instance, investigating how experiences of those with FASD differ or change along the various stages of CLS involvement (i.e., pre-crime, police interaction, pre- and post-sentencing, incarceration, community reintegration) would be helpful to uncover factors that potentially escalate negative effects or outcomes, and how better support at each stage of involvement may reduce risk and support individuals in exiting the system. Moreover, investigation is needed around whether and how protective factors such as early diagnosis and living in a stable and nurturing home (Streissguth et al., 2004) may help to reduce CLS contact for people with FASD, whereas risk factors such as housing insecurity and substance use may prolong contact. Knowledge of these interactions and complexities is important for understanding the holistic and ecological needs of people with NDDs who are involved in the CLS (Holland et al., 2023) and for informing crime prevention, intervention, and re-integration initiatives.

4.3. Socio-cultural considerations

Several studies included in this review focused specifically on Indigenous peoples with FASD who are involved in the CLS (Banerji & Shah, 2017; Blagg et al., 2017; Blagg & Tulich, 2018; Brownell et al., 2019; Flannigan et al., 2022; Flannigan, Pei, Rasmussen, et al., 2018; Flannigan, Pei, Stewart, & Johnson, 2018; Flannigan, Rollans, et al., 2023; Hamilton, Maslen, Watkins, et al., 2020). The broader FASD literature reflects growing awareness regarding critiques that can be made of research focused on Indigenous peoples and FASD. For example, attention has been drawn to pan-Indigenous representations that obscure the diverse cultures, histories, and experiences of First Nations, Métis, and Inuit peoples (Hanson et al., 2023; Pacey, 2009; Wolfson et al., 2019). There are also criticisms about researchers' general failure to appropriately contextualize understandings of FASD socially and historically (Tait, 2003), including limited consideration of the impacts of colonialism and intergenerational trauma (Dickson & Stewart, 2022) and reliance on outdated evidence with limited generalizability (Wolfson et al., 2019). Where these critiques apply to research on FASD and Indigenous peoples in general, they should also be considered in relation to research on FASD and Indigenous peoples involved in the CLS more specifically. Although research can undoubtedly help to advance prevention and intervention efforts, research can also be and has been used as a tool to advance colonial logic and deficit-based narratives about Indigenous peoples. For example, Tait (2008) argues that the general public's perceptions of FASD being elevated among Indigenous peoples have been used to fuel stereotypes and justify surveillance of Indigenous women. FASD among CLS-involved Indigenous peoples is complex, and research must be conducted in a way that is culturally safe and non-stigmatizing, and that prioritizes Indigenous knowledge, values, and worldviews, along with the principles of equity and justice (Hewlett et al., 2023).

4.4. Need for training and resources

The literature on FASD knowledge, attitudes, practice, and training needs among service providers has also grown considerably since 2018. Nine studies were identified involving professionals in the custodial workforce (Heanue et al., 2022; Passmore et al., 2018), forensic mental health clinicians (McLachlan et al., 2021), public defenders, and sexual offending treatment providers (Brown et al., 2017, 2019). Across these studies, professionals' general awareness of FASD was strong, and service providers were highly motivated to learn more about FASD and modify their practice accordingly (Brown et al., 2017, 2019; Heanue et al., 2022; McLachlan et al., 2021; Passmore et al., 2018). However, service providers were often reported to lack confidence, preparedness, and strategies for meeting the needs of clients with FASD, and the majority desired formal training focused on improving knowledge of

behaviours associated with FASD in CLS contexts, building skills for working with clients with FASD, accessing more resources, and creating stronger networks to help navigate CLS frameworks (Pedruzzi et al., 2021). This desire for better access to training and strategies for supporting people with FASD in justice contexts was also reported in our previous review, indicating a critical remaining gap in CLS professional development, training, and resources. Notably, only one study was identified where researchers delivered FASD training for custodial staff (Passmore et al., 2021). This training led to improvements in FASD knowledge and awareness, as well as confidence and preparedness in working with this population, offering preliminary evidence for the promise and potential of such interventions. As this work continues, it will be important for future researchers to explore the nuances of training format (e.g., virtual, in-person, hybrid) and content (e.g., identification, intervention) which will likely vary by profession, setting, and jurisdiction.

4.5. Emerging trends

Across studies, several additional overarching trends were identified. First, many researchers highlighted the relevance of trauma within the context of FASD and CLS involvement. Trauma and adversity were reported in studies of clinical needs (Flannigan et al., 2022; Mela et al., 2020) as well as research on FASD prevalence in correctional settings (McLachlan et al., 2019), CLS trajectories of individuals diagnosed with FASD (Tan et al., 2022), recovery capital among incarcerated youth (Hamilton, Maslen, Best, et al., 2020), and diversionary approaches for Indigenous youth (Blagg et al., 2017; Blagg & Tulich, 2018). This trend reflects the broader FASD literature on trauma and adversity (Flannigan, Kapasi, et al., 2021) and underscores the need for evidence-based trauma-informed responses to FASD in CLS contexts, as well as stronger public health initiatives to prevent trauma from occurring in the first place (Magruder et al., 2016).

Second, the relevance of stigma and potential impacts related to identification and support of people with FASD within the CLS were discussed across multiple studies. This trend was apparent in many ways, including a belief among CLS professionals that an FASD diagnosis could lead to stigma (Chu et al., 2024), and related reluctance among both service providers and individuals with possible FASD to complete assessments (Mullally et al., 2023; Pedruzzi et al., 2021). In this way, stigma, discrimination, and oppression can create barriers to service access and undermine capacity to adequately understand and support people with FASD in the CLS (Dunbar Winsor, 2021; Gibbs, 2022; Mullally et al., 2023). Moreover, experiences of stigma may be exacerbated for Indigenous peoples involved in the CLS, as FASD may be harmfully misunderstood as an "Aboriginal problem" (Dunbar-Winsor, p. 13). Indeed, Indigenous caregivers spoke of the potential for unique stigma and shame following diagnosis of youth involved in the CLS (Hamilton, Maslen, Watkins, et al., 2020). These findings reflect other research on public narratives surrounding the intersection of FASD and the CLS (Aspler et al., 2019, 2018; Aspler, Bogossian, & Racine, 2022; Aspler, Harding, & Cascio, 2022) and the racialization of FASD and compounding harms for Indigenous peoples involved in the CLS (Dickson & Stewart, 2022; Tait, 2003). Together these findings raise critical questions around public and professional perceptions of FASD, stereotypes, discrimination, racism, and practical and ethical implications of the ways in which FASD is perceived and understood within CLS contexts. More work is clearly needed to reduce and prevent the perpetuation of stigma and the significant personal and social harms that it has on people with FASD and their families.

Finally, aligning with trends in the general FASD literature (Flannigan, Wrath, et al., 2021; Olson & Sparrow, 2021), several studies identified in this review integrated strengths-based perspectives. Researchers discussed recovery capital (Flannigan, Rollans, et al., 2023; Hamilton, Maslen, Best, et al., 2020) and linguistic diversity among CLS-involved youth with FASD (Kippin et al., 2018), pointed out strengths in

certain areas of neurocognitive functioning (Flannigan et al., 2019, 2022), identified strong levels of self-awareness and determination to change (Flannigan, Rollans, et al., 2023; Gilbert, Allely, Hickman, et al., 2023), and incorporated strengths-based approaches to intervention (Brintnell et al., 2019; Flannigan, Rollans, et al., 2023; Longstaffe et al., 2018). This small number of studies builds on the growing literature on strengths and resilience and helps to balance the narrative around FASD to be more inclusive of the *whole person*, including strengths, success, and opportunity, rather than solely mitigating risk and responding to challenges (Flannigan, Wrath, et al., 2021; Kautz-Turnbull et al., 2023; Olson & Sparrow, 2021). Future research should incorporate this evidence on strengths and resources to inform strategies and interventions that build resilience and healthy outcomes for people with FASD in the CLS.

4.6. Limitations

The current study was limited in several ways. First, the eligibility criteria and search terms we used to identify new studies were limited to the same established in our 2018 review. Although the use of these criteria and terms ensured consistency between the original and updated review, valuable studies may have been excluded from analysis. For example, topics that have been gaining momentum such as fitness/competence to stand trial, voluntariness, criminal responsibility, and insanity defense were not explicitly included as search terms but may have yielded important findings. Relatedly, we focused only on peer-reviewed academic research in this review, and important contributions from the grey literature were not reflected in our findings. Finally, we did not include a risk of bias or quality assessment in this study, which, although consistent with the approach used in our original review, would have offered an additional level of analysis and insight into literature gaps and future directions. Despite these limitations, this study provides an important update on the state of literature related to FASD and the CLS that can help to guide future research, practice, and policy decisions.

5. Conclusion

Since the publication of our 2018 review of research related to FASD and the CLS, the literature in this area has more than doubled. Although in some ways this indicates an increased acknowledgement of the importance of better understanding and supporting CLS involved individuals with FASD, important gaps remain. Moving forward, it will be important to expand the evidence base with high quality studies that bridge what is currently known about the challenges and complexities of FASD and the CLS with practical, measurable, and meaningful supports and solutions. Coordinated and collaborative efforts are needed across research, practice, and policy levels to bolster individual and community strengths and resiliencies in support of wellbeing and healthy outcomes for all people with FASD and their families.

Other information

This systematic review adhered to the guidelines outlined by the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021) and Tong et al.'s (2012) guidelines for Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ). The review was pre-registered with PROSPERO (CRD42022358579), an international prospective register of systematic reviews.

CRedit authorship contribution statement

Katherine Flannigan: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Conceptualization. **Jessica W. Pun:** Writing – review &

editing, Writing – original draft, Visualization, Validation, Investigation. **Pamela Buttinger:** Writing – review & editing, Writing – original draft, Validation, Investigation, Conceptualization. **Kaitlyn McLachlan:** Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Conceptualization. **Kathleen Holmstrom:** Writing – original draft, Validation, Investigation. **Melissa Tremblay:** Writing – review & editing, Writing – original draft, Conceptualization. **Mansfield Mela:** Writing – review & editing, Conceptualization. **Jacqueline Pei:** Writing – review & editing, Conceptualization.

Declaration of competing interest

We have no conflicts of interest to declare.

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