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Prevalence and Factors Associated With Alleged Offending Among Children Aged 10–13 Years in the Northern Territory of Australia

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ABSTRACT

Recent policy discourse in Australia focuses on the minimum age of criminal responsibility with minimal attention to prevention strategies. Guided by theory which views child development within nested environmental contexts and recognises the cumulative impact of risk factors, this retrospective cohort study uses de-identified linked administrative data to investigate the prevalence of, and factors associated with, alleged offending among children aged 10–13 years (recorded in police data). The study included all Northern Territory (NT) government school children who turned 10 between 1/7/2014 and 30/6/2015 (turning 14 before 1/7/2019) and remained in NT until age 14 ($n = 2530$). Results showed 10.3% of children had at least one alleged offence before age 14, with higher rates among Aboriginal children. High levels of 'crossover' with the child protection system was identified among alleged offenders with 87.8% subject to child protection notifications and 10.0% with experiences of out-of-home care. Mental health issues (20.3%), exposure to domestic violence (64.0%) and school changes (57.5%) were common among alleged offenders. The findings suggest alleged youth offending has multiple risk factors, requiring a paradigm shift towards multifaceted, prevention-focused and culturally responsive interventions. This includes early intervention, public health approaches and acknowledging the existence of institutional racism and intergenerational trauma.

1 | Introduction

One of the pressing social issues in Australia is the over-representation of Aboriginal and Torres Strait Islander peoples in both child protection and youth justice systems. Aboriginal and Torres Strait Islander Australians comprise 6% of the Australian population aged 10–17, but 42% of those in out-of-home care and 49% of those in detention (Australian Institute of Health and Welfare 2022; Productivity Commission 2022). This disparity is particularly pronounced in the Northern Territory (NT), where Aboriginal and Torres Strait Islander (hereafter respectfully referred to as Aboriginal people, which is the stated preference of NT Aboriginal people) children constitute 91% of children in out-of-home care and 96% of youth detainees, despite representing only 42% of the total 10–17-year-old population (Australian Institute of Health and Welfare 2022; Productivity Commission 2022). This over-representation stems from a complex interplay of factors, including poverty, social disadvantage and the enduring legacy of historically forced assimilation and child removal policies (Australian Law Reform Commission 2017; Cunneen and Libesman 2000; House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs 2011; Menzies 2019; Wilkie 1997). Institutional and systemic racism within these

systems further compounds this disparity (Cunneen 2019), intersecting with the well-established link between child maltreatment and youth offending (Malvaso et al. 2016). This link is illuminated through multiple theoretical frameworks. Developmental perspectives suggest early maltreatment disrupts age-appropriate development (Cicchetti and Toth 1995), while life-course approaches emphasise the significance of adolescent experiences in behavioural outcomes (Sampson and Laub 2005). These complementary frameworks align with Bronfenbrenner's Ecological Systems Theory, which posits that child development unfolds through nested environmental contexts—from immediate family units to broader societal structures (Bronfenbrenner 2005). This bio-ecological lens reveals how various risk factors rarely occur in isolation but rather co-occur and compound over time.

A growing concern in Australia centres on alleged youth offending occurring between ages 10 and 13. In the NT, the prevalence of being charged for alleged offending has increased more significantly for this age group compared to those aged 14–17 from the year 2001 to 2019 (He et al. 2023). This trend is mirrored in other jurisdictions, such as South Australia, where despite overall decreases in youth justice system contact, the proportion of younger children entering the system has risen (Malvaso et al. 2020). The South Australia research also indicates that children first supervised between ages 10 and 13 often face more punitive supervision types compared to those entering the system later (Malvaso et al. 2020). Victorian studies further demonstrate that early police charges correlate with complex support needs, including emotional, mental, behavioural and disability-related issues (Baidawi and Sheehan 2019). Notably, a previous NT study found increased alleged youth offending among Aboriginal children with child protection notifications in both early and middle childhood, and among those with substantiated maltreatment in middle childhood (He et al. 2021) compared to Aboriginal children without any child protection notifications. Collectively, these studies emphasise the critical importance of identifying specific risks and protective factors associated with youth offending in Australia.

The media exposure of young Aboriginal detainee mistreatment in 2016 (Australian Broadcasting Commission 2016) catalysed significant system reform through a Royal Commission. Informed by the extensive existing research linking child maltreatment and youth offending, the scope of the Royal Commission was widened to include young people in both child protection and youth justice systems. To inform the adoption of a public health approach, the Royal Commission recommended identifying the size and characteristics of 'crossover children'. 'Crossover children' are children with experience of child maltreatment and engagement in delinquent behaviour, who may or may not be involved with child protection or youth justice systems (Herz et al. 2019). Other recommendations from the Royal Commission included taking a public health approach to child protection and youth justice systems, in which punitive practices for managing youth detainees were replaced by therapeutic and trauma-informed approaches. However, while the Royal Commission reported significant unmet mental health needs among children involved with both systems, its recommendations for mental healthcare were notably limited to clinical services and assessments for high-risk youth in detention or residential care, with no mention of a potential preventive role for mental health services or behavioural interventions in primary healthcare, education or community settings (Royal Commission and Board of Inquiry into the Protection and Detention of Children in the Northern Territory 2017).

Another significant outcome of the Royal Commission was reform to the minimum age of criminal responsibility (MACR). Prior to 2023, Australian jurisdictions uniformly maintained this age at 10 years. The NT led national reform by increasing the MACR to 12 years on 1 August 2023, sparking similar initiatives across Australia, with the Australian Capital Territory, Tasmania and Victoria committed to raising the MACR to 14. However, the policy landscape and legislative provisions regarding the MACR are dynamic and may change over time and across different jurisdictions. In August 2024, Victoria revised its initial commitment of raising the MACR from 14 to 12 (Australian Broadcasting Commission 2024a). Furthermore, on 17 October 2024, the NT enacted legislation to reinstate the minimum age to 10 years, becoming the first jurisdiction to lower the MACR from 12 to 10 (Australian Broadcasting Commission 2024b).

Recent policy discourse in Australia has focused on legislative changes in the MACR across jurisdictions, yet insufficient attention has been directed towards a critical aspect of prevention: identifying and addressing the underlying factors that lead to children's contact with the justice system. Understanding youth justice requires viewing it as 'a continuum of services and responses from preventative, policing, pre-court, correctional and post-release' (Northern Territory Government 2011). This comprehensive perspective is crucial, as focusing solely on legislative reform overlooks the complex nature of youth justice interventions.

Whilst police represent children's initial contact with the system, most Australian research on crossover children has concentrated on those formally charged or convicted, with limited investigation of police contact (Baidawi 2020; Baidawi and Ball 2023; He et al. 2021; Malvaso et al. 2020, 2017, 2019). Addressing this research gap requires extending beyond these formal systems to identify underlying issues facing children and families that lead to justice system contact (Australian Law Reform Commission 2017; House of Representatives Standing Committee on Aboriginal and Torres Strait Islander Affairs 2011). Examining system involvement necessitates distinguishing between two interconnected yet distinct concepts: the risk of committing an offence and the risk of being apprehended by police or classified as a person of interest (hereafter referred to as 'alleged offending'). Disadvantaged children, particularly those involved with child protection services, might face a higher risk of 'alleged offending' due to heightened police surveillance, even if their risk of committing an offence is similar to other population groups.

Recognising these complexities, this study addresses a significant research gap by extending previous NT research (He et al. 2021) through a longitudinal analysis using police data to examine the prevalence and factors relating to 'alleged offending'. It broadens the traditional definition of crossover children to encompass those with police-recorded alleged offences, rather than limiting the scope to those formally charged. To address

this research gap, this study aims to investigate the three key research questions below.

1. What is the prevalence of police-recorded alleged offending among NT children aged 10–13 years?
2. What is the extent of overlap between involvement of NT children, aged 10–13 years, with the child protection system and alleged offending?
3. What are the key characteristics associated with alleged offending for NT children, aged 10–13 years?

2 | Methods

2.1 | Study Design and Study Population

This is a retrospective population-based cohort study of all children enrolled in NT government schools who turned 10 between 1/7/2014 and 30/6/2015 (thus turning 14 before 1/7/2019) and remained in NT until age 14, referred to as Study Cohort A. Children with a school record of having moved interstate or who died between ages 10 and 13 years were excluded. To make use of information on children from earlier ages, we established Study Cohort B. This excludes from Cohort A those born outside of the NT. The advantage of the use of Cohort B lies in the availability of comprehensive data from earlier ages, including school records from preschool through Year 4, child protection records from ages 0 to 9, and hospital records of the child's mother, including instances of mental health issues, self-harm and all births. Note that individuals included in Cohort A and B turned 12 before 1/7/2017 and were therefore subject to an age of criminal responsibility of 10 years.

2.2 | Data Sources

Data for this study were obtained from an extensive repository of de-identified, individual-level, linked administrative datasets established by the Child and Youth Development Research Partnership (CYDRP). The data repository and its linkage process have been reported elsewhere (Su et al. 2020). This study utilised linked records from nine NT government datasets. Three related to NT government schools (the government school enrolment dataset, the government school attendance dataset, and the government school student information dataset); the NT Police Real Time Online Information Management System (PROMIS); the NT Integrated Justice Information System (IJIS); the Department of Children and Families child protection dataset; NT mortality register; NT Perinatal Data Register; the NT hospital inpatient dataset; and the government mental health outpatient dataset.

The study cohort was identified using information from the NT government school enrolment dataset and the NT mortality dataset (with the later used to identify children who had died before reaching 14 years of age). The school enrolment dataset also provided information on school mobility through its enrolment records. The NT government school attendance dataset supplied information on school attendance and the NT government school student information dataset provided information on demographic variables, including 'English as an additional language' (binary) and 'maternal education status' (categorical). The remoteness classification was based on school location, with children attending schools in six urban centres (Darwin, Palmerston, Katherine, Nhulunbuy, Alice Springs and Tennant Creek) categorised as 'urban', whilst the remainder were classified as 'remote'.

The Police Real Time Online Information Management System (PROMIS) dataset, available from 2014 onwards, was used to identify children with alleged offences at ages 10 through 13 inclusive. PROMIS contained information on all incidents reported to police and alleged offences recorded by police officers, including the incident dates. PROMIS also captures incidents of family and domestic violence. The NT Integrated Justice Information System (IJIS) provided records for individuals charged with an offence, including court appearances.

The child protection dataset from the Department of Children and Families contained comprehensive records detailing the dates and types of child protection notifications, alongside the source and nature of reported concerns. These records further included the dates and outcomes of investigations, substantiation status and harm types, as well as information about out-of-home care placements, including start and end dates.

Several health-related datasets were used: the NT Perinatal Data Register, a statutory collection of demographic, antenatal and birth information, enabled the identification of NT-born children and provided parity information for this subset. The hospital inpatient dataset contains records on hospital admissions from all NT public hospitals, including admission and discharge dates and primary diagnoses (including for mental health-related hospitalisations) and length of stay. The mental health collection dataset provided details of NT government mental health outpatient consultations, including consultation dates.

An algorithmic approach was used to determine Aboriginal status which prioritised datasets based on their data quality (i.e., firstly using the Aboriginal status variable in the health datasets, followed by child protection data, and then education and youth justice records) (Silburn 2018). In the hierarchy of data quality, there was a systematic evaluation of the completeness and quality of each data referenced to the inpatient hospital data. An audit in 2011 demonstrated 98% consistency between recorded Aboriginal status and inpatient interviews (Foley et al. 2012). This approach is consistent with best practice guidelines for linked datasets (Australian Institute of Health and Welfare and Australian Bureau of Statistics 2012). The 'sex' variable was derived in the same way.

2.3 | Outcome Variable

The primary outcome of interest was the first alleged offence recorded in police offender data between ages 10 and 13 years (inclusive). This outcome encompassed instances where a young person was either apprehended by police or classified as a person of interest, irrespective of whether they were formally charged, or any subsequent legal action was pursued. This study measured the prevalence of first 'alleged offence' between ages

10 and 13 years (inclusive), which is specifically referred to four-year prevalence. In epidemiological terms, the outcome is the 'four-year period prevalence'.

2.4 | Risk Factors

For Cohort A, the following risk factors measured at ages 10–13 years (inclusive) examined were: mental health events (i.e., defined as outpatient mental health consultations); child protection interactions (as measured by notifications by type, and out of home placement); and exposure to family and domestic violence (as identified from the police data).

For Cohort B, the following risk factors measured at ages 5–9 years (inclusive) examined were: mental health events, child protection interactions, mother hospitalised with a mental health/behavioural disorder and mother hospitalised with self-harm.

2.5 | Characteristics of the Child

The characteristics of the child we controlled for in the analysis based on Cohorts A and B are: place of birth (with an indicator for NT-born), Aboriginal status, sex, English as an additional language, remoteness (Urban or Remote) and mother's educational status. For Cohort A, we additionally control for school mobility from Y5 to Y6 and school attendance at age 10. For Cohort B, we additionally control for parity, being born to a mother less than 18 years old, school mobility from Y1 to Y4, preschool attendance rate and school attendance rate for Y1–Y4.

2.6 | Analysis

All statistical analyses were conducted using Stata for Windows, Version 17. Firstly, we characterised cohort members with alleged offences and without alleged offences by providing descriptive statistics for each subsample for study Cohort A and B. Given the previously documented role of overlap between the child protection and youth justice system, we provided a visualisation of child protection notifications, out-of-home care and youth court and police alleged offending using a Venn diagram created with the Stata module ('pvenn2') (Gong and Ostermann 2011). We then reported the prevalence of alleged offending (from age 10 to 13) for study Cohort A and B by demographic variables. Modified Poisson regression (with robust variance) (Zou 2004) was then used to examine the association between the risk factors and having at least one alleged offence from the ages of 10 to 13 years (inclusive) for Cohort A and B using multivariable analyses (controlling for child characteristics).

2.7 | Ethical Approval and Adherence to AIATSIS Code of Ethics

The study was approved by the Human Research Ethics Committee of the NT Department of Health and the Menzies School of Health Research (HREC-2018-3261) and was supported by a First Nations Advisory Group, which includes independent Aboriginal community members. The First Nations Advisory Group endorses and supports the methodology, aims, and objectives of this research and supports the progression of this research study. This group has been instrumental in guiding the research in CYDRP to ensure its alignment with community priorities and values and ensuring that the management and use of research data is adhering to the AIATSIS Code of Ethics and Indigenous Data Sovereignty principles (Australian Institute of Aboriginal and Torres Strait Islander Studies 2020). The research team includes an Aboriginal researcher with a legal background, who has made substantial contributions to this study, ensuring Indigenous perspectives were embedded in the study analysis and writing.

3 | Results

3.1 | Characteristics of the Study Cohort

A total of 2975 children who turned 10 years of age were enrolled in NT government schools from 1/7/2014 to 30/6/2015 (Figure S1). After applying the exclusion criteria, there were 2530 children in study Cohort A, with similar proportions of Aboriginal (50.8%) and non-Aboriginal children (49.2%). The most significant of the exclusion criteria was children who moved interstate at ages 10–13. Similar proportions of Aboriginal children (15.9%) and non-Aboriginal children (13.7%) were recorded as having moved interstate. For Aboriginal and non-Aboriginal children, there were no differences in the age 10 school attendance rates between children who moved to interstate schools and those who remained in the NT from age 10 to 13 (Table S1). For non-Aboriginal children, there was a higher proportion of children in remote regions among those who moved to interstate schools compared to those who remained in the NT (10.7% c/w 3.4%, $p < 0.001$); for Aboriginal children, the proportions of children in remote regions were similar for those who moved and those who remained in the NT (62.5% c/w 58.8%, $p = 0.290$) (Table S1). The proportion of children having alleged offences was similar for children who moved to interstate schools and those who remained in NT from age 10–13 (10.0% c/w 10.3%, $p = 0.840$). The proportions of children with an alleged offence were also similar for the two groups (i.e., interstate movers and stayers) among both the Aboriginal children (17.3% c/w 18.6%, $p = 0.631$) and non-Aboriginal children (1.0% c/w 1.8%, $p = 0.443$). In the life-course analysis (Cohort B), children born interstate were excluded, leaving 1766 children in Cohort B.

Of the 2530 children in Cohort A, 10.3% had at least one alleged offence (in police data) before their 14th birthday, 4.3% had been charged, 39.1% had been notified to the child protection system and 2.8% had at least one out-of-home care placement from age 10 to 13. The characteristics of the study cohort and by alleged offending status are summarised in Table 1.

Table 1 showed that one-tenth of children who were alleged offenders (from Cohort A) had an out-of-home care placement (10.0%), while the majority of them had child protection notifications from ages 10 to 13 (87.8%). In contrast, less than 2% (1.9%) of children without an alleged offence had an out-of-home care placement, and 43.5% had a child protection notification. Aboriginal children comprised 91.6% of children with alleged

TABLE 1 | Socio-demographic, perinatal and child protection characteristics of children with alleged offending (in age 10–13), children without alleged offending, and all children in the study cohort (children enrolled in NT government schools at age 10 from 1 July 2014 to 30 June 2015).

	Alleged offending		
	Yes	**No**	**All**
All children (study Cohort A)			
Number of children, *N*	261	2269	2530
Proportion, %			
Born in NT			
NT-born	91.2	67.3	69.8
Interstate/overseas	8.8	32.7	30.2
Aboriginal status			
Aboriginal	91.6	46.1	50.8
Non-Aboriginal	8.4	53.9	49.2
Sex			
Female	31.0	50.1	48.1
Male	69.0	49.9	51.9
English as an additional language			
No	13.8	37.4	35.0
Yes	86.2	62.6	65.0
Remoteness			
Urban	46.0	69.0	66.6
Remote	54.0	31.0	33.4
Mother education status			
Completed school (Year 10)	46.0	74.0	71.1
Not completed school (Year 10)	31.4	15.3	17.0
Enrolled to school not by mother	13.4	5.2	6.0
Missing data	9.2	5.6	6.0
Mobility from Y5 to Y6			
Not changed school	42.5	74.1	70.8
Moved from urban to urban	7.7	5.3	5.5
Moved from remote to remote	18.8	10.0	10.9
Moved from remote to urban (or vice-versa)	31.0	10.0	12.2
School attendance at age 10			
> 80%	33.0	67.6	64.0
60%–79%	41.4	21.5	23.6
< 60%	25.7	10.8	12.3
Experience from age 10–13 year old			
Mental health event			
No	79.7	95.5	93.9
Yes	20.3	4.5	6.1
Out-of-home care placement			
No	90.0	98.1	97.2
Yes	10.0	1.9	2.8
CP notifications			
No	12.3	66.5	60.9
Abuse only	9.2	11.3	11.1
Neglect only	17.6	8.6	9.6
Abuse and neglect	60.9	13.6	18.5
Exposed to Family/Domestic Violence			
No	36.0	81.7	77.0
Yes	64.0	18.3	23.0
NT-born children (study Cohort B)			
Number of children, *N*	238	1528	1766
Proportion, %			
Parity			
0	26.1	34.4	33.2
1	28.6	27.3	27.5
≥ 2	45.4	38.4	39.3
Born to mother aged < 18 year old			
No	81.9	91.6	90.3
Yes	18.1	8.4	9.7
Mobility from Y1 to Y4			
Not changed school	32.4	59.2	55.5
Moved from urban to urban	8.8	10.5	10.3
Moved from remote to remote	24.4	15.1	16.3
Moved from remote to urban (or vice-versa)	33.6	13.6	16.3
Preschool school attendance			
> 80%	14.7	40.6	37.1
60%–79%	29.8	24.6	25.3
< 60%	36.6	20.8	22.9

(Continues)

TABLE 1 | (Continued)

	Alleged offending		
	Yes	**No**	**All**
Not enrolled in preschools	18.9	13.9	14.6
School attendance at Y1–Y4			
> 80%	26.9	57.3	53.2
60%–79%	46.2	27.1	29.7
< 60%	26.1	14.0	15.6
Experience from age 0–9 year old			
Mental health event			
No	89.5	96.6	95.6
Yes	10.5	3.4	4.4
Mother hospitalised with mental health/behaviour disorder			
No	68.5	87.9	85.3
Yes	31.5	12.1	14.7
Mother hospitalised with self-harm			
No	68.9	89.2	86.5
Yes	31.1	10.8	13.5
Out-of-home care placement			
No	89.5	96.6	95.6
Yes	10.5	3.4	4.4
CP notifications			
No	23.1	62.2	56.9
Abuse only	20.2	16.3	16.8
Neglect only	16.4	7.7	8.9
Abuse and neglect	40.3	13.8	17.4

offences and 46.1% of children without alleged offences (in Cohort A). It is also notable that one-fifth of alleged offenders had at least one mental health event, and more than two-thirds were exposed to family/domestic violence from age 10 to 13 (Table 1). About three-fifths of the children who were alleged offenders had changed schools between Years 5 and 6. Among the NT-born children who were alleged offenders, about one-third had moved between remote and urban schools, and one-quarter had moved between different remote schools from Years 1 to 4 (Table 1).

In terms of the overlap between child protection and youth justice systems, most children with child protection notifications (89.5%; 886 out of 990 children) and children with out-of-home care placements (84.2%; 59 out of 70 children) did not face charges in court from ages 10 to 13 (Figure S2). This is also the case when the justice outcome is alleged offence in police data from age 10 to 13 (76.9% and 62.9% respectively) (Appendix S3). However, compared to children without child protection notifications, there was an over-representation of children with child protection notifications among children with alleged offences or charges.

The majority of children who faced charges in court, or who had allegations against them in police data, from ages 10 to 13 had previously been reported to child protection services but had not been placed in out-of-home care from age 10 to 13. Children who had been placed in out-of-home care accounted for 10.2% of children with charges in court (11 out of 108 children). On the other hand, children with child protection notifications, but who were not placed in out-of-home care, made up 86.1% of children with charges in court from ages 10 to 13 (93 out of 108 children) (Figure S2).

Similarly, children in out-of-home care accounted for 10.0% of children with alleged offences in police data from ages 10 to 13 (26 out of 261 children). In contrast, children with child protection notifications, but not in out-of-home care, accounted for 77.8% of children with alleged offences in police data from ages 10 to 13 (203 out of 261 children) (Figure S3).

Nearly half of the children with alleged offences in police data from ages 10 to 13 had been reported to the child protection system for experiencing abuse (49.8%; 130 out of 261 children) and/or neglect (55.9%; 146 out of 261 children) from age 10 to 13 (Figure S4).

3.2 | Prevalence of Alleged Offending (In Age 10–13) and the Association With Explanatory Variables in Univariate and Multivariable Analyses

Tables 2 and 3 showed the prevalence of alleged offending (at ages 10–13) and the associations between the risk factors experienced by the child (as well as child and mother characteristics) and alleged offending estimated using univariate and multivariable Modified Poisson models for Cohort A, all children (Table 2) and Cohort B, NT-born children (Table 3) enrolled in NT government schools at age 10 from 1 July 2014 to 30 June 2015, respectively. The prevalence of alleged offending (at ages 10–13) among Aboriginal males, Aboriginal females, non-Aboriginal males and non-Aboriginal females was 24.2%, 12.3%, 2.5% and 1.0% respectively (not shown in tables).

For both study cohorts, child protection notifications had the strongest association with alleged offending in the multivariable regressions that adjusted for characteristics of the child and mother. In the multivariable analysis, children with abuse only notifications at ages 10–13 years (inclusive) were twice as likely to have an alleged offence, children with neglect only notifications from the ages of 10 to 13 years (inclusive) were four times as likely to have an alleged offence, and children with both abuse and neglect notifications at ages 10–13 were five times more likely to have an alleged offence relative to a child without a child protection notification (Table 2). Similarly, children with either only abuse or only neglect notification over ages 0–9 were twice as likely to have an alleged offence while children with both abuse and neglect notifications at ages 0–9 were three times more likely to have an alleged offence relative to a child without a child protection notification (Table 3). Children with mental health

TABLE 2 | Prevalence (%) of alleged offending aged 10–13 years and the association with explanatory variables in univariate and multivariable analyses, children enrolled in NT government schools at age 10 from 1 July 2014 to 30 June 2015 (Cohort A).

		Univariate		Multivariable	
	Prevalence	Ratio[a]	95% CI	Ratio[b]	95% CI
Place of birth					
NT-born	13.5	1.00		1.00	
Interstate/overseas	3.0	0.22	[0.15–0.34]**	0.76	[0.51–1.12]
Aboriginal status					
Non-Aboriginal	1.8	1.00		1.00	
Aboriginal	18.6	10.51	[6.84–16.15]**	3.05	[1.87–4.99]**
Sex					
Female	6.7	1.00		1.00	
Male	13.7	2.06	[1.61–2.65]**	2.21	[1.77–2.75]**
English as an additional language					
No	4.1	1.00		1.00	
Yes	13.7	3.36	[2.39–4.73]**	1.19	[0.85–1.68]
Remoteness of school at age 10					
Urban	7.1	1.00		1.00	
Remote	16.7	2.34	[1.86–2.95]**	0.99	[0.76–1.29]
Maternal educational status					
Completed school (Year 10)	6.7	1.00		1.00	
Not completed school (Year 10)	19.1	2.86	[2.21–3.72]**	1.21	[0.94–1.57]
Unknown[b]	23.0	3.45	[2.46–4.84]**	1.57	[1.13–2.17]**
Missing	15.9	2.38	[1.59–3.57]**	1.25	[0.86–1.82]
School mobility from Y5-Y6					
Not changed school	6.2	1.00		1.00	
Moved from urban to urban	14.3	2.31	[1.48–3.60]**	1.18	[0.79–1.76]
Moved from remote to remote	17.7	2.86	[2.09–3.90]**	1.04	[0.75–1.44]
Moved from remote to urban (or vice-versa)	26.3	4.25	[3.27–5.50]**	1.17	[0.91–1.50]
School attendance at age 10					
> 80%	5.3	1.00		1.00	
60%–79%	18.1	3.41	[2.61–4.46]**	1.11	[0.84–1.47]
< 60%	21.5	4.06	[3.02–5.45]**	1.13	[0.84–1.54]
Mental health event (age 10–13)					
No	8.8	1.00		1.00	
Yes	34.4	3.93	[3.05–5.07]**	1.74	[1.38–2.20]**
Out-of-home care (age 10–13)					
No	9.6	1.00		1.00	
Yes	37.1	3.89	[2.80–5.40]**	1.07	[0.78–1.47]

(Continues)

TABLE 2 | (Continued)

	Prevalence	Univariate		Multivariable	
		Ratio[a]	95% CI	Ratio[b]	95% CI
CP notifications (age 10–13)					
No	2.1	1.00		1.00	
Abuse only	8.5	4.11	[2.46–6.87]**	1.72	[1.00–2.96]*
Neglect only	19.0	9.15	[5.95–14.07]**	3.81	[2.43–5.96]**
Abuse and neglect	34.0	16.39	[11.37–23.61]**	4.81	[3.14–7.37]**
Exposed to DV (age 10–13)					
No	4.8	1.00		1.00	
Yes	28.6	5.93	[4.69–7.51]**	2.12	[1.65–2.71]**

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
[a]Prevalence ratio.
[b]Unknown as the school enrolment of the child was completed by a person other than the mother.

events (at ages 10–13 for Cohort A, or ages 0–9 for Cohort B) were twice as likely to have an alleged offence at ages 10–13, as shown in Tables 2 and 3. Children who had been exposed to family/domestic violence were also twice as likely to have an alleged offence compared to a child who had not been exposed to family/domestic violence at ages 10–13 years (inclusive) (Table 2). Family characteristics that may be associated with disadvantage, such as being born to a mother aged less than 18, a mother who has not completed Year 10 education, having siblings, and moving from remote to urban schools, are also risk factors for having an alleged offence (Table 3). Males are twice as likely as females to have an alleged offence in both univariate and multivariable Modified Poisson estimates. While Aboriginal status is associated with an 8–10 fold increase in the likelihood of having an alleged offence at ages 10–13 in the univariate analysis, after adjusting for characteristics of the child (including the child's mother), Aboriginal status is associated with a threefold increase in the likelihood of being an alleged offender.

4 | Discussion

This study documents the prevalence of alleged offending among children aged 10–13 years (recorded in police administrative data) and examines associations between alleged offending and risk factors. Compared to previous studies, we broaden the consideration of crossover children from those who are in out-of-home care and who either face charges in court or who are in detention, to include those with any child protection notifications and to those with police recorded alleged offences.

Our findings reveal that 10.3% of children in our cohort had at least one alleged offence recorded in police data before their 14th birthday. This four-year period prevalence varied by gender and Aboriginal status, with Aboriginal males showing the highest rate (24.2%), followed by Aboriginal females (12.3%), while non-Aboriginal children had substantially lower rates (2.5% for males and 1.0% for females).

Regarding the overlap between systems, whilst the majority of children with child protection notifications (89.5%) and out-of-home care placements (84.2%) did not face charges in court, there was a clear over-representation of children with child protection histories among alleged offenders. Strikingly, 87.8% of alleged offenders had prior child protection notifications, though only 10% had experienced out-of-home care. Nearly half of alleged offenders had been reported for experiencing abuse (49.8%) and/or neglect (55.9%). Further, 64% of alleged offenders were recorded as exposed to family or domestic violence and 20% experienced a mental health event over ages 10 to 13, compared to 18% and 4%, respectively, among 10 to 13-year-olds without an alleged offence. These statistics highlight the significant intersection between victimisation and subsequent contact with the justice system.

The characteristics and experiences associated with alleged offending paint a complex picture. Aboriginal children comprised 91.6% of alleged offenders, despite representing only 50.8% of the total cohort. Our multivariable regression analyses demonstrated that while Aboriginal status was significantly associated with alleged offending, this relationship was substantially mediated by other socioeconomic and environmental factors.

These empirical findings demonstrate that alleged youth offending emerges from a complex interplay of cumulative risk factors rather than a singular factor, necessitating a multifaceted approach to prevention and intervention strategies. Three crucial implications for policy and practice emerge from these empirical findings.

4.1 | Early Contact With the Child Protection System Is an Opportunity to Support Youth and Their Families and Prevent Future Youth Offending

Our findings highlight the critical importance of strengthening early intervention services for children with child maltreatment. Our study corroborates previous studies showing a link between

TABLE 3 | Prevalence (%) of alleged offending aged 10–13 years and the association with extended explanatory variables in univariate and multivariable analyses, NT-born children enrolled in NT government schools at age 10 from 1 July 2014 to 30 June 2015 (Cohort B).

		Univariate		Multivariable	
	Prevalence	Ratio[a]	95% CI	Ratio[a]	95% CI
Aboriginal status					
Non-Aboriginal	2.5	1.00		1.00	
Aboriginal	19.8	7.94	[4.83–13.07]**	3.06	[1.74–5.39]**
Sex					
Female	8.9	1.00		1.00	
Male	17.7	2.00	[1.55–2.58]**	1.95	[1.53–2.49]**
English as an additional language					
No	5.3	1.00		1.00	
Yes	17.3	3.28	[2.27–4.74]**	1.09	[0.73–1.63]
Remoteness of school at age 10					
Urban	9.9	1.00		1.00	
Remote	18.6	1.88	[1.48–2.38]**	0.88	[0.65–1.18]
Parity					
0	10.6	1.00		1.00	
1	14.0	1.33	[0.96–1.83]	1.53	[1.09–2.14]*
≥	15.6	1.47	[1.10–1.97]**	1.57	[1.11–2.22]*
Born to mother aged < 18 year-old					
No	12.2	1.00		1.00	
Yes	25.1	2.06	[1.54–2.75]**	1.75	[1.23–2.48]**
Maternal educational status					
Completed school (Year 10)	8.8	1.00		1.00	
Not completed school (Year 10)	21.2	2.41	[1.85–3.16]**	1.33	[1.01–1.75]*
Unknown[b]	29.2	3.33	[2.35–4.72]**	1.58	[1.09–2.30]*
Missing	21.6	2.46	[1.65–3.67]**	1.32	[0.88–1.99]
School mobility from Y1 to Y4					
Not changed school	7.8	1.00		1.00	
Moved from urban to urban	11.5	1.47	[0.93–2.32]	1.16	[0.72–1.85]
Moved from remote to remote	20.1	2.57	[1.87–3.51]**	1.33	[0.95–1.85]
Moved from remote to urban (or vice-versa)	27.8	3.54	[2.66–4.70]**	1.48	[1.10–2.00]**
Preschool attendance					
< 80%	5.3	1.00		1.00	
60%–79%	15.9	2.98	[2.02–4.38]**	1.09	[0.75–1.59]
< 60%	21.5	4.03	[2.77–5.84]**	1.14	[0.76–1.72]
Not enrolled in preschools	17.4	3.27	[2.15–4.96]**	1.15	[0.76–1.74]
School attendance at Y1–Y4					
< 80%	6.8	1.00		1.00	

(Continues)

TABLE 3 | (Continued)

		Univariate		Multivariable	
	Prevalence	**Ratio[a]**	**95% CI**	**Ratio[a]**	**95% CI**
60%–79%	21.0	3.08	[2.31–4.11]**	1.15	[0.83–1.58]
< 60%	22.5	3.30	[2.39–4.55]**	1.15	[0.77–1.71]
Mental health event (age 0–9)					
No	12.6	1.00		1.00	
Yes	32.5	2.57	[1.82–3.64]**	2.13	[1.50–3.03]**
Maternal mental hospitalisation					
No	10.8	1.00		1.00	
Yes	28.8	2.67	[2.10–3.39]**	1.24	[0.95–1.63]
Maternal self-harm hospitalisation					
No	10.7	1.00		1.00	
Yes	31.0	2.88	[2.27–3.66]**	1.08	[0.81–1.44]
Out-of-home care (age 0–9)					
No	12.6	1.00		1.00	
Yes	32.5	2.57	[1.82–3.64]**	0.88	[0.59–1.31]
CP notifications (age 0–9)					
No	5.5	1.00		1.00	
Abuse only	16.2	2.95	[2.05–4.25]**	2.06	[1.42–2.99]**
Neglect only	24.8	4.54	[3.12–6.60]**	2.23	[1.52–3.28]**
Abuse and neglect	31.3	5.71	[4.21–7.76]**	3.01	[2.14–4.25]**

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
[a]Prevalence ratio.
[b]Unknown as the school enrolment of the child was completed by a person other than the mother.

child maltreatment and youth offending (Ferrante 2013; He et al. 2019; Hurren Paterson 2015; Hurren Paterson et al. 2017; Malvaso 2017; Malvaso et al. 2016, 2017; Royal Commission and Board of Inquiry into the Protection and Detention of Children in the Northern Territory 2017; Stewart et al. 2008). Children with more than one type of maltreatment were at the highest risk of youth offending. This finding reaffirms previous research that documents a high proportion of Aboriginal children being reported for multiple types of child maltreatment (He et al. 2019). These findings underscore the need for the development of targeted interventions to prevent subsequent involvement in the youth justice system, particularly for children who have been notified for multiple types of maltreatment.

4.2 | An Expansion of Public Health Approaches

Our findings also demonstrate the necessity of adopting a comprehensive public health approach for the prevention of child maltreatment and respond to youth offending. Early contact with the child protection system has previously been recognised as an opportunity for prevention beyond statutory obligations to determine and respond to child maltreatment. In 2010, a public inquiry raised concerns about the child protection system adopting a 'forensic approach that focuses more on the technicalities of whether harm occurred than on meeting the actual needs of families and children' (Bamblett et al. 2010). Among the recommendations in the Inquiry report was a focus on a public health approach supporting early intervention through pathways for families to receive services and support, even for children without any notification or unsubstantiated notification (Bamblett et al. 2010). Such approaches are prioritised in the Australian government's 'National Framework for Protecting Australia's Children 2021–2031' (Department of Social Services 2021) which emphasises public health principles of access to quality, universal and targeted services to strengthen families, help children to thrive and divert children away from statutory services (Jenkins 2021).

4.3 | A Life-Course and Cumulative Risks Lens Which Considers the Complex Interplay of Historical and Contemporary Factors

Our findings underscore the urgent need for a multifaceted approach to address the over-representation of Aboriginal children in the youth justice system—one that acknowledges the complex interplay of historical trauma and contemporary factors,

including systemic bias, through both life-course and cumulative risk perspectives. Bronfenbrenner's Ecological Systems Theory provides a valuable framework for our study, illuminating how child development is shaped by interconnected environmental layers (Bronfenbrenner 2005). This bio-ecological lens reveals how risk exposures compound over time: children experiencing mental health challenges alongside domestic violence face elevated risks of youth offending, whilst school mobility might disrupt learning. These interconnected risk factors highlight the need for comprehensive, multi-agency prevention and intervention approaches.

Our study also emphasises the need to understand the underlying causes of the over-representation of Aboriginal children in the youth justice system. Although our multivariable Modified Poisson model estimates indicated that various disadvantage-related factors could explain over half of the elevated risk of police-recorded alleged offences among Aboriginal youth aged 10–13, a significant risk remained even after adjusting for these factors. This persistent disparity suggests the influence of factors not captured in our datasets, such as differential treatment by law enforcement, the enduring legacy of historical policies (including child removal policies) and a higher likelihood of encountering individual, family, social and contextual circumstances that raise the risk of justice system involvement (Cunneen 2020; Homel et al. 1999). The proximal reasons for this over-representation, and how to address it, need to be considered in light of the intergenerational impacts on Aboriginal people of poverty, displacement, and institutional and social disadvantage stemming from historic policies (Atkinson 2002; McCallum 2022).

Previous research provides some insights into the contributing environmental and socio-political factors that lead to the overrepresentation of Aboriginal crossover children (Ball and Baidawi 2021). Evidence indicates that maltreated Aboriginal children face a higher likelihood of criminal charges and convictions compared to their non-Aboriginal peers (Stewart et al. 2002) (Malvaso et al. 2017). Environmental factors, including inadequate access to safe and affordable housing, health and social services, further exacerbate child protection involvement (Hunter et al. 2020). A lack of culturally competent practice across child protection and youth justice systems may also contribute to higher levels of criminal justice involvement, such as in circumstances of culturally inappropriate practice in residential care (Gerard et al. 2019), and in systems and interventions unable to support Aboriginal children's connections with community, spirituality and cultural practices (Mendes et al. 2016). Addressing the overrepresentation of Aboriginal children in the justice system requires a multifaceted approach that acknowledges the historical context and focuses on culturally appropriate family welfare and child protection system responses, along with preventative interventions (Atkinson 2002; Ball and Baidawi 2021; Malvaso et al. 2019; McCallum 2022).

Furthermore, our findings highlight the need for a life-course perspective that recognises the interconnectedness of various systems. The significant association between mental health events and offending risk emphasises the need for accessible mental healthcare beyond detention settings. Although the NT Royal Commission recommended improved access to mental healthcare assessments and clinical treatment for high-risk youth in detention or residential care, our findings suggest that extending these services to a broader population of children could play a crucial preventative role. This approach aligns with the principle of early intervention, aiming to address mental health needs before they escalate and potentially contribute to justice system involvement. Similarly, school mobility—particularly prevalent among Aboriginal students at 24.7% annually compared to 12.1% for non-Aboriginal students—requires culturally responsive, targeted educational support and inter-regional collaboration to maintain learning continuity (Su et al. 2023).

4.4 | Limitations

Our study is limited to the information in the available administrative datasets and may not fully account for or characterise the context of young people's initial alleged offences. As a consequence, it provides an incomplete view of the nature of interactions of young people with the justice system, or why and how the justice system interacts with them. The study also lacked information on disabilities, such as neurodevelopmental impairments, which previous studies have demonstrated to be linked to youth offending (Baidawi 2020). Another limitation is the absence of data regarding specific interventions implemented following child protection notifications, precluding examination of their potential influence on subsequent youth offending. Furthermore, the study did not explore the protective factors against offending, such as family, Country, culture and spirituality—elements that would be more appropriately explored through qualitative methodologies. A final and methodological limitation in our study is the near-complete nesting of out-of-home placements within child protection notifications in our multivariable model, potentially leading to collinearity. Despite this limitation, both variables were retained in the model as conceptually they capture two distinct aspects of child protection involvement—notifications indicate identified risks of harm, whilst placements reflect systemic responses to these concerns.

The aforementioned limitations, along with the use of a single-year cohort in the smallest Australian jurisdiction, suggest that caution should be taken when drawing general conclusions from the findings. Despite these limitations, this study extends our current understanding and provides valuable new insights for future research of crossover children.

5 | Conclusion

This study reveals the multifaceted nature of risk factors associated with alleged youth offending among NT children aged 10–13 years. Our findings suggest that preventing youth offending requires a nuanced understanding of how various risk factors interact and compound over time. This calls for integrated, culturally responsive services that can address multiple needs. The disproportionate representation of Aboriginal children in both systems—comprising 91.6% of alleged offenders despite representing only 50.8% of the cohort—demands urgent attention. While socioeconomic disadvantage explains part of this

disparity, the persistent overrepresentation even after accounting for these factors points to deeper systemic issues.

The recent policy focus on the MACR in Australia, while important, should not overshadow the need for more fundamental systemic change. Our research highlights three crucial areas for reform. First, there is a pressing need to strengthen early intervention services for children with child protection notifications, particularly those experiencing multiple forms of maltreatment. Second, the adoption of a comprehensive public health approach—extending beyond minimum statutory obligations—could help address the underlying factors that lead to system involvement. Third, any effective response must acknowledge and address the historical context of institutional racism and intergenerational trauma that continues to impact Aboriginal communities. Looking ahead, future research should explore protective factors, particularly those grounded in Aboriginal culture and community strengths. There is also a need to evaluate early intervention and youth justice programmes and to better understand how different systems—education, health, child protection and justice—can work together more efficiently and effectively to support vulnerable children and their families.

Ultimately, this study reinforces the urgent need for a paradigm shift in how we approach youth justice and child protection. Rather than waiting for children to accumulate risk factors that lead to system involvement, we must move towards prevention-focused, culturally responsive approaches that strengthen families and communities. Only through such fundamental change can we hope to break the cycle of system involvement that continues to disproportionately affect Aboriginal children and young people.

Author Contributions

Vincent Yaofeng He: conceptualization, investigation, writing – original draft, writing – review and editing, visualization, validation, methodology, software, formal analysis, project administration, data curation. **Steven Roche:** conceptualization, methodology, writing – review and editing. **Jenny Williams:** conceptualization, methodology, writing – review and editing, validation. **Tamika Williams:** conceptualization, methodology, writing – review and editing. **Steven Guthridge:** conceptualization, funding acquisition, supervision, project administration, writing – review and editing, writing – original draft, methodology, resources.

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Conflicts of Interest

Vincent Yaofeng He is currently an employee of the Northern Territory Government. His involvement in this study predates that employment and the views contained herein do not reflect those of the Northern Territory Government. He initiated and completed the study during his employment at the Menzies School of Health Research until 14 April 2023; subsequently, he began his employment with the Northern Territory Government on 2 May 2023. All other authors declare no conflicts of interest.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.