Maltreatment Risk among Children with Disabilities

Miriam J Maclean[a], BPsych(Hons), MSc, PhD, Scott Sims[a], MBiostat, BSC, Carol Bower[a], MSC, MB BS PhD, FAPHM, Helen Leonard[a], MBChB, MPH, Fiona J Stanley[a], MD, MSC, FFPHM, FAFPHM, Melissa O'Donnell[a], BPsych(Hons), MPsych, Dip Ed, PhD

Affiliations: a. Telethon Kids Institute, University of Western Australia, Perth, Western Australia.

Address correspondence to: Melissa O'Donnell, Telethon Kids Institute, University of Western Australia, 100 Roberts Road, Subiaco, Australia, 6008. Telephone: (08) 9489 7777. Email: Melissa.O'Donnell@telethonkids.org.au

Short Title: Maltreatment Risk among Children with Disabilities

Funding source: This work was supported by an Australian Research Council Linkage Project Grant [LP100200507] and an Australian Research Council Discovery Grant [DP110100967]. Dr Melissa O'Donnell is supported by a National Health and Medical Research Council Early Career Fellowship [1012439].

Financial Disclosure: The authors have no financial relationships relevant to this article to disclose.

Conflict of Interest: The authors have no conflicts of interest relevant to this article to disclose.

Abbreviations:
WA-Western Australia
WARDA- Western Australian Register of Developmental Anomalies
IDEA- Intellectual Disability Exploring Answers
HMDS– Hospital Morbidity Data System
MHIS– Mental Health Information System
ICD- International Classification of Disease
CPFS- Department of Child Protection and Family Support
HR- Hazard Ratio, CI- Confidence Interval
ID- Intellectual Disability
DS- Down syndrome

Table of Contents Summary
Children with disabilities are at increased risk of maltreatment and this population-based study determines whether risk varies by type of disability.

What is known:
Children with disabilities experience elevated rates of child abuse and neglect. Only a few population-based studies have been conducted producing mixed evidence regarding maltreatment risk for children with different types of disabilities.

What this study adds:
Children with disabilities account for one in three substantiated maltreatment allegations, however maltreatment risk was not consistent across all disabilities. Children with intellectual

disability, mental/behavioural problems and conduct disorder had increased risk but not autism, Down syndrome or birth defects.

Contributors' Statement Page

Miriam Maclean conceptualised and designed the study, drafted the initial manuscript and approved the final manuscript as submitted.

Scott Sims carried out the initial analyses, reviewed and revised the manuscript and approved the final manuscript as submitted.

Dr Carol Bower, Dr Helen Leonard and Dr Fiona Stanley contributed to the design of the study, reviewed and revised the manuscript and approved the final manuscript as submitted.

Dr Melissa O'Donnell contributed to the conceptualisation and design of the study, critically reviewed the manuscript and approved the final manuscript as submitted.

Abstract

Background: Children with disabilities are at increased risk of child maltreatment however there is a gap in the evidence about whether all disabilities are at equal risk and whether risk factors vary according to the type of disability.

Methods: A population-based record-linkage study of all children born in Western Australia between 1990-2010. Children with disabilities were identified using population-based registers and risk of maltreatment determined by allegations reported to the Department for Child Protection and Family Support.

Results: While children with disabilities make up 10.4% of the population they represent 25.9% of children with a maltreatment allegation and 29% of those with a substantiated allegation. However increased risk of maltreatment was not consistent across all disability types. Children with intellectual disability, mental/behavioural problems and conduct disorder continued to have increased risk of an allegation and substantiated allegation after adjusting for child, family and neighbourhood risk factors. In contrast, adjusting for these factors resulted in children with autism having a lower risk, and children with Down syndrome and birth defects/cerebral palsy having the same risk as children without disability.

Conclusions: The prevalence of disabilities in the child protection system suggests a need for awareness of the scope of issues faced by these children and the need for interagency collaboration to ensure children's complex needs are met. Supports are needed for families with children with disabilities to assist in meeting the child's health and developmental needs, but also to support the parents in managing the often more complex parenting environment.

Introduction

An estimated 5.1% of children worldwide have a moderate to severe disability[1]. Research shows that children with disabilities experience elevated rates of child abuse and neglect[2-6]. However there are critical knowledge gaps leading United States researchers Kendall-Tackett to state "there is an appalling gap in the states' ability to protect abused and neglected children with disabilities"[7].

At the most basic level, states/countries need to know the proportion of children within their child protection systems who have disabilities, and their types of disability[7]. Risk of maltreatment is associated with child characteristics such as age and ethnicity, parent factors such as young age, mental health problems and substance abuse, and neighbourhood factors such as socioeconomic disadvantage[6]. Families of children with disabilities more frequently experience risk factors associated with a higher risk of maltreatment [8]. However, the risk for maltreatment among children with disabilities has not been explored taking into account the multiple risk factors that often co-occur in the context of these families.

The few population-based studies conducted, have produced mixed evidence regarding maltreatment risk for children with different types of disabilities[9,4,10], and it remains unclear whether disability types, such as intellectual disability (ID), are associated with increased risk. The aims of this research are to: report the prevalence of different disabilities within the child protection system in an Australian state; and to assess risk of maltreatment in various types of disability taking into account child, family and neighbourhood risk factors.

Methods

Population and Data Sources

We conducted a population-based record-linkage study of all children born in Western Australia (WA) between 1990-2010 using de-identified administrative data. Disability information was obtained from four sources which had information for the whole study period 1990 to 2010. The first is the Western Australian Register of Developmental Anomalies (WARDA)[11] which includes structural or functional birth defects that are present before birth and diagnosed by age six, and cerebral palsy. WARDA receives notifications of birth defects from the Midwives Notification System, the Hospital Morbidity Data System and other services, (e.g. genetic, pathology, and private practitioners). The second is the population-based Intellectual Disability Exploring Answers (IDEA)[12] database which provides WA state data on individuals with ID and/or autism, using information provided by the Disability Services Commission (DSC) for individuals of any age with ID who are provided with services, and the Department of Education (individuals with ID receiving education support, predominantly aged 5-17 years). The IDEA database also collects information on severity of ID and for cases obtained through DSC the probable cause utilising diagnostic information reviewed from medical records. Cases could be classified as caused by chromosomal disorders, metabolic disorders, prenatal exposure to alcohol, postnatal injury, cultural-familial (family history of ID/environmental disadvantage), etc[13]. The third is the Hospital Morbidity Data System (HMDS) which contains information on all public and private hospital discharges, including up to 21 diagnostic codes utilising the International Classification of Diseases (ICD) codes (ICD-9:1990-June 1999, ICD-10: July 1999-2010, see Table 1). The fourth is the Mental Health Information System (MHIS) containing information on all mental health-related public and private inpatient admissions and public outpatient contacts with diagnoses captured using ICD codes. This study has ethics approval from the WA Department of Health Human Research Ethics Committee.

Disability for this paper was defined as any limitation or impairment which may affect everyday activities ranging from intellectual, physical, and psychological conditions[14]. This broad definition includes psychological conditions, which are often not diagnosed until adolescence, as well as disabilities typically diagnosed at birth or soon after. Children's disabilities were identified through the four data sources of WARDA, IDEA, HMDS and MHIS, and disability groups were categorised as shown in Table 1. Disability categories were chosen as they were consistent with our definition, were the main disability groups identified in the sources and their sample sizes were adequate for analyses. Children could be grouped in more than one category if they had comorbid conditions, however Down syndrome (DS) was grouped separately as it is both a birth defect and causes ID. Of the 54,532 children who had either ID, birth defect/cerebral palsy, autism, conduct disorder, or a mental/behavioural disorder, 15.6% had one or more comorbidities. For children with ID there was a high rate of comorbidity with other conditions (62.6%).

Table 1. Disability Group and their corresponding codes and databases.

Group	Databases	ICD-9 codes	ICD-10 Codes
Intellectual Disability	IDEA, HMDS, MHIS	317-319	F70-F79
Down Syndrome	IDEA, WARDA, HMDS, MHIS	758.0	Q90
Birth Defects/Cerebral Palsy (All congenital malformations and cerebral palsy)	WARDA*		
Autism	IDEA, HMDS, MHIS	299.0	F84.0, F84.1
Conduct Disorder	HMDS, MHIS	312, 314.0	F90-F92
Mental and Behavioural Disorder** (All other mental/behavioural disorders apart from autism, conduct disorder, and intellectual disability).	HMDS, MHIS	290-316 (excluding 299.0, 312, 314.0)	F00-F69, F80-F99 (excluding F84.0, F84.1, F90-F92
Any Disability	Any of the above	Any of the above	Any of the above

*http://kemh.health.wa.gov.au/services/register_developmental_anomalies/diagnostic_codes_birth_defects.htm

**This includes organic disorders, disorders due to psychoactive substance use, schizophrenia type disorders, mood disorders, behavioural syndromes, stress related disorders, personality disorders, specific developmental disorders, behavioural and emotional disorders).

We also included an additional analysis of two birth defect categories from the WARDA: spina bifida (n=192); and cleft lip and/or palate (n=525), to compare to previous research[15]. The disability data was linked to records from Births Registrations (1990-2010), the Midwives Notification System (1990-2010), Mortality Database (1990-2010) and the Department of Child Protection and Family Support (1990-2010). Using probabilistic linkage of common identifiers such as name, address and birth date, the data were linked by the Department of Health's Data Linkage Branch where extensive clerical review was also conducted as per their process, with a linkage quality of 97-98%[16,17]. The identifiers were separated from the clinical or service information to maximise privacy during the linkage process, with only de-identified information provided to researchers.

The child's gender, Aboriginality, birth weight and gestational age were obtained from Births Registrations and Midwives Notification System, along with parents' marital status and age at the time of birth. Neighbourhood-level socio-economic status was determined by the Index of Relative Social Disadvantage from the Australian Bureau of Statistics using the Birth and Midwives data[18]. Five levels of disadvantage were assigned to census collection districts (approximately 200 households) ranging from 1 (most disadvantaged) to 5 (least disadvantaged). Parents' history of hospital discharges and contacts (pre and post-birth) for mental health, substance-related issues and assault-related injuries were ascertained from HMDS and the MHIS (1970-2010). The Mortality Register was used to censor observations at date of death.

The Department for Child Protection and Family Support (CPFS) records provided data on children's entire history of maltreatment allegations from birth onwards including age of

allegation and type of maltreatment. Allegations consist of reports made to CPFS regarding alleged child abuse and neglect. An allegation is substantiated by CPFS when following investigation there is reasonable cause to believe the child has been, is being, or is likely to be abused, neglected or otherwise harmed. Following a substantiated allegation children could be removed from their families and enter out-of-home care.

Statistical Analysis

In addition to descriptive analysis, Cox regression was used to estimate the adjusted and unadjusted hazard ratio (HR) and 95% confidence interval (CI) for the time in months from birth to first maltreatment allegation, adjusted for disability types and other risk factors. Results where the 95% CIs did not include the null value of 1 were considered statistically significant. Records were censored at their date of death and if there was no child maltreatment allegation by the end of followup. The main analyses firstly assessed the hazard ratio for child maltreatment allegations using a dichotomous disability covariate (disability versus no disability), and secondly using six dichotomous covariates (six disability types) in addition to adjusting for child, family and neighbourhood risk factors. In the categorical disability analysis (6 disability groups) children with comorbidities could be categorised in more than one group (except DS) and analysed accordingly. Further Cox regression analyses investigated time to a substantiated allegation and time to a period of out-of-home care. In our analyses we are assuming the values of these covariates were determined at the point when follow-up began on each child (time=0, i.e. at birth) and that these did not change over the period of observation. As we are not confident when diagnoses began we did not add a time varying covariate for disability and have stated this in the limitations. Additional analyses examined risk of allegations related to aspects of ID including severity, comorbidity, cause, and the specific birth defects of spina bifida and cleft lip and/or palate. Further

analyses were also conducted to investigate type of maltreatment allegation (neglect, physical and sexual abuse) for all disability groups and ID severity (appendix).

Results

Risk of allegations

Of the 524,534 children in the population cohort, 4.6% had a maltreatment allegation (Table 2). Overall, 25.9% of child maltreatment allegations and 29.0% of substantiated allegations involved a child with a disability. Maltreatment allegations varied by disability type, children with ID comprised 6.7% allegations, similar to birth defects/cerebral palsy (6.6%), and conduct disorder (4.5%) with the largest number of allegations for children with mental/behavioural disorders (15.6%). Only a small proportion of allegations included children with Down syndrome (0.1%) or autism (0.7%).

Age at first maltreatment allegation was similar across disability types with a mean age of 4.8 years, and fairly similar to children without disabilities (4.2 years). Type of maltreatment allegation was also similar across disability groups (neglect~25%, physical abuse~24%, sexual abuse~19% and emotional abuse~3.5%). This pattern was generally similar to children without disabilities, except proportions were slightly higher for neglect and physical abuse. The only groups which varied to a large degree were children with ID who had a higher proportion of neglect (33%) and children with conduct disorder who had more physical abuse (31%).

Prior to adjusting for child, family and neighbourhood characteristics, children with a disability had over a two-fold increased risk of having a maltreatment allegation [Hazard Ratio (HR)=2.64, 95%CI:2.56-2.74] and a three-fold increased risk of a substantiated

allegation (HR=3.09, 95%CI:2.97-3.22) compared to children without a disability (see Table 3). All disability types other than DS were associated with a significantly increased risk for having a maltreatment allegation prior to adjustment. The highest hazard ratios were for conduct disorder (HR=5.14, 95%CI:4.83-5.47) followed by ID (HR=3.86, 95%CI:3.67-4.06) and mental/behavioural disorders (HR=3.69, 95%CI:3.56-3.82). The risk of substantiated allegation was also higher.

Adjustment for demographic and psychosocial characteristics

As shown in the appendix, demographic and psychosocial characteristics vary across disability type. Accounting for child, family and neighbourhood risk factors partially attenuated the relationship between disabilities and maltreatment, particularly for conduct disorder and mental/behavioural disorders, and changed the relationship for autism from increased to decreased risk (Table 3). After controlling for other risk factors, children with a disability still had an increased risk of maltreatment allegations (HR=1.74, 95%CI:1.68-1.80) and substantiated allegations (HR=1.89, 95%CI:1.80-1.98) compared to children without disabilities.

Risk was highest for children with intellectual disabilities (HR=2.14, 95%CI:2.00-2.28], followed by conduct disorder, and mental/behavioural disorders. There was significantly lower risk of maltreatment allegations for children with autism (HR=0.74, 95%CI:0.63-0.89), and children with DS also had lower risk, although did not reach significance (HR=0.69, 95%CI:0.46-1.02). Risk of maltreatment allegations did not differ between children with birth defects/cerebral palsy and children with no disabilities (HR=0.99, 95%CI:0.93-1.05), although they had a slightly elevated risk of a substantiated allegation (HR=1.10, 95%CI:1.01-1.20) and entering out-of-home care (HR=1.32, 95%CI:1.18-1.49, see

appendix). Analysis by type of maltreatment allegation found relatively consistent results with the exception of maltreatment involving sexual abuse, where autism was protective and birth defects/cerebral palsy showed no increased risk. However caution should be taken interpreting results due to smaller sample sizes and therefore unreliable estimates (appendix).

Supplementary multivariate analysis of spina bifida and cleft lip and/or palate was conducted finding an increased risk of substantiated allegation in the univariate analysis (HR=1.94, 95%CI:1.01-3.72; HR=1.61, 95%CI:1.01-2.56 respectively) but after adjustment found no increased risk (HR=0.74, 95%CI:0.33-1.65; HR=0.81, 95%CI:0.42-1.55 respectively). Caution should be taken with this finding due to small sample size.

Aboriginal children had an increased risk of a maltreatment allegation almost 6 and a half times compared to non-Aboriginal children. However this risk dropped to 1.64 (95%CI:1.57-1.70) once other factors were taken into account, particularly as they had a higher risk of other family and social risk factors. The proportion of Aboriginal children with disability was 14.2%, compared with 10.1% for non-Aboriginal children. They had a higher proportion of children with ID (3.2% versus 1.5%) and mental/behavioural disorder (17.5% versus 14.3%), both which had higher risks of maltreatment allegations.

Severity and cause of intellectual disability

For children with ID, less severe disability was related to increased likelihood of maltreatment allegations (Table 4). After controlling for other risk factors, children with borderline-mild ID had an almost threefold increased likelihood of maltreatment allegations (HR=2.73, 95%CI:2.45-3.04), and children with mild-moderate ID were at twofold increased likelihood of allegations (HR=2.01, 95%CI:1.85-2.17). The risk associated with severe ID

did not differ significantly from children without ID (HR=1.30, 95%CI:0.95-1.79). When broken down by type of maltreatment allegation the findings were relatively consistent except that for children with severe ID they were at increased risk of neglect (appendix).

Among children with ID, a supplementary analysis found an increased maltreatment risk for children for whom the recorded cause of disability was postnatal injury (HR=5.14, 95%CI:2.99-8.83), prenatal exposure to alcohol (HR=2.01, 95%CI:1.30-3.11), other birth defects(HR=9.49, 95%CI:2.20-41.06) and cultural-familial (HR=4.13, 95%CI(3.01-5.66).

Comorbidity

Comorbidity was common. Of the 8,551 children with ID, 5,350 (62.6%) also have at least one of the following: birth defect/cerebral palsy, autism, conduct disorder or a mental/behavioural diagnosis. The presence of comorbid ID significantly increased the likelihood of having a maltreatment allegation for children with birth defect/cerebral palsy, autism or mental health and behavioural disorders (Table 5). Children with autism but no ID showed a non-significant increased risk probably due to volatility of estimates due to small numbers.

Discussion

Children with disabilities make up 10.4% of the WA population however they account for one in four maltreatment allegations and one in three substantiated allegations. This disproportionate representation of children with disabilities in maltreatment allegations are consistent with international findings[9]. Importantly the increased risk of maltreatment allegations was not consistent across all disability types. Over-represented groups included children with ID, conduct disorder and mental/behavioural disorders.

Prior studies have included various disability types but there is no consistent method for defining and grouping disability types, which reduces comparability. Also different countries may have different thresholds and processes around child maltreatment allegations which reduces comparability. Nevertheless, comparisons with previous studies shed light on some consistent findings. Unadjusted results show significantly elevated risk of allegations for all disability types except DS, with a more than threefold increased risk of allegations for mental/behavioural disorders, conduct disorder, and ID. After adjusting for risk factors, children with ID, mental/behavioural problems and conduct disorder continued to have increased risk of allegations and substantiated allegations, consistent with previous research[4,9,10]. Likewise children with ID continued to have increased risk of allegations, consistent with some but not all previous population studies[4,9].

In contrast, after adjustment children with autism, DS and birth defects/cerebral palsy showed no increased risk for an allegation. However for substantiated maltreatment children with birth defects/cerebral palsy had a slightly increased risk which just reached significance. Our results of no increased risk for autism and DS are consistent with previous research despite different lengths of follow-up[4,9]. However our finding of no increased risk for spina bifida or cleft lip and/or palate after adjustment was opposite to previous findings[15].

Possible explanations for the lower risk for children with DS and autism include that these disabilities are comparatively well recognised, understood and supported. Parents tended to be older, better off socio-economically, and for DS, the ready availability of pre-natal screening in WA means most parents have had the opportunity for prenatal diagnosis and the choice to continue with the pregnancy[19].

We cannot specifically address the directionality of maltreatment and disability in our study. However the stronger relationship between disability types that could be caused by or share a pathway with maltreatment is consistent with studies that found the relationship with maltreatment was stronger (e.g. Sullivan[9]) or only present (e.g. Spencer[4]) for disabilities such as conduct disorder, mental/behavioural problems, and ID. Together with our examination of the recorded cause of intellectual disability, finding increased risk for postnatal injury, prenatal exposure to alcohol, and cultural-familial causes lends further support to this. As an example of potential complexities, the case of maternal alcohol use during pregnancy (causing ID) and continuing following birth may impact parenting a child with complex needs resulting in child protection involvement. This should be examined in future research.

Regardless of causality, the disability types most strongly associated with maltreatment often co-occurred with a constellation of other risk factors such as parents who are young or who have been hospitalised for mental health or substance use, and living in more disadvantaged neighbourhoods. These families already face additional stressors and have fewer resources to access services for their children's special needs.

The inverse relationship between severity of ID and risk of maltreatment is consistent with other research[3]. It has been suggested that where children's disabilities are more profound, parents may have more realistic expectations, or children may be less able to function in ways that are provocative (e.g. talking back). Furthermore, clustering of mild ID within families is relatively common, and linked to socio-economic disadvantage[20]. In combination with our finding that ID with cultural-familial causes was associated with increased maltreatment it may be that a number of children with mild ID are more likely to experience maltreatment

because they have a higher risk family profile. It is important that qualitative research investigates further factors that may increase risk and identify support strategies and interventions which may assist families.

The relationship between disability and child maltreatment was partially attenuated after adjusting for demographic and psychosocial risk factors. These findings indicate that disability is an important risk factor for maltreatment, but not all disabled children should be considered at increased risk, and that other risk factors at the child, family and neighbourhood level also play an important role. From our analyses socioeconomic disadvantage, teenage parents, maternal mental health and substance use admissions were strong risk factors for maltreatment. Factors at these different levels need to be considered when assessing the needs of families to ameliorate risks.

Although the use of administrative data allows complete case ascertainment of children with maltreatment allegations from birth onwards in WA it does have limitations. Obviously maltreatment will only be included if it is reported. While we have comprehensively ascertained disability from a number of population level data sources not all children with disabilities will be identified. Co-morbidities will also be under-ascertained as the MHIS only captures one diagnosis. During the study period it is expected that there would be changes in the prevalence of diagnoses over time which would have impacted upon the prevalence of ICD codes. For example previous research found a rise in the prevalence of autism diagnoses in 1994 with the introduction of the Diagnostic and Statistical Manual Version IV and in 1997 with the formalisation of assessment procedures[21]. In addition a number of important variables could not be obtained using our data including: the child's level of functioning; age of diagnosis; type and amount of support services families are receiving; family functioning;

and parents' own disability status. The other issue is the timing of the onset of disability/condition in relation to maltreatment to provide further evidence of directionality, whether maltreatment may be a cause for some conditions (e.g. conduct disorder) or contributes as a risk factor to maltreatment. We also cannot rule out that children with disabilities are likely to have increased service use, therefore higher scrutiny and increased likelihood to be reported for maltreatment which should be considered in future research.

The prevalence of disabilities in the child protection population suggests the need for awareness by agencies of the scope of issues faced by children in the system and interagency collaboration to ensure children's complex needs are met. In addition supports are needed for families of children with disabilities not only to assist in meeting the child's health and developmental needs, but also to support parents in managing the often more complex parenting environment, including dealing with challenging behaviour. Research indicates that family-centred care with coordination of services, continuity of care and respite care are important factors in reducing child protection risk[22,23]. As signatories to the United Nations Conventions on the Rights of the Child and Rights of Persons with Disabilities, governments have committed to assist parents in the performance of their child rearing responsibilities and that that persons with disabilities and their family members should receive the necessary assistance to enable families to contribute towards the full and equal enjoyment of the rights of persons with disabilities. This highlights the important role governments and society have in ensuring that children with disabilities and their families have the appropriate services and support structures in place to enable them to achieve their full potential and ensure their wellbeing.

Acknowledgements

The authors acknowledge the partnership of the Western Australian Government Departments of Health, Child Protection, Education, Disability Services, Corrective Services and Attorney General who provided support as well as data for this project. This paper does not necessarily reflect the views of the government departments involved in this research. We would also like to thank the Western Australian Data Linkage Branch for linking the data.

References

1. World Health Organisation. *World Report on Disability.* Geneva: World Health Organisation;2011.
2. Sullivan PM, Knutson JF. The association between child Maltreatment and disabilities in a hospital-based epidemiological study. *Child Abuse & Neglect.* 1998;22(4):271-288.
3. Verdugo MA, Bermejo BG, Fuertes J. The maltreatment of intellectually handicapped children and adolescents. *Child Abuse & Neglect.* 1995;19(2):205-215.
4. Spencer N, Devereux E, Wallace A, et al. Disabling conditions and registration for child abuse and neglect: A population-based study. *Pediatrics.* 2005;116(3):609-613.
5. Westcott HL, Jones DPH. Annotation: The abuse of disabled children. *Journal of Child Psychology and Psychiatry.* 1999;40(4):497-506.
6. O'Donnell M, Nassar N, Leonard H, et al. Characteristics of non-Aboriginal and Aboriginal children and families with substantiated maltreatment: A population-based study. *International Journal of Epidemiology.* 2010;39:921-928.
7. Kendall-Tackett K, Lyon T, Taliaferro G, Little L. Why child maltreatment researchers should include children's disability status in their maltreatment studies. *Child Abuse & Neglect.* 2005;29(2):147-151.
8. Fisher M, Hodapp R, Dykens E. Child abuse among children with disabilities: What we know and what we need to know. *International Review of Research in Mental Retardation.* 2008;35:251-289.
9. Sullivan PM, Knutson JF. Maltreatment and disabilities: A population-based epidemiological study. *Child Abuse & Neglect.* 2000;24(10):1257-1273.
10. Jaudes PK, Mackey-Bilaver L. Do chronic conditions increase young children's risk of being maltreated? *Child Abuse & Neglect.* 2008;32(7):671-681.
11. Bower C, Baynam G, Rudy E, et al. *Report of the Western Australian Register of Developmental Anomalies 1980-2014.* Perth: King Edward Memorial Hospital;2015.
12. Petterson B, Leonard H, Bourke J, et al. IDEA (Intellectual Disability Exploring Answers): A population-based database for intellectual disability in Western Australia. *Annals of Human Biology.* 2005;32(2):237-243.
13. Bourke J, De Klerk N, Smith T, Leonard H. Population-based prevalence of intellectual disability and autism spectrum disorder in Western Australia. *Medicine* 2016;95(21):e3737.
14. Australian Bureau of Statistics. Children with a disability. *Australian Social Trends, Jun 2012*. Canberra2012.
15. Van Horne BS, Moffitt KB, Canfield MA, et al. Maltreatment of children under age 2 with specific birth defects: A population-based study. *Pediatrics.* 2015;136(6):e1504-e1512.
16. Kelman C, Bass A, Holman C. Research use of linked health data - a best practice protocol. *Australian and New Zealand Journal of Public Health.* 2002;26(3):251-255.
17. Department of Health. Data linkage - making the right connections. 2016. http://www.datalinkage-wa.org.au/sites/default/files/Data%20Linkage%20Branch%20-%20Linkage%20Quality.pdf Accessed 14/12/2016.
18. Australian Bureau of Statistics. *Socio-Economic Indexes for Areas (SEIFA) - Technical Paper.* Canberra: Australian Bureau of Statistics;2008.
19. Collins VR, Muggli EE, Riley M, Palma S, Halliday JL. Is Down Syndrome a disappearing birth defect? *Journal of Pedatrics* 2008;152(152):20-24.
20. Bower C, Leonard H, Petterson B. Intellectual disability in Western Australia. *Journal of Paediatrics and Child Health.* 2000;36(3):213-215.
21. Nassar N, Dixon G, Bourke J, et al. Autism spectrum disorders in young children: effect of changes in diagnostic practices. *International Journal of Epidemiology.* 2009;38(1245-1254).
22. O'Brien J, O'Brien J. Planned respite care: Hope for families under pressure. *Australian Journal of Social Issues.* 2001;36(1):51-65.
23. Hodgetts S, Nicholas D, Zwaigenbaum L, McConnell D. Parents' and professionals' perceptions of family centered care for children with autism spectrum disorder across service sectors. *Social Science & Medicine.* 2013;96:138-146.

Table 2. Characteristics of study population and level of child protection involvement

Characteristic	Total	No Allegation		Any Allegation		Any Substantiated Allegation		Entered out-of-home care	
	N	N	%	N	%	N	%	N	%
Number	524534	500518		24016		11560		5596	
Sex									
Male	268651	257108	51.4%	11543	48.1%	5472	47.3%	2810	50.2%
Female	255831	243362	48.6%	12469	51.9%	6088	52.6%	2786	49.8%
Aboriginality									
Non-Aboriginal	492740	475379	95.0%	17361	72.3%	7771	67.2%	3506	62.7%
Aboriginal	31612	24975	5.0%	6637	27.6%	3779	32.7%	2085	37.3%
Missing	182	164	0.03%	18	0.1%	10	0.1%	5	0.09%
Socio-economic status									
1 (most disadvantaged)	120565	37560	7.5%	11506	47.9%	5811	50.3%	2903	51.9%
2	120126	81247	16.2%	5805	24.2%	2749	23.4%	1335	23.9%
3	99811	66313	13.5%	3344	13.9%	1550	13.4%	726	13.0%
4	94009	136417	27.3%	2097	8.7%	923	8.0%	420	7.5%
5 (least disadvantaged)	87330	177067	35.4%	1120	4.7%	445	3.8%	173	3.1%
Missing	2693	1914	0.4%	144	0.6%	82	0.7%	39	0.7%
Disability Type									
Intellectual Disability	8551	6952	1.4%	1599	6.7%	905	7.8%	527	9.4%
Down Syndrome	552	521	0.1%	31	0.1%	15	0.1%	8	0.1%
Birth Defect/Cerebral Palsy	30090	28501	5.7%	1589	6.6%	860	7.4%	498	8.9%
Autism	2253	2078	0.4%	175	0.7%	89	0.8%	56	1.0%
Conduct disorder	3924	2846	0.6%	1078	4.5%	573	5.0%	318	5.7%
Mental and behavioural disorder	19813	16062	3.2%	3751	15.6%	2073	17.9%	1004	17.9%
Any disability	54535	48324	9.7%	6211	25.9%	3352	29.0%	1709	30.5%
Maternal age									
<20	30019	25194	5.0%	4825	20.1%	2406	20.8%	1162	20.8%

20-29	252817	239044	47.8%	13773	57.3%	6638	57.4%	3162	56.5%
30+	241642	236228	47.2%	5414	22.5%	2516	21.8%	1272	22.7%
Missing	56	52	0.01%	4	0.02%	0	0.0%	0	0.0%
Paternal age									
<20	9522	8107	1.6%	1415	5.9%	687	5.9%	327	5.8%
20-29	175262	165343	33.0%	9919	41.3%	4649	40.2%	2074	37.1%
30+	314549	307078	61.4%	7471	31.1%	3257	28.2%	1518	27.1%
Missing	25201	19990	4.0%	5211	21.7%	2967	25.7%	1677	30.0%
Gestational age									
<37 weeks	38702	35767	7.1%	2935	12.2%	1606	13.9%	945	16.9%
37+ weeks	485157	464117	92.7%	21040	87.6%	9933	85.9%	4642	83.0%
Birthweight for Gestational Age									
Below 10th percentile	52489	48271	9.6%	4218	17.6%	2182	18.9%	1164	20.8%
Above 10th percentile	471322	451566	90.2%	19756	82.3%	9357	80.9%	4423	79.0%
Marital Status									
Single	51697	44091	8.8%	7606	31.7%	4000	34.6%	2223	39.7%
Married/Defacto	470751	454529	90.8%	16222	67.5%	7436	64.3%	3302	59.0%
Missing	2086	1898	0.4%	188	0.8%	124	1.1%	71	1.3%
Maternal MH related admission									
Yes	86956	75459	15.1%	11497	47.9%	6153	53.2%	3573	63.8%
No	437578	425059	84.9%	12519	52.1%	5407	46.8%	2023	36.2%
Maternal substance-related admission									
Yes	41150	31278	6.3%	9872	41.1%	5756	49.8%	3597	64.3%
No	483384	469240	93.7%	14144	58.9%	5804	50.2%	1999	26.9%
Paternal MH related admission									
Yes	46689	41323	8.3%	5366	22.3%	2756	23.8%	1506	26.9%
No	477845	459195	91.7%	18650	77.6%	8804	76.2%	4090	73.1%
Paternal substance-related admission									
Yes	43431	37212	7.4%	6219	25.9%	3371	29.2%	1932	34.5%
No	481103	463306	92.6%	17797	74.1%	8189	70.8%	3664	65.5%

Table 3. Risk of maltreatment allegation and substantiated maltreatment allegation by disability.

	Risk of Maltreatment Allegation			Risk of Substantiated Maltreatment Allegation		
Characteristic	**Crude HR (95% CI)**	**Adjusted HR (Disability Yes vs No)***	**Adjusted HR (Six Disability Category)****	**Crude HR (95% CI)**	**Adjusted HR (Disability Yes vs No)***	**Adjusted HR (Six Disability Category)****
Sex						
Male	Ref	Ref	Ref	Ref	Ref	Ref
Female	1.14 (1.12-1.17)	1.19 (1.15-1.22)	1.21 (1.17-1.24)	1.18 (1.14-1.22)	1.28 (1.22-1.33)	1.30 (1.25-1.36)
Aboriginality						
Non-Aboriginal	Ref	Ref	Ref	Ref	Ref	Ref
Aboriginal	6.47 (6.29-6.66)	1.64 (1.57-1.71)	1.64 (1.57-1.70)	7.90 (7.60-8.22)	1.78 (1.68-1.89)	1.78 (1.68-1.88)
Socio-economic status						
1 (most disadvantaged)	7.04 (6.62-7.49)	2.65 (2.47-2.84)	2.62 (2.44-2.80)	8.83 (8.02-9.73)	2.81 (2.52-3.14)	2.78 (2.48-3.10)
2	3.54 (3.32-3.78)	2.08 (1.94-2.23)	2.07 (1.93-2.22)	4.21 (3.81-4.65)	2.34 (2.09-2.62)	2.32 (2.07-2.59)
3	2.47 (2.31-2.64)	1.70 (1.58-1.83)	1.70 (1.57-1.83)	2.89 (2.60-3.21)	1.88 (1.67-2.12)	1.88 (1.67-2.12)
4	1.72 (1.59-1.85)	1.40 (1.29-1.51)	1.40 (1.30-1.52)	1.90 (1.70-2.13)	1.47 (1.29-1.67)	1.47 (1.30-1.67)
5 (least disadvantaged)	Ref	Ref	Ref	Ref	Ref	Ref
Maternal age						
<20	7.18 (6.90-7.46)	2.02 (1.91-2.15)	2.00 (1.88-2.12)	7.43 (7.02-7.86)	1.80 (1.65-1.96)	1.78 (1.63-1.94)
20-29	2.26 (2.19-2.33)	1.40 (1.35-1.46)	1.39 (1.34-1.45)	2.35 (2.24-2.46)	1.38 (1.30-1.47)	1.36 (1.28-1.45)
>=30	Ref	Ref	Ref	Ref	Ref	Ref
Paternal age						
<20	6.60 (6.23-6.99)	1.18 (1.10-1.27)	1.20 (1.11-1.28)	7.04 (6.48-7.64)	1.20 (1.08-1.33)	1.22 (1.10-1.35)
20-29	2.25 (2.18-2.32)	1.14 (1.10-1.18)	1.14 (1.10-1.18)	2.41 (2.30-2.52)	1.16 (1.10-1.23)	1.16 (1.10-1.23)
>=30	Ref	Ref	Ref	Ref	Ref	Ref
Marital Status						
Single	4.48 (4.36-4.60)	1.56 (1.51-1.62)	1.55 (1.49-1.61)	4.97 (4.79-5.17)	1.57 (1.49-1.66)	1.56 (1.48-1.65)
Married/Defacto	Ref	Ref	Ref	Ref	Ref	Ref
Estimated Gestation						
<37 weeks	1.86 (1.79-1.94)	1.25 (1.20-1.31)	1.29 (1.23-1.35)	2.13 (2.02-2.24)	1.33 (1.25-1.42)	1.35 (1.27-1.44)

Birth Weight for Gestational Age						
<10th Percentile	1.90 (1.84-1.96)	1.23 (1.18-1.28)	1.23 (1.18-1.28)	2.06 (1.96-2.15)	1.26 (1.19-1.33)	1.25 (1.18-1.33)
Maternal mental health-related admission						
Yes	4.77 (4.65-4.90)	2.32 (2.24-2.39)	2.28 (2.21-2.36)	5.76 (5.57-5.98)	2.47 (2.35-2.59)	2.43 (2.31-2.55)
Maternal substance-related admission						
Yes	8.61 (8.39-8.84)	2.82 (2.72-2.92)	2.78 (2.69-2.89)	11.68 (11.26-12.12)	3.36 (3.19-3.54)	3.33 (3.16-3.50)
Paternal mental health-related admission						
Yes	2.92 (2.83-3.01)	1.68 (1.62-1.74)	1.65 (1.59-1.71)	3.12 (2.99-3.26)	1.69 (1.61-1.78)	1.66 (1.58-1.75)
Paternal substance-related admission						
Yes	3.85 (3.74-3.97)	1.86 (1.79-1.93)	1.85 (1.78-1.91)	4.45 (4.28-4.64)	2.10 (1.99-2.21)	2.09 (1.98-2.20)
Any Disability						
Yes	2.64 (2.56-2.72)	1.74 (1.68-1.80)		3.09 (2.97-3.22)	1.89 (1.80-1.98)	
Intellectual Disability						
Yes	3.86 (3.67-4.06)		2.14 (2.00-2.28)	4.51 (4.21-4.83)		2.15 (1.96-2.35)
Down Syndrome						
Yes	1.15 (0.80-1.66)		0.69 (0.46-1.02)	1.08 (0.63-1.86)		0.48 (0.25-0.93)
Birth Defect/Cerebral Palsy						
Yes	1.12 (1.06-1.18)		0.99 (0.93-1.05)	1.27 (1.19-1.37)		1.10 (1.01-1.20)
Autism						
Yes	1.53 (1.32-1.78)		0.74 (0.63-0.89)	1.65 (1.34-2.03)		0.87 (0.68-1.11)
Conduct disorder						
Yes	5.14 (4.83-5.47)		1.84 (1.70-1.98)	5.57 (5.12-6.06)		1.74 (1.56-1.93)
Mental and behavioural disorder						
Yes	3.69 (3.56-3.82)		1.62 (1.55-1.69)	4.37 (4.17-4.59)		1.74 (1.64-1.85)

* Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, parental substance-related admissions and whether they had a disability.

** Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, parental substance-related admissions and disability groups.

Table 4. Risk of maltreatment allegation by severity of intellectual disability

Severity of ID	Number	Multivariate Hazards Ratio*
Borderline-Mild	2775	2.73 (2.45-3.04)
Mild-Moderate	4077	2.01 (1.85-2.17)
Severe	552	1.30 (0.95-1.79)
Unknown	1147	1.57 (1.22-2.03)
No Intellectual Disability	515983	Ref

* Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, and parental substance-related admissions.

Table 5. Risk of maltreatment allegation by comorbidity with intellectual disabilities

Disability Group (with and without ID)#	Number	Multivariate Hazards Ratio*
Down Syndrome	552	0.77 (0.51-1.17)
Birth defect/Cerebral Palsy with ID	2606	1.78 (1.54-2.04)
Birth defect/Cerebral Palsy no ID	27484	0.96 (0.90-1.02)
Autism with ID	2120	1.21 (1.02-1.45)
Autism no ID	133	1.71 (0.92-3.19)
Conduct with ID	485	1.83 (1.51-2.23)
Conduct no ID	3439	1.92 (1.78-2.08)
Mental disorders with ID	1587	2.13 (1.86-2.43)
Mental disorders no ID	18226	1.63 (1.55-1.70)

* Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, and parental substance-related admissions.
#Reference group is children not in that disability group.

Appendix Table. Demographics associated with Disability Group.

Demographics	Intellectual Disability		Down Syndrome		Birth Defect/Cerebral Palsy		Autism		Conduct Disorder		Mental and Behavioural Disorder		Any Disability		No Disability	
Total																
Sex																
Male	5763	67.4%	284	51.4%	17482	58.1%	1853	82.2%	2946	75.1%	10319	52.1%	31433	57.6%	237218	50.5%
Female	2761	32.3%	251	45.5%	12607	41.9%	400	17.8%	978	24.9%	9491	47.9%	23071	42.3%	232760	49.5%
Aboriginality																
Non-Aboriginal	7527	88.0%	505	91.5%	28447	94.5%	2205	97.9%	3606	91.9%	17452	88.1%	49998	91.7%	442742	94.2%
Aboriginal	996	11.6%	30	5.4%	1638	5.4%	47	2.1%	317	8.1%	2352	11.9%	4497	8.2%	27115	5.8%
Missing	28	0.3%	17	3.1%	5	0%	1	0.0%	1	0.0%	9	0.0%	40	0.1%	142	0.0%
Socio-economic status																
1 (Most disadvantaged)	3018	35.3%	127	23.0%	6661	22.1%	541	24.0%	1450	37.0%	6519	32.9%	14956	27.4%	105609	22.5%
2	2094	24.5%	140	25.4%	6817	22.7%	539	23.9%	1045	26.6%	4876	24.6%	12858	23.6%	107268	22.8%
3	1451	17.0%	95	17.2%	5802	19.3%	455	20.2%	647	16.5%	3411	17.2%	9985	18.3%	89826	19.1%
4	1081	12.6%	85	15.4%	5436	18.1%	393	17.4%	446	11.4%	2762	13.9%	8715	16%	85294	18.1%
5 (Least disadvantaged)	846	9.9%	85	15.4%	5229	17.4%	315	14.0%	314	8.0%	2134	10.8%	7723	14.2%	79607	16.9%
Missing	61	0.7%	20	3.6%	145	0.5%	10	0.4%	22	0.6%	111	0.6%	298	0.5%	2395	0.5%
Maternal age																
<20 years	780	9.1%	29	5.3%	1597	5.3%	98	4.3%	526	13.4%	2191	11.1%	4268	7.8%	25751	5.5%
20-29 years	4360	51.0%	169	30.6%	14028	46.6%	1051	46.6%	2288	58.3%	10930	55.2%	27424	50.3%	225393	48%
30+ years	3384	39.6%	337	61.1%	14465	48.1%	1104	49.0%	1110	28.3%	6688	33.8%	22812	41.8%	218830	46.6%
Paternal age																
<20 years	236	2.8%	8	1.4%	506	1.7%	28	1.2%	117	3.0%	582	2.9%	1220	2.2%	8302	1.8%
20-29 years	3002	35.1%	141	25.5%	9586	31.9%	710	31.5%	1713	43.7%	7925	40.0%	19327	35.4%	155935	33.2%
30+ years	4368	51.1%	354	64.1%	18423	61.2%	1401	62.2%	1589	40.5%	9165	46.3%	29797	54.6%	284752	60.6%
Gestational age																
37+ weeks	7291	85.3%	409	74.1%	25860	85.9%	2051	91.0%	3580	91.2%	18055	91.1%	48139	88.3%	437018	93%
<37 weeks	1232	14.4%	126	22.8%	4198	14%	201	8.9%	343	8.7%	1729	8.7%	6310	11.6%	32392	6.9%
Birth weight																

Above 10th percentile	6975	81.6%	421	76.3%	25906	86.1%	1997	88.6%	3405	86.8%	17229	87.0%	47122	86.4%	424200	90.3%
Low < 10th percentile	1547	18.1%	114	20.7%	4146	13.8%	255	11.3%	517	13.2%	2555	12.9%	7321	13.4%	45168	9.6%
Marital status																
Single	1505	17.6%	68	12.3%	3102	10.3%	228	10.1%	926	23.6%	3764	19.0%	7721	14.2%	43976	9.4%
Married/Defacto	6997	81.8%	466	84.4%	26877	89.3%	2018	89.6%	2993	76.3%	15992	80.7%	46618	85.5%	424133	90.2%
Maternal mental health-related admission																
No	6004	70.2%	435	78.8%	24533	81.5%	1659	73.6%	2156	54.9%	12496	63.1%	40326	73.9%	397252	84.5%
Yes	2547	29.8%	117	21.2%	5557	18.5%	594	26.4%	1768	45.1%	7317	36.9%	14209	26.1%	72747	15.5%
Maternal substance-related admission																
No	7117	83.2%	502	90.9%	27495	91.4%	2045	90.8%	2989	76.2%	15698	79.2%	47087	86.3%	436297	92.8%
Yes	1434	16.8%	50	9.1%	2595	8.6%	208	9.2%	935	23.8%	4115	20.8%	7448	13.7%	33702	7.2%
Paternal mental health-related admission																
No	7205	84.3%	499	90.4%	27282	90.7%	1984	88.1%	3063	78.1%	16267	82.1%	47435	87%	430410	91.6%
Yes	1346	15.7%	53	9.6%	2808	9.3%	269	11.9%	861	21.9%	3546	17.9%	7100	13%	39589	8.4%
Paternal substance-related admission																
No	7354	86.0%	502	90.9%	27533	91.5%	2070	91.9%	3230	82.3%	16599	83.8%	48118	88.2%	432985	92.1%
Yes	1197	14.0%	50	9.1%	2557	8.5%	183	8.1%	694	17.7%	3214	16.2%	6417	11.8%	37014	7.9%

Supplementary Appendix. Cox regression: Risk of entering out-of-home care by disability

Characteristic		Crude HR (95% CI)	Adjusted HR* (Disability Yes vs No)	Adjusted HR** (Six Disability Category)
Sex				
	Male	Ref	Ref	Ref
	Female	1.05 (0.99-1.10)	1.11 (1.04-1.18)	1.14 (1.07-1.22)
Aboriginality				
	Non-Aboriginal	Ref	Ref	Ref
	Aboriginal	9.39 (8.89-9.91)	1.82 (1.68-1.97)	1.83 (1.69-1.98)
Socio-economic status				
	1 (most disadvantaged)	11.45 (9.82-13.35)	3.17 (2.63-3.82)	3.14 (2.60-3.78)
	2	5.31 (4.54-6.23)	2.80 (2.32-3.38)	2.78 (2.30-3.36)
	3	3.52 (2.99-4.16)	2.18 (1.79-2.66)	2.18 (1.79-2.66)
	4	2.24 (1.87-2.67)	1.68 (1.36-2.08)	1.70 (1.38-2.10)
	5 (least disadvantaged)	Ref	Ref	Ref
Maternal age				
	<20	7.06 (6.52-7.65)	1.58 (1.39-1.79)	1.57 (1.39-1.78)
	20-29	2.25 (2.11-2.41)	1.27 (1.16-1.38)	1.25 (1.15-1.37)
	>=30	Ref	Ref	Ref
Paternal age				
	<20	7.06 (6.26-7.96)	1.00 (0.86-1.17)	1.02 (0.88-1.18)
	20-29	2.34 (2.19-2.50)	1.03 (0.95-1.11)	1.03 (0.95-1.12)
	>=30	Ref	Ref	Ref
Marital Status				
	Single	6.17 (5.85-6.51)	1.73 (1.61-1.87)	1.72 (1.60-1.86)
	Married/Defacto	Ref	Ref	Ref
Estimated Gestation				
	<37 weeks	2.64 (2.46-2.83)	1.56 (1.44-1.70)	1.56 (1.43-1.70)
Birth Weight				
	<10th Percentile	2.33 (2.18-2.48)	1.34 (1.24-1.45)	1.32 (1.22-1.43)
Maternal MH related admission				
	Yes	8.88 (8.40-9.38)	3.00 (2.79-3.23)	2.97 (2.76-3.19)
Maternal substance-related admission				
	Yes	20.86 (19.75-22.04)	5.41 (5.01-5.84)	5.39 (4.99-5.83)
Paternal MH related admission				
	Yes	3.67 (3.46-3.90)	1.79 (1.66-1.92)	1.76 (1.63-1.89)
Paternal substance-related admission				
	Yes	5.69 (5.39-6.02)	2.49 (2.31-2.68)	2.49 (2.31-2.69)
Any Disability				
	Yes	3.44 (3.25-3.64)	1.80 (1.67-1.93)	
Intellectual Disability				
	Yes	5.66 (5.17-6.20)		2.16 (1.91-2.44)
Down Syndrome				

Yes	1.38 (0.69-2.77)	0.47 (0.19-1.13)
Birth Defect/Cerebral Palsy		
Yes	1.57 (1.43-1.72)	1.32 (1.18-1.49)
Autism		
Yes	2.18 (1.67-2.83)	1.11 (0.80-1.53)
Conduct disorder		
Yes	6.79 (6.05-7.60)	1.83 (1.58-2.12)
Mental and behavioural disorder		
Yes	4.65 (4.34-4.98)	1.44 (1.31-1.58)

* Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, parental substance-related admissions and whether they had a disability.

** Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, parental substance-related admissions and disability groups

Supplementary Appendix. Cox regression: Adjusted risk by type of maltreatment allegation by disability

Type of Disability#	Sexual Abuse Adjusted HR (95% CI)*	Physical Abuse Adjusted HR (95% CI)*	Neglect Adjusted HR (95% CI)*
Intellectual Disability	2.78 (2.35-3.28)	2.19 (1.87-2.56)	2.19 (1.92-2.49)
Down Syndrome	**	0.75 (0.28-2.04)	0.46 (0.19-1.13)
Birth Defect/Cerebral Palsy	0.90 (0.75-1.08)	1.17 (1.01-1.37)	1.42 (1.26-1.60)
Autism	0.34 (0.18-0.67)	0.98 (0.67-1.44)	1.09 (0.76-1.56)
Conduct disorder	1.98 (1.64-2.41)	2.18 (1.85-2.57)	1.30 (1.09-1.56)
Mental and behavioural disorder	2.52 (2.26-2.81)	1.87 (1.68-2.09)	1.21 (1.10-1.34)

* Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, parental substance-related admissions and other types of disability.
**Numbers too small to report estimates
#Reference group is children without that disability

Supplementary Appendix. Cox regression: Adjusted risk by type of maltreatment allegation by severity of intellectual disability

Severity of ID	Sexual Abuse Adjusted HR (95% CI)*	Physical Abuse Adjusted HR (95% CI)*	Neglect Adjusted HR (95% CI)*
Borderline-Mild	3.79 (2.94-4.88)	2.63 (2.05-3.39)	3.99 (3.30-4.83
Mild-Moderate	2.53 (2.06-3.12)	2.06 (1.70-2.49)	1.64 (1.39-1.94)
Severe	0.31 (0.04-2.20)	1.37 (0.65-2.91)	2.03 (1.17-3.54)
Unknown	2.68 (1.36-5.28)	2.38 (1.43-3.97)	2.53 (1.54-4.15)
No Intellectual Disability	Reference	Reference	Reference

* Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for generational age, parental mental health-related admissions, parental substance-related admissions.