

# Maltreatment Risk Among Children With Disabilities

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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 and 2010. Children with disabilities were identified by using population-based registers and risk of maltreatment determined by allegations reported to the Department for Child Protection and Family Support.

**RESULTS:** Although children with disabilities make up 10.4% of the population, they represent 25.9% of children with a maltreatment allegation and 29.0% of those with a substantiated allegation; however, increased risk of maltreatment was not consistent across all disability types. Children with intellectual disability, mental/behavioral problems, and conduct disorder continued to have increased risk of an allegation and substantiated allegation after adjusting for child, family, and neighborhood 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.



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Dr Maclean conceptualized and designed the study, and drafted the initial manuscript; Mr Sims carried out the initial analyses, and reviewed and revised the manuscript; Drs Bower, Leonard, and Stanley contributed to the design of the study, and reviewed and revised the manuscript; Dr O'Donnell contributed to the conceptualization and design of the study, and critically reviewed the manuscript, and all authors approved the final manuscript as submitted.

**DOI:** 10.1542/peds.2016-1817

Accepted for publication Jan 26, 2017

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PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

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**FINANCIAL DISCLOSURE:** The authors have indicated they have no financial relationships relevant to this article to disclose.

**WHAT'S KNOWN ON THIS SUBJECT:** 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 1 in 3 substantiated maltreatment allegations; however, maltreatment risk was not consistent across all disabilities. Children with intellectual disability, mental/behavioral problems, and conduct disorder had increased risk, but not autism, Down syndrome, or birth defects.

**To cite:** Maclean MJ, Sims S, Bower C, et al. Maltreatment Risk Among Children With Disabilities. *Pediatrics*. 2017; 139(4):e20161817

**TABLE 1** Disability Group and Their Corresponding Codes and Databases.

Group	Databases	ICD-9 Codes	ICD-10 Codes
ID	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 <sup>a</sup>		
Autism	IDEA, HMDS, MHIS	299.0	F84.0, F84.1
Conduct disorder	HMDS, MHIS	312, 314.0	F90-F92
Mental and behavioral disorder <sup>b</sup> (all other mental/behavioral 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

<sup>a</sup> [http://kemh.health.wa.gov.au/services/register\\_developmental\\_anomalies/diagnostic\\_codes\\_birth\\_defects.htm](http://kemh.health.wa.gov.au/services/register_developmental_anomalies/diagnostic_codes_birth_defects.htm).

<sup>b</sup> This includes organic disorders, disorders due to psychoactive substance use, schizophrenia-type disorders, mood disorders, behavioral syndromes, stress-related disorders, personality disorders, specific developmental disorders, behavioral and emotional disorders.

An estimated 5.1% of children worldwide have a moderate to severe disability.<sup>1</sup> Research shows that children with disabilities experience elevated rates of child abuse and neglect.<sup>2–6</sup> However, there are critical knowledge gaps, leading US researchers Kendall-Tackett et al<sup>7</sup> to state “there is an appalling gap in the states’ ability to protect abused and neglected children with disabilities.”

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.<sup>7</sup> 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 neighborhood factors, such as socioeconomic disadvantage.<sup>6</sup> Families of children with disabilities more frequently experience risk factors associated with a higher risk of maltreatment.<sup>8</sup> However, the risk for maltreatment among children with disabilities has not been explored taking into account the multiple risk factors that often cooccur 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,<sup>4,9,10</sup> and it remains unclear whether disability types, such as intellectual disability (ID), are associated with increased risk. The aims of this research were 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 neighborhood 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 and 2010 using de-identified administrative data. Disability information was obtained from 4 sources that had information for the whole study period 1990 to 2010. The first is the WA Register of Developmental Anomalies (WARDA),<sup>11</sup> which includes structural or functional birth defects that are present before birth and diagnosed by age 6, and cerebral palsy. WARDA

receives notifications of birth defects from the Midwives Notification System, the Hospital Morbidity Data System (HMDS), and other services (eg, genetic, pathology, and private practitioners). The second is the population-based Intellectual Disability Exploring Answers (IDEA)<sup>12</sup> database, which provides WA state data on individuals with ID and/or autism, by using information provided by the Disability Services Commission 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 the Disability Services Commission, the probable cause by using 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), and so forth.<sup>13</sup> The third is HMDS, which contains information on all public and private hospital discharges, including up to 21 diagnostic codes by using 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 by using ICD codes. This study has ethics approval from the WA Department of Health Human Research Ethics Committee.

Disability for this article was defined as any limitation or impairment that may affect everyday activities ranging from intellectual, physical, and psychological conditions.<sup>14</sup> 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 4 data sources of WARDA, IDEA, HMDS and MHIS, and disability groups were categorized as shown in Table 1. Disability categories were chosen because 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 >1 category if they had comorbid conditions; however, Down syndrome (DS) was grouped separately because it is both a birth defect and causes ID. Of the 54 532 children who had ID, birth defect/cerebral palsy, autism, conduct disorder, or a mental/behavioral disorder, 15.6% had  $\geq 1$  comorbidities. For children with ID, there was a high rate of comorbidity with other conditions (62.6%).

We also included an additional analysis of 2 birth defect categories from the WARDA, spina bifida ( $n = 192$ ) and cleft lip and/or palate ( $n = 525$ ), to compare with previous research.<sup>15</sup>

The disability data were 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 (CPFS) (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 in which extensive clerical review also was conducted as per their process, with a linkage quality of 97% to 98%.<sup>16,17</sup> The identifiers were separated from the clinical or service information to maximize privacy during the linkage process, with only de-identified information provided to researchers.

The child's sex, 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. Neighborhood-level socioeconomic status was determined by the Index of Relative Social Disadvantage from the Australian Bureau of Statistics by using the Birth and Midwives data.<sup>18</sup> Five levels of disadvantage were assigned to census collection districts (~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 CPFS records provided data on children's entire history of maltreatment allegations from birth onward, 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 after investigation there is reasonable cause to believe the child has been, is being, or is likely to be abused, neglected, or otherwise harmed. After 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 in which 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 follow-up. The main analyses first assessed the HR for child maltreatment allegations by using a dichotomous disability covariate (disability versus no disability), and second by using 6 dichotomous covariates (6 disability types) in addition to adjusting for child, family, and neighborhood risk factors. In the categorical disability analysis (6 disability groups), children with comorbidities could be categorized in >1 group (except DS) and analyzed 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 assumed the values of these covariates were determined at the point when follow-up began on each child (time = 0; ie, 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 also were conducted to investigate type of maltreatment allegation (neglect, physical and sexual abuse) for all disability groups and ID severity (Supplemental Information).

## 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/behavioral disorders (15.6%). Only a small proportion of allegations included children with DS (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 also was 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 that 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%).

Before adjusting for child, family, and neighborhood characteristics, children with a disability had more than a twofold increased risk of having a maltreatment allegation (HR 2.64, 95% CI 2.56–2.74) and a threefold increased risk of a substantiated allegation (HR 3.09, 95% CI 2.97–3.22) compared with 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 before adjustment. The highest HRs 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/behavioral disorders (HR 3.69, 95% CI 3.56–3.82). The risk of substantiated allegation also was higher.

#### Adjustment for Demographic and Psychosocial Characteristics

As shown in the Supplemental Tables, demographic and psychosocial characteristics vary across disability type. Accounting for child, family, and

neighborhood risk factors partially attenuated the relationship between disabilities and maltreatment, particularly for conduct disorder and mental/behavioral 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 with children without disabilities.

Risk was highest for children with IDs (HR 2.14, 95% CI 2.00–2.28), followed by conduct disorder and mental/behavioral 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 Supplemental Information). Analysis by type of maltreatment allegation found relatively consistent results, with the exception of maltreatment involving sexual abuse, in which autism was protective and birth defects/cerebral palsy showed no increased risk. However, caution should be taken when interpreting results due to smaller sample sizes and therefore unreliable estimates (Supplemental Information).

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 of almost 6.5 times compared with 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% vs 1.5%) and mental/behavioral disorder (17.5% versus 14.3%), both of which had higher risks of maltreatment allegations.

#### Severity and Cause of ID

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 (Supplemental Information).

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

**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	524 534	500 518		24 016		11 560		5596	
Sex									
Male	268 651	257 108	51.4	11 543	48.1	5472	47.3	2810	50.2
Female	255 831	243 362	48.6	12 469	51.9	6088	52.6	2786	49.8
Aboriginality									
Non-Aboriginal	492 740	475 379	95.0	17 361	72.3	7771	67.2	3506	62.7
Aboriginal	31 612	24 975	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
Socioeconomic status									
1 (most disadvantaged)	120 565	37 560	7.5	11 506	47.9	5811	50.3	2903	51.9
2	120 126	81 247	16.2	5805	24.2	2749	23.4	1335	23.9
3	99 811	66 313	13.5	3344	13.9	1550	13.4	726	13.0
4	94 009	136 417	27.3	2097	8.7	923	8.0	420	7.5
5 (least disadvantaged)	87 330	177 067	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									
ID	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	30 090	28 501	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 behavioral disorder	19 813	16 062	3.2	3751	15.6	2073	17.9	1004	17.9
Any disability	54 535	48 324	9.7	6211	25.9	3352	29.0	1709	30.5
Maternal age, y									
<20	30 019	25 194	5.0	4825	20.1	2406	20.8	1162	20.8
20–29	252 817	239 044	47.8	13 773	57.3	6638	57.4	3162	56.5
30+	241 642	236 228	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, y									
<20	9522	8107	1.6	1415	5.9	687	5.9	327	5.8
20–29	175 262	165 343	33.0	9919	41.3	4649	40.2	2074	37.1
30+	314 549	307 078	61.4	7471	31.1	3257	28.2	1518	27.1
Missing	25 201	19 990	4.0	5211	21.7	2967	25.7	1677	30.0
Gestational age, wk									
<37	38 702	35 767	7.1	2935	12.2	1606	13.9	945	16.9
37+	485 157	464 117	92.7	21 040	87.6	9933	85.9	4642	83.0
Birth weight for gestational age									
<10th percentile	52 489	48 271	9.6	4218	17.6	2182	18.9	1164	20.8
>10th percentile	471 322	451 566	90.2	19 756	82.3	9357	80.9	4423	79.0
Marital status									
Single	51 697	44 091	8.8	7606	31.7	4000	34.6	2223	39.7
Married/defacto	470 751	454 529	90.8	16 222	67.5	7436	64.3	3302	59.0
Missing	2086	1898	0.4	188	0.8	124	1.1	71	1.3
Maternal mental health–related admission									
Yes	86 956	75 459	15.1	11 497	47.9	6153	53.2	3573	63.8
No	437 578	425 059	84.9	12 519	52.1	5407	46.8	2023	36.2
Maternal substance-related admission									
Yes	41 150	31 278	6.3	9872	41.1	5756	49.8	3597	64.3
No	483 384	469 240	93.7	14 144	58.9	5804	50.2	1999	26.9
Paternal mental health–related admission									
Yes	46 689	41 323	8.3	5366	22.3	2756	23.8	1506	26.9
No	477 845	459 195	91.7	18 650	77.6	8804	76.2	4090	73.1
Paternal substance-related admission									
Yes	43 431	37 212	7.4	6219	25.9	3371	29.2	1932	34.5
No	481 103	463 306	92.6	17 797	74.1	8189	70.8	3664	65.5

**TABLE 3** Risk of Maltreatment Allegation and Substantiated Maltreatment Allegation by Disability

Characteristic	Risk of Maltreatment Allegation			Risk of Substantiated Maltreatment Allegation		
	Crude HR (95% CI)	Adjusted HR (Disability Yes Versus No) <sup>a</sup>	Adjusted HR (6-Disability Category) <sup>b</sup>	Crude HR (95% CI)	Adjusted HR (Disability Yes Versus No) <sup>a</sup>	Adjusted HR (6-Disability Category) <sup>b</sup>
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)
Socioeconomic 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/defaulto	Ref	Ref	Ref	Ref	Ref	Ref
Estimated gestation						
<37 wk	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)	1.74 (1.68–1.80)	3.09 (2.97–3.22)	1.89 (1.80–1.98)	1.89 (1.80–1.98)
ID						
Yes	3.86 (3.67–4.06)	Ref	2.14 (2.00–2.28)	4.51 (4.21–4.83)	Ref	2.15 (1.96–2.35)
Down syndrome						
Yes	1.15 (0.80–1.66)	0.69 (0.46–1.02)	0.69 (0.46–1.02)	1.08 (0.63–1.86)	Ref	0.48 (0.25–0.93)

**TABLE 3 Continued**

Characteristic	Risk of Maltreatment Allegation		Risk of Substantiated Maltreatment Allegation			
	Crude HR (95% CI)	Adjusted HR (Disability Yes Versus No) <sup>a</sup>	Adjusted HR (6-Disability Category) <sup>b</sup>	Crude HR (95% CI)	Adjusted HR (Disability Yes Versus No) <sup>a</sup>	Adjusted HR (6-Disability Category) <sup>b</sup>
Birth defect/cerebral palsy						
Yes	1.12 (1.06–1.18)	0.99 (0.93–1.05)	0.99 (0.93–1.05)	1.27 (1.19–1.37)	1.10 (1.01–1.20)	1.10 (1.01–1.20)
Autism						
Yes	1.53 (1.32–1.78)	0.74 (0.63–0.89)	0.74 (0.63–0.89)	1.65 (1.34–2.03)	0.87 (0.68–1.11)	0.87 (0.68–1.11)
Conduct disorder						
Yes	5.14 (4.83–5.47)	1.84 (1.70–1.98)	1.84 (1.70–1.98)	5.57 (5.12–6.06)	1.74 (1.56–1.93)	1.74 (1.56–1.93)
Mental and behavioral disorder						
Yes	3.69 (3.56–3.82)	1.62 (1.55–1.69)	1.62 (1.55–1.69)	4.37 (4.17–4.59)	1.74 (1.64–1.85)	1.74 (1.64–1.85)

Ref, reference category.

<sup>a</sup> Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for gestational age, parental mental health–related admissions, parental substance-related admissions and whether they had a disability.

<sup>b</sup> Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for gestational age, parental mental health–related admissions, parental substance-related admissions and disability groups.

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 8551 children with ID, 5350 (62.6%) also have at least 1 of the following: birth defect/cerebral palsy, autism, conduct disorder, or a mental/behavioral 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 behavioral disorders (Table 5). Children with autism but no ID showed a nonsignificant 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 1 in 4 maltreatment allegations and 1 in 3 substantiated allegations. This disproportionate representation of children with disabilities in maltreatment allegations are consistent with international findings.<sup>9</sup> Importantly, the increased risk of maltreatment allegations was not consistent across all disability types. Overrepresented groups included children with ID, conduct disorder, and mental/behavioral disorders.

Previous 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/behavioral disorders, conduct disorder, and ID. After adjusting for risk factors, children with ID, mental/behavioral problems, and conduct disorder continued to have increased risk of allegations and substantiated allegations, consistent with previous research.<sup>4,9,10</sup> Likewise, children with ID continued to have increased risk of allegations, consistent with some but not all previous population studies.<sup>4,9</sup>

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.<sup>4,9</sup> However, our finding of no increased risk for spina bifida or cleft lip and/or palate after adjustment was the opposite of previous findings.<sup>15</sup>

Possible explanations for the lower risk for children with DS and autism include that these disabilities are comparatively well recognized, understood, and supported. Parents tended to be older, better off socioeconomically, and for DS, the ready availability of prenatal screening in WA means most parents have had the opportunity for prenatal diagnosis and the choice to continue with the pregnancy.<sup>19</sup>

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 (eg, Sullivan and Knutson<sup>9</sup>) or present (eg, Spencer et al<sup>4</sup>) only for disabilities such as conduct disorder,

**TABLE 4** Risk of Maltreatment Allegation by Severity of ID

Severity of ID	Number	Multivariate HR <sup>a</sup>
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 ID	515 983	Ref

Ref, reference category.

<sup>a</sup> Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for gestational age, parental mental health–related admissions, and parental substance-related admissions.

**TABLE 5** Risk of Maltreatment Allegation by Comorbidity With IDs

Disability Group (With and Without ID) <sup>a</sup>	Number	Multivariate HR <sup>b</sup>
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	27 484	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	18 226	1.63 (1.55–1.70)

<sup>a</sup> Reference group is children not in that disability group.

<sup>b</sup> Adjusted by sex, Aboriginality, socioeconomic status, maternal age, paternal age, marital status, estimated gestation, birth weight for gestational age, parental mental health–related admissions, and parental substance-related admissions.

mental/behavioral problems, and ID. Together with our examination of the recorded cause of ID, 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 after birth may affect 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 cooccurred with a constellation of other risk factors, such as parents who are young or who have been hospitalized for mental health or substance use, and living in more disadvantaged neighborhoods. 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.<sup>3</sup> 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 (eg, talking back). Furthermore, clustering of mild ID within families is relatively common, and linked to socioeconomic disadvantage.<sup>20</sup> 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 that 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 neighborhood levels 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 onward in WA, it does have limitations. Obviously, maltreatment will be included only if it is reported. Although we have comprehensively ascertained disability from a number of population-level data sources, not all children with disabilities will be identified. Comorbidities also will be underascertained, as the MHIS captures only 1 diagnosis. During the study period, it is expected that there would be changes in the prevalence of diagnoses over time, which would have affected 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 of Mental Disorders, Fourth Edition*, and in 1997 with the formalization of assessment procedures.<sup>21</sup> 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 (eg, 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 behavior. Research indicates that family-centered care with coordination of services, continuity of care, and respite care are important factors in reducing child protection risk.<sup>22, 23</sup> 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 persons with disabilities and their family members should receive the necessary assistance to enable families to contribute toward 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 well-being.

## ACKNOWLEDGMENTS

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

## ABBREVIATIONS

CI: confidence interval  
CPFS: Department of Child Protection and Family Support  
DS: Down syndrome  
HMDS: Hospital Morbidity Data System  
HR: hazard ratio  
ICD: *International Classification of Diseases*  
ID: intellectual disability  
IDEA: Intellectual Disability Exploring Answers  
MHIS: Mental Health Information System  
WA: Western Australia  
WARDA: Western Australian Register of Developmental Anomalies

**FUNDING:** This work was supported by an Australian Research Council Linkage Project Grant (LP100200507) and an Australian Research Council Discovery Grant (DP110100967). Dr O'Donnell is supported by a National Health and Medical Research Council Early Career Fellowship (1012439).

**POTENTIAL CONFLICT OF INTEREST:** The authors have indicated they have no potential conflicts of interest to disclose.

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DOI: 10.1542/peds.2016-1817 originally published online March 6, 2017;

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