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## Background

Unintentional or accidental injury is the leading cause of mortality of children in the United States (Hoyert et al., 2006) and is a significant concern for children with developmental disabilities. A recent study of individuals aged 5-29 with intellectual disability demonstrated age-standardized injury-related mortality and morbidity ratios of 8 and 2, respectively, when compared with the general population (Sherrard et al., 2001). Another study reported that attention-deficit / hyperactivity disorder (ADHD) in children under 12 years is associated with over twice the odds of having at least one accident claim (Swensen et al., 2004). To our knowledge, only one study has attempted to characterize injury epidemiology in individuals with autism; the study reported excess mortality due to accidents in Californians with autism (Shavelle et al., 2001). Children with autism may be at higher risk for injury due to sensorimotor deficits or behavioral abnormalities including hyperactivity, social avoidance and poor judgment. Although caretaking guidelines acknowledge the possibility of increased risk (Ohio ASD/PDD Guidelines, 2006) the extent to which children with autism are at a higher risk of injury has not been previously described in any age group. **The objective of the present study was to report on injury risk in children aged 3-5 with autism, ADD/ADHD, and unaffected controls from a U.S. national survey.**

## Methods

### Study sample

- The **National Survey of Children's Health** (NSCH) was conducted by the CDC in 2003-04 to collect self-report data from parents who had children aged 0-17 across the U.S. The present study analyzed the subset of children aged 3-5.
- Diagnoses of autism and ADD/ADHD were reported by parents responding to the question: "Has a doctor or health professional ever told you that the child has [autism, ADD/ADHD]?"
- 82 children were reported to have **autism**; 191 separate children were reported to have **ADD/ADHD**; **unaffected controls** were 13,398 children without known disabilities, behavioral problems, anxiety/depression, or other medical conditions (e.g. asthma, hearing/vision problems, bone/joint/muscle problems, and diabetes).

### Outcome

- Injury**: parent report of the child requiring medical attention due to an injury, accident, or poisoning during the past 12 months.

### Statistical analysis

- Multivariate regression analysis was performed to compare the risk of injury in children with autism against children with ADD/ADHD, and unaffected controls.
- Methods of variance estimation accounting for the complex sample design (multi-stage sampling with weighting) were applied. Specifically, standard errors were obtained using the Taylor-series approximation method.

## Results

- The 12-month prevalences of injury in the autism group and in the ADD/ADHD group was approximately twice that of the unaffected controls (Table 2).
- Children with autism were not significantly different from children with ADD/ADHD in reported injuries (Table 3).
- Compared with unaffected controls, children with autism were **2.2 times more likely to have a reported injury** (Table 3).

Table 1. Characteristics of the study sample

	Injury			
	Un-weighted		Weighted	
	Yes n (%)	No n (%)	Yes %	No %
<b>Study group</b>				
Autism	17 (1.0)	65 (0.5)	0.9	0.4
ADD/ADHD	44 (2.6)	147 (1.2)	3.1	1.2
Controls	1633 (96.4)	11762 (98.2)	96.0	98.4
<b>Child's sex</b>				
Male	915 (54.0)	5842 (48.8)	55.6	49.2
Female	779 (46.0)	6125 (51.2)	44.4	50.8
<b>Child's age, years</b>				
3	641 (37.8)	4217 (35.2)	34.9	33.6
4	574 (33.9)	3936 (32.9)	34.8	34.1
5	479 (28.3)	3821 (31.9)	30.3	32.3
<b># of Children in household</b>				
1	571 (33.7)	4114 (34.4)	17.8	18.1
2	702 (41.4)	5156 (43.1)	39.7	41.5
3+	421 (24.9)	2704 (22.6)	42.5	40.4
<b>Child's race</b>				
White	1326 (83.1)	8767 (79.8)	78.6	75.4
Other	269 (16.9)	2215 (20.2)	21.4	24.6
<b>Household poverty level</b>				
<100%	190 (11.2)	1372 (11.5)	14.2	16.1
100-184%	269 (15.9)	1901 (15.9)	17.0	17.5
185-299%	385 (22.7)	2566 (21.4)	20.4	18.7
≥300%	716 (42.3)	5018 (41.9)	38.5	36.6
Missing	134 (7.9)	1117 (9.3)	9.9	11.1

Table 2. Un-weighted and weighted 12-month prevalences of injury by study group

	Injury	
	Un-weighted	Weighted
<b>Autism</b>	17 / 82 = <b>20.7%</b>	<b>24.2%</b>
<b>ADD/ADHD</b>	44 / 191 = <b>23.0%</b>	<b>26.5%</b>
<b>Unaffected controls</b>	1633 / 13395 = <b>12.2%</b>	<b>11.9%</b>

Table 3. Adjusted associations of reported injury with autism

	Injury	
	OR	95% CI
<b>Autism</b>	1.05	0.41, 2.71
<b>ADD/ADHD</b>	1.00	
<b>Autism</b>	<b>2.20</b>	<b>1.02, 4.73</b>
<b>Unaffected controls</b>	1.00	

\* Multivariate regression models adjusted for child sex, child age, number of children in household, child race, and household poverty level.

## Discussion

Children with autism were twice as likely to experience injury needing medical attention than unaffected controls but were not different from children with ADD/ADHD. **Findings from this study demonstrate that young children with autism are at a higher risk of injury.** A previous report documented elevated death rates in individuals with autism for accident-related causes such as suffocation and drowning (Shavelle et al., 2001). Future studies need to clarify the extent to which injuries and accidents in young children with autism are related to underlying comorbid disabilities (e.g. seizures, asthma, sensorimotor deficits).

