Autism Prevalence Trends Over Time in Denmark

Changes in Prevalence and Age at Diagnosis

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Objective: To examine the effect of changing age at diagnosis on the diagnosed prevalence of autism among different birth cohorts.

Design: Population-based cohort study.

Setting: Children were identified in the Danish Medical Birth Registry and psychiatric outcomes were obtained via linkage with the Danish National Psychiatric Register.

Participants: All children born in Denmark from January 1, 1994, through December 31, 1999 (N = 407 458).

Main Outcome Measures: The age-specific prevalence, hazard ratio, and relative risk by age.

Results: Statistically significant shifts in age at diagnosis were observed for autism spectrum disorder; children diagnosed before age 9 years in the cohorts born between January 1, 1994, and December 31, 1995, between January 1, 1996, and December 31, 1997, and be-

tween January 1, 1998, and December 31, 1999, were on average diagnosed at ages 5.9 (95% confidence interval [CI], 5.8-6.0), 5.8 (95% CI, 5.7-5.9), and 5.3 (95% CI, 5.2-5.4) years, respectively. The relative risk comparing the 1996-1997 birth cohort with the 1994-1995 birth cohort at age 3 years was 1.20 (95% CI, 0.86-1.67), which decreased to 1.10 (95% CI, 1.00-1.20) at age 11 years. Similarly, the relative risk comparing the 1998-1999 birth cohort with the 1994-1995 birth cohort at age 3 years was 1.69 (95% CI, 1.24-2.31), which decreased to 1.23 (95% CI, 1.11-1.37) at age 11 years. Similar results were observed for childhood autism.

Conclusions: Shifts in age at diagnosis inflated the observed prevalence of autism in young children in the more recent cohorts compared with the oldest cohort. This study supports the argument that the apparent increase in autism in recent years is at least in part attributable to decreases in the age at diagnosis over time.

Arch Pediatr Adolesc Med. 2008;162(12):1150-1156

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A RECENT REVIEW OF THE EPIdemiology of autism documented the large number of studies that have shown an increase in the age-specific prevalence of reported autism cases in the last 2 decades.[1] Once considered rare, the current prevalence estimates for all autism spectrum disorders of about 6 cases per 1000 children indicate that autism spectrum disorder may be the second most common serious developmental disability after mental retardation.[2-4] Recent studies have also shown that an upward trend in prevalence is not unique to autism but is also the case for other childhood neuropsychiatric disorders such as attention-deficit/hyperactivity disorder and Tourette syndrome.[5,6] The increase in the reported prevalence of autism has raised the concerns that the incidence of autism

is increasing and that the increase may be due to adverse exposures such as childhood vaccines.[7]

The increase in the prevalence of reported cases may be caused by many factors such as heightened public awareness, changes in referral pattern, changes in diagnostic criteria, case identification, or reporting methods. In the few studies that have investigated the effect of these potential confounders, the main focus has been on diagnostic substitution in which a child who might have received a disability label such as learning disability or mental retardation 15 to 20 years ago may now be diagnosed with autism because of shifting diagnostic practices.[6,8,9] These studies suggest that diagnostic substitution may explain part of the increase in the prevalence of autism. Correct interpretation of changes in autism prevalence is impor-