Update on the Rising Prevalence of Autism and Its Impacts

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Epidemiology of Autism

• The study of the frequency & distribution of autism* in populations.

• A basis for understanding and informing
  • Prevalence, incidence, trends and impacts
  • Health disparities
  • Service needs
  • Causes and risk factors
  • Changes over the life course
  • Effectiveness & cost-effectiveness of treatments
  • Public health policy

* DSM 5 definition of autism spectrum disorder (ASD): persistent deficits in social communication and social interaction accompanied by restricted, repetitive patterns of behavior, interests or activities; onset early in life.
1st epidemiologic study of autism in the U.S. was conducted in the 1960s in Wisconsin and found it extremely rare.

**Epidemiology of Infantile Autism**

*Darold A. Treffert, MD, Winnebago, Wis*

*Arch Gen Psychiat—Vol 22, May 1970*

- Prevalence:
  - 280 cases among 899,750 Wisconsin children, ages 3-12 years
  - 3.1 / 10,000 (1 in 3,226 children)
  - 3.4 : 1 ratio of boys to girls
Number of children with autism in Wisconsin: special education enrollment, 1992-2008

2011-2012 School Year: 8,885 ages 3-22, 8,154 ages 6-22;
2015-2016: 10,402 ages 6-21      2021-2022: 14,630 ages 3-21 12,544 ages 6-21


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## Biennial estimates of autism prevalence at age 8 years, ADDM Network, 2000–2020

<table>
<thead>
<tr>
<th>Surveillance Year</th>
<th>Population Denominator</th>
<th># Children with Autism</th>
<th>Prevalence /1,000 (site to site range)</th>
<th>This is about 1 in x children</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>187,761</td>
<td>1,252</td>
<td>6.7 (4.5-9.9)</td>
<td>1 in 150</td>
</tr>
<tr>
<td>2002</td>
<td>407,578</td>
<td>2,685</td>
<td>6.6 (3.3-10.6)</td>
<td>1 in 150</td>
</tr>
<tr>
<td>2004</td>
<td>172,335</td>
<td>1,376</td>
<td>8.0 (4.6-9.8)</td>
<td>1 in 125</td>
</tr>
<tr>
<td>2006</td>
<td>307,790</td>
<td>2,757</td>
<td>9.0 (4.2-12.1)</td>
<td>1 in 110</td>
</tr>
<tr>
<td>2008</td>
<td>337,093</td>
<td>3,820</td>
<td>11.3 (4.8-21.2)</td>
<td>1 in 88</td>
</tr>
<tr>
<td>2010</td>
<td>363,749</td>
<td>5,338</td>
<td>14.7 (8.7-21.9)</td>
<td>1 in 68</td>
</tr>
<tr>
<td>2012</td>
<td>346,978</td>
<td>5,063</td>
<td>14.6 (8.2-24.6)</td>
<td>1 in 68</td>
</tr>
<tr>
<td>2014</td>
<td>325,483</td>
<td>5,473</td>
<td>16.8 (13.1-29.3)</td>
<td>1 in 59</td>
</tr>
<tr>
<td>2016</td>
<td>275,419</td>
<td>4,895</td>
<td>18.5 (15.1-31.4)</td>
<td>1 in 54</td>
</tr>
<tr>
<td>2018</td>
<td>220,281</td>
<td>5,058</td>
<td>23.0 (22.3-23.6)</td>
<td>1 in 44</td>
</tr>
<tr>
<td><strong>2020</strong></td>
<td><strong>226,339</strong></td>
<td><strong>6,245</strong></td>
<td><strong>27.6 (23.1-44.9)</strong></td>
<td><strong>1 in 36</strong></td>
</tr>
</tbody>
</table>

**Total:** 42,962

[https://www.cdc.gov/ncbddd/autism/data.html](https://www.cdc.gov/ncbddd/autism/data.html)
Rise in Autism Prevalence Among 8 Year-Old Children in the US, 2000-2020, by Sex

Sources: CDC’s ADDM Network ASD prevalence reports, MMWR, published 2007-2023.
Possible explanations of the increase in autism prevalence

• Expansion of diagnostic criteria
• Gradual adoption of autism as a special education reporting category since 1992
• Increased awareness, training, treatment options
• Changes in diagnostic practices:
  • Diagnostic substitution
  • Diagnostic accretion
  • Expansion of developmental screening (AAP 2006)
• Change in risk factors
Evidence of Diagnostic Substitution

Trends in the Number of 6-11 Year-Old Children Receiving Special Education Services for Intellectual Disability and Autism, Wisconsin, 1997-2016

Factors associated with the prevalence of autism

• Pre-term birth
• Low birth weight
• Birth spacing (inter-pregnancy interval <24 mo)
• Birth order
• Advanced parental age
These estimates assume that those cases missing functional limitation data are not more or less likely to be in a certain level of functional limitation than another.
Perpetrated the idea that autism preferentially affects children from affluent families.
Socioeconomic Disparity in the Prevalence of Autism Spectrum Disorder in Wisconsin

Matthew J. Maenner, BS; Carrie L. Arneson, MS; Maureen S. Durkin, PhD, DrPH

- N = 181 cases, 36,989 children (age 8 years) under surveillance in 2002

Figure 1. Prevalence of Autism Spectrum Disorder (ASD) by Socioeconomic Status (SES). Note: black bars indicate 95% confidence intervals.

Race, class contribute to disparities in autism diagnoses

BY HANNAH FURFARO
20 NOVEMBER 2017
Racial and Ethnic Disparity in Autism Prevalence, ADDM Network, 2002-2010

Prevalence per 1,000

- **White**
- **Black**
- **Hispanic**
Campaigns to increase early detection of autism in diverse populations
CDC & Waisman Center Resources
Learn the Signs. Act Early.

Milestone and Disability-Specific Fact Sheets https://actearly.wisc.edu/
8-year-old children living in ADDM Network sites were identified with ASD in 2016.
Socioeconomic disparity in ASD prevalence in the U.S. has changed in recent surveillance years (2018 and 2020), with prevalence now lowest in high income communities.
Recent change in the pattern of racial and ethnic differences in autism prevalence
Rise in Autism Prevalence Among 8 Year-Old Children in the Wisconsin, 2002-2020, by Race/Ethnicity

Sources: CDC’s ADDM Network ASD prevalence reports, MMWR, published 2007-2023
Other Key Findings from the ADDM Network

Outcomes in Adolescence: >50% with Co-Occurring Conditions at age 16

More children are being identified with ASD by 48 months

AGE GROUP
- 4 YEARS
- 8 YEARS

Axe in months

ASD diagnosis or special education classification per 1000 children

Boys
Girls

%}

ADHD
Anxiety
Depression
Epilepsy
OCD
Impacts of the COVID-19 Pandemic

ADDM Network: Fewer Developmental Evaluations

Evaluations 2016-2020 compared to 2012-2016

MORE
LESS

Display as 6 months prior and 6 months post-pandemic

Study to Explore Early Development (SEED): Financial Impacts Greater for Families of Children with Autism

Employment Reduction
Increased Remote Work
Difficulty Paying Bills
Fear Losing Home

Autism
Typically Developing
Conclusions

• Epidemiologic studies show increasing prevalence of autism over time, which now affects >2% of children

• Given the high cost of autism, this trend places considerable demands on schools, healthcare systems and increasing numbers of families

• Need for ongoing monitoring and understanding of:
  • Factors associated with increased prevalence of autism, including the elevated male-to-female ratio
  • The complexity and variability of autism symptoms and support needs
  • High frequency of co-occurring conditions and disabilities
  • Equitable access to autism diagnoses and proven interventions
  • Strategies for improving outcomes across the life-course for autistic persons and their families, especially during public health emergencies