Shadyside Hospital: Dispelling Myths About Autism

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Myth 1. The Autism Epidemic

A real epidemic or

A re-appreciation of the severity spectrum and initiation of epidemiologic studies

Prevalence: Epidemiologic Studies

- Very very few studies prior to 1980
- By 2000, several non-US studies published
- CDC launches multiple sites to study epidemiology in U.S.

Autism & ASD Prevalence: 2000 to 2006

Prevalence 3 Fold Increase	Baird[1]	Chakrabarti & Fombonne[2]	Brick Township NJ[3]	CDC[4]	CDC[6]
Autism	30.8/10,000	16.8/10,000	40.5/10,000	34/10,000	
Other ASDs	27.1/10,000	45.8/10,000	26.9/10,000		90/10,000
Total for ASDs[5]	57.9/10,000	62.6/10,000	67.4/10,000		
Total for ASDs	1/170	1/160	1/150		1/110

[1]Baird et al, 2000; [2]Chakrabarti & Fombonne, 2001; [3]Bertrand et al, 2001; [4]Yeargin-Allsopp et al, 2003
[5]This number was 2/10,000 in 1980 [6]Autism and Developmental Disabilities Monitoring Network Surveillance Year 2006 Principal Investigators; CDC

ASD Prevalence 2007 to 2012

Source	Year	Prevalence
National Survey of Children's Health[1]	2007	1/86
CDC 14-site ADDM network[2]	2008	1/88
National Survey of Children's Health[3]	2011-2012	1/50

[1] Centers for Disease Control and Prevention, National Center for Health Statistics, State and Local Area Integrated Telephone Survey. 2007 National Survey of Children's Health Frequently Asked Questions. Available from URL: http://www.cdc.gov/nchs/slaits/nsch.htm#2007nsch

[2] CDC Website - Prevalence of Autism Spectrum Disorders – Autism and Developmental Disabilities Monitoring Network, 14 Sites, United States, 2008 Available from URL: http://www.cdc.gov/ncbddd/autism/data.html

[3]Centers for Disease Control and Prevention, National Center for Health Statistics, State and Local Area Integrated Telephone Survey. 2011-2012 National Survey of Children's Health Frequently Asked Questions. April 2013. Available from URL: http://www.cdc.gov/nchs/slaits/nsch.htm #2011nsch

NHS Phone Survey of ASD Prevalence: From 2007 to 2012

- "Changes in Prevalence of Parent-reported Autism Spectrum Disorder in School-aged U.S. Children: 2007 to 2011-2012" Blumberg et al., National Health Statistics Reports #65, March 20, 2013
  - Parent report of ASD diagnosis in 6-17 year olds

    2007: **1 in 86** or 1.16%

    2011-2012: **1 in 50** or 2%

Increase due to new diagnosis of children in this group, particularly adolescents, with previously unrecognized & milder ASD

Prevalence Study by Kim et al, 2011 Direct Assessment of All Children: 1/35

"Prevalence of Autism Spectrum Disorders in a Total Population Sample" Kim et al., Am. J. Psychiatry 2011; 168:904-912

- Direct screening of all 7-12 year olds in a South Korean community in collaboration with Yale U

  1 in 35 or 2.64% with ASD;

66% of these ASD cases were in main stream school population, undiagnosed and untreated

Second Argument For An Epidemic Falls

If autism is not an epidemic,

why are there no adults with autism?

“**Autism and diagnostic substitution: evidence from a study of adults with a history of developmental language disorder**” Bishop et al., 2008, Dev Med Child Neurol 50:341-345.

- 38 adults diagnosed with developmental language disorder as children re-evaluated
- All had ADI (parents) and ADOS (participant): 8 met criteria for autism on both instruments and 4 met criteria for autism spectrum disorder
- Some children who nowadays would be diagnosed unambiguously with autism were diagnosed as developmental language disorder in the past.

"Prevalence of autism and its correlates in state hospital" Mandell et al., 2012

- 10% of 141 inpatients at one psychiatric hospital met SRS criteria for ASD
- Not previously diagnosed with ASD
- Had a variety of psychiatric diagnoses

What is the cause of the growing ASD prevalence estimates?

- Consequence of new diagnostic criteria that include milder cases? Yes
- Growing awareness among parents and professionals leading to increased screening? Yes
- Over-diagnosis or under-diagnosis? Both.
- Actual increase in occurrence? Doubtful.

2. AUTISM IS **NOT** CAUSED BY VACCINES OR OTHER TOXINS

NOT.

The Toxin Myth: Fact 1.

- **Began with** Wakefield et al report of autism onset in association with MMR immunization at 15-18 months and supported by an increase in measles titer in gut.

- **Accelerant**: Delay in parent awareness of symptoms until second year of life; some cases have rapid deceleration of development between 12 and 24 months when the “core” skills affected by autism normally emerge.

- **Evidence/Facts:** The measles titers cited in the study were fraudulent and case histories were altered to create appearance of a temporal relationship.

London Times Reports Alterations of Case Histories in Wakefield et al study

- An investigative reporter spent two years tracking down the families included in the Wakefield et al study and compared parent history of regression to reported history

MMR doctor fixed data on autism

The Sunday Times, February 8 2009

THE doctor who sparked the scare over the safety of the MMR vaccine for children changed and misreported results in his research, creating the appearance of a possible link with autism, a Sunday Times investigation has found.

Fact 2.
Federal Court Masters' Decisions:

- The decisions can be found here:
  http://www.uscfc.uscourts.gov/node/5026

- **"The U.S. Court of Claims is different from many other courts: The families involved didn't have to prove the inoculations definitely caused the complex neurological disorder, just that they probably did."**

Federal Court Masters' Comments

- In the ruling, Special Master Denise Vowell wrote, "Sadly, the petitioners in this litigation have been the victims of bad science conducted to support litigation rather than to advance medical and scientific understanding" of autism.
- http://www.mnn.com/family/family-activities/blogs/federal-court-vaccines-do-not-cause-autism
- "Unfortunately, the Cedillos have been misled by physicians who are guilty, in my view, of gross medical misjudgment," Hastings wrote.

http://www.washingtonpost.com/wp-dyn/content/article/2009/02/12/AR2009021201391.html

Fact 3. Environmental Associations With Prevalence Are Intra-uterine

- Toxicologic studies report associations with exposures during pregnancy and early postnatal period (Volk et al, 2013)
- Latest study concludes environmental associations with prevalence in ASD are anti-natal but mechanisms unknown (Scott et al, 2013)
- Associations include: advanced parental age at conception; maternal diabetes, smog and pesticides and maternal febrile illness and stress during pregnancy. Causation not demonstrated. Protective effect of maternal folate supplementation.

Fact 4. New Evidence About Onset: First Signs of ASD By 3-5mos

- Longitudinal studies of infants at increased genetic risk for ASD to define earliest symptoms
- At 3-5 months: postural instability, impaired fine motor coordination
- By 9 months: unusual response to sensory stimuli, odd motor movements, and unusual visual preoccupation with objects
- 12-24 months: all traditional “core” and “co-morbid” manifestations emerge together; a subset has a dramatic deceleration

Fact 5. The Biggest "E" Effect in ASD is Beneficial Impact of Interventions

- Lots of evidence that human environmental influences are strong and positive
- Studies are demonstrating brain changes as a result of these interventions
- Think about "E" effects in a new way

5. Hope for Reversing Autism

By Alice Park | Dec. 04, 2012 | 2 Comments

GETTY IMAGES

In encouraging news for parents of autistic children, researchers say early behavior therapy can help normalize brain patterns responsible for the symptoms of the condition. Children diagnosed with autism spectrum disorders who participated in the Early Start Denver Model program, which involves intensive social and linguistic engagement with toddlers, showed changes in the way their brains process human faces and objects. Autistic youngsters generally show more brain activity when they view images of an inanimate object like a toy than when they see a picture of a woman's face. But after two years of ESDM therapy, the autistic children showed the opposite response, and these patterns came close to mimicking those found among normally developing children. It's a hopeful sign that it's possible to halt some of the brain changes linked to autism and possibly even reverse them. But the key to the program's success involves early and intensive intervention with properly trained counselors who actively engage the toddlers in several hours of therapy a week.

Early Behavioral Intervention Is Associated With Normalized Brain Activity in Young Children With Autism

Geraldine Dawson, Ph.D., Emily J.H. Jones, Ph.D., Kristen Merkle, B.S., Kaitlin Venema, B.S., Rachel Lowy, B.S., Susan Faja, Ph.D., Dana Kamara, B.S., Michael Murias, Ph.D., Jessica Greenson, Ph.D., Jamie Winter, Ph.D., Milani Smith, Ph.D., Sally J. Rogers, Ph.D., Sara J. Webb, Ph.D.

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J Autism Dev Disord. 2013 Jun 28. [Epub ahead of print]

Comparative Efficacy of LEAP, TEACCH and Non-Model-Specific Special Education Programs for Preschoolers with Autism Spectrum Disorders.

Boyd BA, Hume K, McBee MT, Alessandri M, Gutierrez A, Johnson L, Sperry L, Odom SL.

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Abstract

LEAP and TEACCH represent two comprehensive treatment models (CTMs) that have been widely used across several decades to educate young children with autism spectrum disorders. The purpose of this quasi-experimental study was to compare high fidelity LEAP (n = 22) and TEACCH (n = 25) classrooms to each other and a control condition (n = 28), in which teachers in high quality special education programs used non-model-specific practices. A total of 198 children were included in data analysis. Across conditions, children's performances improved over time. This study raises issues of the replication of effects for CTMs, and whether having access to a high quality special education program is as beneficial as access to a specific CTM.

PMID: 23812661 [PubMed - as supplied by publisher]

Peer Training Outperforms Traditional Autism Interventions

Training classmates produces greater gains in social inclusion than even one-on-one training between therapist and child

TOP 10 SCIENCE
Autism Research Advances of 2012

Kasari C, Rotheram-Fuller E, Locke J, Gulsrud A. Making the connection: randomized controlled trial of social skills at school for children with autism spectrum disorders. J Child Psychol Psychiatry. 2012; 53(4): 431-9.

Supported employment improves cognitive performance in adults with Autism

D. García-Villamisar[1] & C. Hughes[2]

Journal of Intellectual Disability Research
Volume 51 Part 2 pp 142-150 February 2007

Cellular Signaling Pathways Leading to New Biologic Treatments For Severe Cases

- Clinically, there are **two worlds of autism**. One world is that of the less severe cases for whom various neurocognitive rehabilitation strategies are changing outcome. The second world is that of the severe cases where treatments are not working.

Myth 4: We don't know much about the cause of autism.

Truth: We know a lot about the etiology and pathophysiology of autism. We also know a lot about the cognitive basis of autism behavior.

It is just not widely known.

SFARI website has excellent reviews of scientific studies. https://sfari.org/

Brain Res. 2011 Mar 22;1380:42-77. doi: 10.1016/j.brainres.2010.11.078. Epub 2010 Dec 1.

Etiological heterogeneity in autism spectrum disorders: more than 100 genetic and genomic disorders and still counting.

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Abstract

There is increasing evidence that autism spectrum disorders (ASDs) can arise from rare highly penetrant mutations and genomic imbalances. The rare nature of these variants, and the often differing orbits of clinical and research geneticists, can make it difficult to fully appreciate the extent to which we have made progress in understanding the genetic etiology of autism. In fact, there is a persistent view in the autism research community that there are only a modest number of autism loci known. We carried out an exhaustive review of the clinical genetics and research genetics literature in an attempt to collate all genes and recurrent genomic imbalances that have been implicated in the etiology of ASD. We provide data on 103 disease genes and 44 genomic loci reported in subjects with ASD or autistic behavior. These genes and loci have all been causally implicated in intellectual disability, indicating that these two neurodevelopmental disorders share common genetic bases. A genetic overlap between ASD and epilepsy is also apparent in many cases. Taken together, these findings clearly show that autism is not a single clinical entity but a behavioral manifestation of tens or perhaps hundreds of genetic and genomic disorders. Increased recognition of the etiological heterogeneity of ASD will greatly expand the number of target genes for neurobiological investigations and thereby provide additional avenues for the development of pathway-based pharmacotherapy. Finally, the data provide strong support for high-resolution DNA microarrays as well as whole-exome and whole-genome sequencing as critical approaches for identifying the genetic causes of ASDs.

Curr Opin Genet Dev. 2013 Jun;23(3):310-5. doi: 10.1016/j.gde.2013.02.003. Epub 2013 Mar 25.

Recent developments in the genetics of autism spectrum disorders.

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Abstract

The last several years have marked a turning point in the genetics of autism spectrum disorder (ASD) due to rapidly advancing genomic technologies. As the pool of bona fide risk genes and regions accumulates, several key themes have emerged: these include the important role of rare and de novo mutation, the biological overlap among so-called syndromic and 'idiopathic' ASD, the elusive nature of the common variant contribution to risk, and the observation that the tremendous locus heterogeneity underlying ASD appears to converge on a relatively small number of key biological processes. Perhaps most striking has been the revelation that ASD mutations show tremendous phenotypic variability ranging from social disability to schizophrenia, intellectual disability, language impairment, epilepsy and typical development.