

Vaccines and Autism: A Summary of CDC Conducted or Sponsored Studies

The evidence is clear: vaccines do not cause autism spectrum disorder (ASD). This fact sheet provides a summary of studies that were conducted by CDC or with CDC's involvement.

Recommended Childhood Vaccines and Autism

Study Title	Summary and Citation
Increasing exposure to antibody-stimulating proteins and polysaccharides in vaccines is not associated with risk of autism	<p>This study looked at the number of antigens (substances in vaccines that cause the body's immune system to produce disease-fighting antibodies) from vaccines during the first two years of life. Researchers compared children with ASD to children without ASD. The results showed that the total amount of antigen from vaccines received was the same between children with and without ASD.</p> <ul style="list-style-type: none"> ➤ DeStefano F, Price CS, Weintraub ES. <u>Increasing exposure to antibody-stimulating proteins and polysaccharides in vaccines is not associated with risk of autism.</u> <i>J Pediatr.</i> 2013 Aug;163(2):561-7. Epub 2013 Mar 30.

Thimerosal, Autism, and Other Neurodevelopmental Outcomes

Study Title	Summary and Citation
Prenatal and Infant Exposure to Thimerosal From Vaccines and Immunoglobulins and Risk of Autism	<p>Exposure to thimerosal, a vaccine preservative, has been said to be associated with the increased risk of ASD. This study compared children with ASD to those without, and looked at prenatal and infant exposure to thimerosal from vaccines. This study found no difference in exposure to thimerosal between children with and without ASD.</p> <ul style="list-style-type: none"> ➤ Price CS, Thompson WW, Goodson B, Weintraub ES, Croen LA, et al. <u>Prenatal and Infant Exposure to Thimerosal From Vaccines and Immunoglobulins and Risk of Autism.</u> <i>Pediatrics.</i> Epub 2010 Sep 13.
Autism and Thimerosal-Containing Vaccines: Lack of Consistent Evidence for an Association	<p>In 1992, Denmark and Sweden stopped using thimerosal in vaccines. This study compared the rate of ASD in these countries before and after thimerosal was removed. In both countries, ASD rates increased between 1987 and 1999. If thimerosal exposure was related to ASD, one would expect that ASD rates would decrease after 1992 when children were no longer being exposed.</p> <ul style="list-style-type: none"> ➤ Stehr-Green P, Tull P, Stellfeld M, Mortenson PB, Simpson D. <u>Autism and thimerosal-containing vaccines: lack of consistent evidence for an association.</u> <i>Am J Prev Med.</i> 2003 Aug;25(2):101-6.

Study Title	Summary and Citation
<p>Safety of Thimerosal-Containing Vaccines: A Two-Phased Study of Computerized Health Maintenance Organization Databases</p>	<p>CDC used the Vaccine Safety Datalink (VSD) to look for possible links between thimerosal-containing vaccines and a variety of health problems. CDC and VSD researchers found statistically significant associations between thimerosal and language delays and tics. However, the associations were weak and were not consistent between study populations. The study found no link between thimerosal and ASD.</p> <ul style="list-style-type: none"> ➤ Verstraeten T, Davis RL, DeStefano F, Lieu TA, Rhodes PH, et al. Safety of thimerosal-containing vaccines: a two-phased study of computerized health maintenance organization databases. <i>Pediatrics</i>. 2003 Nov;112(5):1039-48.
<p>Early Thimerosal Exposure and Neuropsychological Outcomes at 7 to 10 Years</p>	<p>This study measured neurodevelopmental disorders in children. The study found only a few statistically significant associations between exposure from thimerosal and neuropsychological functioning. Results of this study show no link between thimerosal-containing vaccines and neurodevelopmental disorders in children.</p> <ul style="list-style-type: none"> ➤ Thompson WW, Price C, Goodson B, Shay DK, Benson P, et al. Early Thimerosal Exposure and Neuropsychological Outcomes at 7 to 10 Years. <i>N Engl J Med</i> 2007; 357:1281-1292.
<p>Neuropsychological Performance 10 Years After Immunization in Infancy With Thimerosal-Containing Vaccines</p>	<p>CDC funded this follow-up study in Italy that compared neuropsychological outcomes of children who were randomly assigned to receive one of two forms of diphtheria-tetanus-acellular pertussis vaccine (DTaP) in the first year of life: one containing thimerosal and the other containing 2-phenoxyethanol. Ten years after vaccination, the two groups were tested on 24 neuropsychological outcomes. This study adds to the body of scientific evidence that thimerosal in vaccines is not harmful to children.</p> <ul style="list-style-type: none"> ➤ Tozzi AE, Bisiacchi P, Tarantino V, De Mei B, D'Elia L, et al. Neuropsychological Performance 10 Years After Immunization in Infancy With Thimerosal-Containing Vaccines. <i>Pediatrics</i> 2009;123(2):475 -482.

Measles, Mumps, and Rubella (MMR) Vaccine and Autism

Study Title	Summary and Citation
<p>A Population-Based Study of Measles, Mumps, and Rubella Vaccination and Autism</p>	<p>CDC has an ongoing cooperative agreement with the Danish Medical Research Council which supports a collaborative research program with Danish researchers and provides opportunities for CDC to study causes of developmental disabilities through Denmark's unique public health infrastructure.</p> <p>This study, which followed more than 500,000 children over 7 years, found no association between the MMR vaccine and ASD.</p> <ul style="list-style-type: none"> ➤ Madsen KM, Hviid A, Vestergaard M, Schendel D, Wohlfahrt J, et al. A Population-Based Study of Measles, Mumps, and Rubella Vaccination and Autism. <i>N Engl J Med</i> 2002; 347:1477-1482.

Study Title	Summary and Citation
<p>Age at First Measles-Mumps-Rubella Vaccination in Children With Autism and School-Matched Control Subjects: A Population-Based Study in Metropolitan Atlanta</p>	<p>CDC conducted this study using data collected through the Metropolitan Atlanta Developmental Disabilities Surveillance Program. This study looked at MMR vaccination and ASD by comparing children who had been diagnosed with ASD to those who had not. The study included children vaccinated by the age of 18 months, 24 months, and 36 months. The findings revealed that vaccination between 24 and 36 months was slightly more common among children with ASD, and that association was strongest among children 3-5 years of age. This finding was most likely a result of immunization requirements for preschool special education program attendance in children with ASD.</p> <ul style="list-style-type: none"> ➤ DeStefano F, Bhasin TK, Thompson WW, Yeargin-Allsopp M, Boyle C. <u>Age at First Measles-Mumps-Rubella Vaccination in Children With Autism and School-Matched Control Subjects: A Population-Based Study in Metropolitan Atlanta.</u> <i>Pediatrics</i> 2004;113(2):259 -266.
<p>Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study</p>	<p>CDC supported a study to investigate the association between MMR vaccine, gastrointestinal tract (GI) disorders, and ASD. Researchers studied MMR vaccine timing and evaluated bowel tissue samples from 25 children with ASD and GI disorders and 13 children with GI disturbances alone, looking for a difference in the presence of measles vaccine virus in the samples between children with and without ASD. The study's results showed that MMR vaccine does not trigger or exacerbate GI disorders or ASD.</p> <ul style="list-style-type: none"> ➤ Hornig M, Briese T, Buie T, Bauman ML, Lauwers G, et al. <u>Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study.</u> <i>PLoS ONE</i> 2008; 3(9): e3140.
<p>Is There a 'Regressive Phenotype' of Autism Spectrum Disorder Associated with the Measles-Mumps-Rubella Vaccine? A CPEA Study</p>	<p>The National Institute of Child Health and Human Development (NICHD) and CDC collaborated to study regressive autism and measles-mumps-rubella (MMR) vaccination. This study used data from children with regressive autism and children without autism. The results showed no evidence of a link between regression in ASD and MMR vaccination.</p> <ul style="list-style-type: none"> ➤ Richler J, Luyster R, Risi S, Hsu WL, Dawson G. <u>Is there a 'regressive phenotype' of Autism Spectrum Disorder associated with the measles-mumps-rubella vaccine? A CPEA Study.</u> <i>J Autism Dev Disord.</i> 2006 Apr;36(3):299-316.