Science Summary: CDC Studies on Thimerosal in Vaccines

The evidence is clear: thimerosal is not a toxin in vaccines, but merely a preservative, preventing contamination, that has been used in vaccines for decades. This fact sheet provides a summary of thimerosal-related studies that were conducted by CDC or with CDC's involvement.

Study	Summary and Citation
Brain function, behavior, language, coordination and thimerosal Thimerosal exposure in early life and neuropsychological outcomes 7-10 years later	This study assessed whether prenatal thimerosal exposure or thimerosal exposure between birth and 7 months of age was associated with seven specific neuropsychological outcomes in children ages 7-10 years. The study found no associations with thimerosal and general intellectual functioning, verbal memory, fine motor coordination, executive functioning, behavior regulation and language. There was a small association between early thimerosal exposure and the presence of tics in boys, but no association among girls. It is necessary to perform additional studies examining the association between thimerosal and tics using more reliable and valid measures of tics. ➢ Barile JP, Kuperminc GP, Weintraub ES, Mink JW, Thompson WW. Thimerosal exposure in early life and neuropsychological outcomes 7-10 years later. Journal of Pediatric Psychology. 2012 January/February; 37(1):106-118
Thimerosal exposure in the womb and in infancy: Prenatal and Infant Exposure to Thimerosal From Vaccines and Immunoglobulins and Risk of Autism	This study compared children with Autism 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 Autism. ➢ Price CS, Thompson WW, Goodson B, Weintraub ES, Croen LA, et al. Prenatal and Infant Exposure to Thimerosal From Vaccines and Immunoglobulins and Risk of Autism. Pediatrics. Epub 2010 Sep 13.
Long-term results of thimerosal exposure Neuropsychological Performance 10 Years After Immunization in Infancy With Thimerosal-Containing Vaccines	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. Results show that thimerosal in vaccines is not harmful to children. ➢ 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. Pediatrics 2009;123(2):475 -482.
Thimerosal in US, UK, and Denmark Thimerosal-containing vaccines: evidence versus public apprehension	Three large epidemiological studies that analyzed data from US health maintenance organizations, the UK General Practice Research Database, and the entire country of Denmark failed to find an association between exposure to thimerosal-containing vaccines and autism. ➢ DeStefano F. Thimerosal-containing vaccines: evidence versus public apprehension. Expert Opinion Drug Dafety. 2009; 8(2):1-4.

Thimerosal and Children's Flu Shots: Inactivated influenza vaccine (IIV) in children <2 years of age: Examination of selected adverse events reported to the Vaccine Adverse Event Reporting System (VAERS) after thimerosal-free or thimerosal-containing vaccine	This study measured the proportion of injection site reactions (ISR), rash, and infections reported to the Vaccine Adverse Event Reporting System (VAERS) after testing three versions of an inactivated influenza vaccine (IIV) in children less than 2 years of age. The three versions of IIV included thimerosal-free, thimerosal-including, and ones in which the presence of thimerosal could not be determined. The study found no difference between the proportion of ISR, rash, or infections in all three versions of IIV. ➢ McMahon AW, Iskander JK, Haber P, Braun MM, Ball R. Inactivated influenza vaccine (IIV) in children <2 years of age: Examination of selected adverse events reported to the Vaccine Adverse Event Reporting System (VAERS) after thimerosal-free or thimerosal-containing vaccine. Vaccine. 2008 Jan; 26(3):427-429.
Thimerosal and neurodevelopmental disorders Early Thimerosal Exposure and Neuropsychological Outcomes at 7 to 10 Years	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. ➢ Thompson WW, Price C, Goodson B, Shay DK, Benson P, et al. Early Thimerosal Exposure and Neuropsychological Outcomes at 7 to 10 Years. N Engl J Med 2007; 357:1281-1292.
Thimerosal and health outcomes Safety of Thimerosal-containing vaccines: a two-phased study of computerized health maintenance organization databases	This study looked for possible links between thimerosal-containing vaccines and a variety of health problems. CDC and research partners 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 Autism. ➢ 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. Pediatrics. 2003 Nov;112(5):1039-48.
Effects of removing thimerosal Autism and thimerosal-containing vaccines: lack of consistent evidence for an association. Effects of removing thimerosal	This study compared the prevalence and incidence of autism in California, Sweden, and Denmark with average exposures to thimerosal-containing vaccines between the mid-1980s and the late-1990s. In California, thimerosal in vaccines increased throughout the 1990s. In contrast, Sweden and Denmark decreased thimerosal in the late 1980s and eliminated thimerosal in the early 1990s. In all three countries, the incidence and prevalence of autism increased significantly between the mid-1980s and the late 1990s. These findings indicate that increased exposure to thimerosal-containing vaccines is not responsible for increased rates of autism. ➢ Stehr-Green P, Tull P, Stellfeld M, Mortenson PB, Simpson D. Autism and thimerosal-containing vaccines: lack of consistent evidence for an association. American Journal of Preventive Medicine. 2003 Aug; 25(2): 101-106.
Comparing outcomes with and without thimerosal Autism and thimerosal-containing vaccines: lack of consistent evidence for an association	In 1992, Denmark and Sweden stopped using thimerosal in vaccines. This study compared the rate of Autism in these countries before and after thimerosal was removed. In both countries, Autism rates increased between 1987 and 1999. If thimerosal exposure was related to Autism, one would expect that Autism rates would decrease after 1992 when children were no longer being exposed. ➢ Stehr-Green P, Tull P, Stellfeld M, Mortenson PB, Simpson D. Autism and thimerosal-containing vaccines: lack of consistent evidence for an association. Am J Prev Med. 2003 Aug;25(2):101-6.