



Contract Negotiations With Payers
Differentiate Your Practice Through a Better Contract



Advertisement

PEDIATRICS®

Advanced Search 

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

[Home](#) [My Pediatrics](#) [Journal Information](#) [Current Issue](#) [Past Issues](#) [Subscriptions & Services](#) [Contact Us](#)

Post-publication Peer Review (P³R) is an online forum for ongoing review peer review. To submit a P³R please go to the article you wish to respond to and click on the link that reads "P³Rs: Submit a Response." Submission of P³Rs are open to all health care professionals and experts in related fields.

Post-publication Peer Reviews to:

SPECIAL ARTICLES:

Paul A. Offit and Rita K. Jew

Addressing Parents' Concerns: Do Vaccines Contain Harmful Preservatives, Adjuvants, Additives, or Residuals?

Pediatrics 2003; 112: 1394-1397 [[Abstract](#)] [[Full text](#)] [[PDF](#)]
 **P³Rs: Submit a response to this article**

P³Rs published:

- ▼ **Parents' worries about thimerosal in vaccines are well founded!**
Mark R. Geier, MD, Ph.D., David A. Geier of Medcon, Inc. (12 March 2004)
- ▼ **Re: Parents' worries about thimerosal in vaccines are well founded!**
paul a offit, Paul Offit (17 March 2004)
- ▼ **Offit and Jew incorrect on 2003 Vaccination Schedules**
Brian S. Hooker (31 March 2004)
- ▼ **response to brian hooker**
Paul A Offit, Rita K. Jew (1 April 2004)

Parents' worries about thimerosal in vaccines are well founded!

12 March 2004



Mark R. Geier, MD, Ph.D.,
geneticist and vaccinologist
The Genetic Centers of America,
David A. Geier of Medcon, Inc.

Letter to the Editor:

The recent article by Offit and Jew [1] is misleading and contains many inaccurate statements. The authors obviously did not take the proper time to search and review the literature that is a requisite for writing a review article. The following comments will be directed to their specific section on thimerosal.

Send letter to journal:
Re: Parents' worries about thimerosal in vaccines are well founded!

First, the authors stated, "Although no published studies to date have compared the incidence of neurodevelopmental delay in children who received thimerosal-free or thimerosal-containing vaccines, several factors are reassuring that the level of mercury contained in the vaccines was not likely to be harmful." In fact, there are three studies [2-4] in the peer-reviewed literature that have examined children

E-mail Mark R. Geier,
MD, Ph.D., et al.

receiving thimerosal-containing childhood vaccines in comparison to thimerosal-free (i.e. contained 2-phenoxyethanol as a preservative since their introduction) childhood vaccines administered to children as part of the routine childhood immunization schedule. These studies have shown 2- to 6- fold statistically significant increased risks for neurodevelopmental disorders and increasing dose-response effects for additional doses of mercury from thimerosal-containing childhood vaccines in comparison to thimerosal-free childhood vaccines.

Second, the authors stated, "However, no data exist on the capacity of low-dose, chronic exposure to ethylmercury to harm the developing nervous system." In addition to the three previously referenced articles showing a direct relationship between increasing mercury from thimerosal and neurodevelopmental disorders from two different databases [2-4], Blaxill [5] has in an ecological analysis shown that the prevalence of autism in the state of California was directly correlated with the doses of mercury children received from thimerosal-containing childhood vaccines. Hornig [6] has found that early postnatal administration of thimerosal to mice using doses and timing that mimic the childhood immunization schedule induced mouse strain-specific effects mirroring those of human neurodevelopmental disorders. It has also been shown by other authors evaluating the effects of ethylmercury in animal systems that ethylmercury causes distinct-specific damage to the nervous system [7,8]. Bernard et al. [9,10] have evaluated mercury and autism, and determined that exposure to mercury can cause immune, sensory, neurological, motor, and behavioral dysfunctions similar to traits defining or associated with autism, and the similarities extend to neuroanatomy, neurotransmitters, and biochemistry. Authors from the Centers for Disease Control and Prevention (CDC) [11] concluded that they had serious reservations about administering higher doses of mercury from thimerosal-containing childhood vaccines than the 25 micrograms of mercury from a single DTP vaccine at one time because of, "the need to assure safety of the preservative." Evaluation of children with autistic spectrum disorders in comparison to normal-matched control children has shown that autistic children retain abnormally high concentrations (thimerosal has been shown [12] and conceded by authors from the Food and Drug Administration (FDA) [13] to cross the blood-brain barrier and placental barrier resulting in considerable concentrations of mercury in the brain) of mercury from such sources as thimerosal-containing childhood vaccines, whereas normal vaccinated children retain similar concentrations of mercury as normal unvaccinated children [14,15]. It has been reported that children who go onto to develop autism have a genetic polymorphism (i.e. lower numbers of sulfhydryl groups) that causes them to have a decreased ability to excrete mercury, and as a result they buildup concentrations of mercury in their brains resulting in neurotoxicity [14]. Furthermore, evaluation of micromolar concentrations of thimerosal on neurons in tissue culture has shown that thimerosal can interfere with the conduction of neurons [16], cause neurodegeneration [17], and induce DNA breaks, caspase -3 activation, membrane damage, and cell death [18]. Most recently, Waly et al. [19], from the Johns Hopkins University, Northeastern University, Tufts University, and the University of Nebraska have published, "A recent analysis of data from the Vaccine Adverse Event Reporting System, maintained by the Centers for Disease Control, found a significant correlation between the use of the thimerosal-containing formulation (vs the thimerosal-free formulation) of the Diphtheria, Tetanus, acellular Pertussis (DTaP) vaccine and autism. The discovery of the PI3-kinase/MAP-kinase/MS pathway, and its potent inhibition by developmental neurotoxins, including vaccine components thimerosal and aluminum, provides a potential molecular explanation for how increased use of vaccines could promote and increase in the incidence of autism."

Third, the authors stated, "However, the pharmacokinetics of ethylmercury and methylmercury are not the same. Methylmercury has a biological half-life in blood of approximately 50 days compared with that of approximately 7 days for ethylmercury." We have found numerous articles that have reported that ethylmercury and methylmercury are similar. Tan and Parkin [20] have reported that ethylmercury ions and methylmercury ions should display similar complexation and chemical characteristics. Fagan et al. [21] have published that although thimerosal is an ethylmercury compound, it has similar toxicological properties to methylmercury, and the long-term neurological sequelae produced by the ingestion

of either methyl- or ethylmercury based fungicides are indistinguishable. Zhang [22] has reported that ethylmercury compounds have toxicological properties similar to those of methylmercury compounds, and there is evidence that both methyl- and ethylmercury can persist in the body for a long time. Yonaha et al. [8] have reported that the clinical signs and pathological findings caused by methylmercury compounds in animal experiments are known to be similar to Minamata disease manifested in humans. At the same time, the symptoms in cats, calves, and mice poisoned by ethylmercury compounds are similar to those in methylmercury compounds. Further, alkylmercury compounds having short carbon chains (C1-C3) bring about specific neurotoxicity and signs of poisoning in rats including weight loss, ataxia, and closing of the hind legs. Ueha-Ishibashi et al. [23] have conducted studies with thimerosal and methylmercury demonstrating that both had similar in vitro toxic effects on cerebellar granule neurons dissociated from 2-week-old rats. An international committee [24] has previously evaluated the maximum allowable concentrations of mercury compounds. The authors reported that the elimination of methyl- and ethylmercury is very slow, especially in man and primates, and consequently there is a considerable risk of mercury accumulation. It was determined that women of childbearing age should not be exposed to an occupational risk from methyl- and ethylmercury compounds. The authors concluded that for methyl- and ethylmercury salts, the ceiling value for mercury in whole blood was the same. Even authors from the FDA [25] have published, "Because higher-dose exposure to ethylmercury from thimerosal results in toxicity comparable to that observed after high-dose exposure to methylmercury, and because of the chemical similarity of the 2 compounds, it appears reasonable to consider toxicity of low doses of methylmercury and ethylmercury to be similar."

Miller et al. [26] have investigated the distribution and excretion of methyl- and ethylmercury in animal systems. The authors intramuscularly injected chicks with 3.0 mg of methyl- and ethylmercury per kilogram of body weight. It was determined that higher concentrations of mercury were observed in the liver, blood, and kidney of chicks following ethylmercury injection than methylmercury injection. Similarly, decreasing blood mercury concentrations were observed following injection of chicks with methyl- or ethylmercury, and significantly higher concentrations of mercury were present in the kidney and liver of ethylmercury injected chicks in comparison to methylmercury injected chicks 1-10 days following injection. Brooks et al. [27] developed a precise and accurate method for the determination of either methyl- or ethylmercury in the blood and tissue of rats using capillary gas chromatography with electron-capture detection. The authors applied their method to evaluate a pharmacokinetic study in rats dosed orally with 8 mg mercury/kg as methylmercury chloride and ethylmercury chloride. The authors found higher concentrations of mercury present in the blood of ethylmercury (~100% of the dose entered the blood) treated rats than methylmercury (~80% of the dose entered the blood) treated rats. The authors also determined that the peak mercury blood concentration occurred sooner in methylmercury treated rats (12 hours) in comparison to ethylmercury (24 hours), and that greater amounts of mercury were present in the blood for longer times in ethylmercury (at 5 days: ~75% of maximum value) treated rats in comparison to methylmercury (at 5 days: ~60% of maximum value) treated rats.

Fourth, the authors stated that thimerosal was removed from most childhood vaccines by 2001 as a precautionary measure. In reality, as the CDC has recently conceded in a recent communication with Dr. Weldon, a Florida Congressman, some of the routinely recommended childhood vaccines contained the full amounts of thimerosal even as late as 2003, and many vaccines given to children even today contain 25 micrograms of thimerosal including: pediatric Diphtheria-Tetanus (DT) vaccine, Tetanus-diphtheria (Td) vaccine, tetanus toxoid vaccine, meningitis vaccine, and influenza vaccine. Many of these vaccines have expiration dates towards the end of 2005, and there is no reason to think that the manufacturers are planning to completely remove thimerosal anytime soon. In fact several documents recently obtained from WHO state that is their policy to lobby strongly for maintaining thimerosal in childhood vaccines for the foreseeable future because they say it is necessary for use in third world countries and if it is removed from US vaccines these countries may refuse to use thimerosal containing vaccines.

Fifth, the authors stated that the developing CNS of the fetus is more susceptible to environmental and toxic insults than that of the newborn. This fact further accentuates the dangers from the high levels of thimerosal, which is capable of crossing the placental and blood brain barriers, [12,13] that were contained until recently in Rho- immunoglobulin. Rho-immunoglobulin in some formulations contained more than 100 micrograms per dose and pregnant women often got more than one dose during their pregnancy. A recent paper by Holmes et al. [15] showed that autism occurred far more in children born to women receiving Rho-immunoglobulin than in comparison to matched-controls. The fact that fetuses are highly susceptible to mercury toxicity is a reason to question the current recommendation to give thimerosal-containing (i.e. 25 micrograms of mercury per dose) influenza vaccines to pregnant women while at the same time recommending that they not eat any fish.

Sixth, with regard to the authors comments on the birth doses of hepatitis B vaccine, since the hepatitis B status of most pregnant women who deliver babies in the US is known, and is negative in the vast majority of cases, it would seem that a more prudent recommendation would be to administer thimerosal-free hepatitis B vaccine to infants at birth only when their mothers are known to be carriers of the disease, or perhaps, if the hepatitis status is unknown.

Seventh, the authors imply that there is little or no peer-reviewed literature on the dangers of thimerosal. Nothing could be further from the truth. By simply doing a literature search anyone can confirm that there are literally many hundreds of articles in the peer-reviewed literature on the dangers of thimerosal (merthiolate) including case-reports, animal studies, tissues culture studies, genetic studies, toxicology studies, and biochemical studies. These papers were published over many decades by authors from a wide variety of fields in science and medicine.

Finally, the only way to restore confidence in our much needed vaccine program is to admit our past mistakes, correct them as soon as is possible and to conduct accurate, honest and open discussion of the problems associated with vaccines. In light of the recent "Autism Alarm" from the CDC, HHS and AAP which warns that now 1/166 children have autistic spectrum disorders, and even far worse 1/6 children have developmental and/or behavioral disorders, we must demand the immediate removal of thimerosal from all vaccines and other medical products.

Dr. Mark R. Geier has been a consultant and expert witness in cases involving vaccine adverse reactions before the National Vaccine Injury Compensation Program and in civil litigation.

David A. Geier has been a consultant in cases involving vaccine adverse reactions before the National Vaccine Injury Compensation Program and in civil litigation.

References

1. Offit PA, Jew RK. Addressing parents' concerns: Do vaccines contain harmful preservatives, adjuvant, additives, or residuals? *Pediatrics*. 2003;112:1394-1401.
2. Geier MR, Geier DA. Neurodevelopmental disorders following thimerosal-containing vaccines: a brief communication. *Exp Biol Med*. 2003;228:660-664.
3. Geier MR, Geier DA. Thimerosal in childhood vaccines, neurodevelopment disorders, and heart disease in the United States. *J Am Phys Surg*. 2003;8(1):6-11.
4. Geier DA, Geier MR. An assessment of the impact of thimerosal on childhood neurodevelopmental disorders. *Pediatr Rehabil*. 2003;6:97-102.
5. 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;25:101-106.
6. Hornig M. Etiologic factors and pathogenesis of autism: evidence from clinical

- studies and animal models. Presentation to the Institute of Medicine of the U.S. National Academy of Science, 9 February 2004.
7. Mukai N. An experimental study of alkylmercurial encephalopathy. *Acta neuropath.* 1972;22:102-109.
 8. Yonaha M, Ishikura S, Uchiyama M. Toxicity of organic mercury compounds. III. Uptake and retention of mercury in several organs of mice by long term exposure to alkoxyethylmercury compounds. *Chem Pharm Bull.* 1975;23:1718-1725.
 9. Bernard S, Enayati A, Redwood L. Autism: a novel form of mercury poisoning. *Med Hypothesis.* 2001;56:462-471.
 10. Bernard S, Enayati A, Roger H, et al. The role of mercury in the pathogenesis of autism. *Mol Psychiatry* 2002;7:S42-S43.
 11. Stetler HC, Garbe PL, Dwyer DM, et al. Outbreaks of Group A Streptococcal abscesses following Diphtheria-Tetanus-Toxoid-Pertussis vaccination. *Pediatrics.* 1985;75:299-303.
 12. Gasset AR, Itoi M, Ishii Y, et al. Teratogenicities of ophthalmic drugs. *Arch Ophthalmol.* 1975;93:52-55.
 13. Slikker W. Developmental neurotoxicology of therapeutics: survey of novel recent findings. *Neurotoxicology.* 2000;21:250.
 14. Bradstreet J, Geier DA, Kartzinell JJ, Adams JB, Geier MR. A case-control study of mercury burden in children with autistic spectrum disorders. *J Am Phys Surg.* 2003;8:76-79.
 15. Holmes AS, Blaxill MF, Haley BE. Reduced levels of mercury in first baby haircuts of autistic children. *Int J Toxic.* 2003;22:277-285.
 16. Song J, Jang YY, Shin YK, et al. Inhibitory action of thimerosal, a sulfhydryl oxidant, on sodium channels in rat sensory neurons. *Brain Res.* 2000;864:105-113.
 17. Brunner M, Albertini S, Wurgler FE. Effects of 10 known or suspected spindle poisons in the in vitro porcine brain tubulin assembly assay. *Mutagenesis.* 1991;6:65-70.
 18. Baskin DS, Ngo H, Didenko VV. Thimerosal induces DNA breaks, caspase-3 activation, membrane damage, and cell death in cultured human neurons and fibroblasts. *Toxicol Sci.* 2003;74:361-368.
 19. Waly M, Olteanu H, Banerjee R, et al. Activation of methionine synthase by insulin-like growth factor-1 and dopamine: a target for neurodevelopmental toxins and thimerosal. *Mol Psychiatry.* 2004 Jan 27.
 20. Tan M, Parkin JE. Route of decomposition of thiomersal (thimerosal). *Int J Pharmaceutics.* 2000;208:23-34.
 21. Fagan DG, Pritchard JS, Clarkson TW, et al. Organ mercury levels in infants with omphaloceles treated with organic mercurial antiseptic. *Arch Dis Child.* 1977;52:962-964.
 22. Zhang J. Clinical observations in ethyl mercury chloride poisoning. *Am J Ind Med.* 1984;5:251-258.
 23. Ueha-Ishibashi T, Oyama Y, Nakao H, et al. Effect of thimerosal, a preservative in vaccines, on intracellular Ca²⁺ concentration of rat cerebellar neurons. *Toxicology* 2004;195:77-84.

24. Report of an International Committee. Maximum allowable concentrations of mercury compounds. *Arch Environ Health*. 1969;19:891-905.
25. Ball LK, Ball R, Pratt RD. An assessment of thimerosal use in childhood vaccines. *Pediatrics*. 2001;107:1147-1154.
26. Miller VL, Klavano PA, Jerstad AC, et al. Absorption, distribution, and excretion of ethylmercuric chloride. *Toxicol Appl Pharmacol*. 1961;3:459-468.
27. Brooks AGF, Bailey E, Snowden RT. Determination of methyl- and ethylmercury in rat blood and tissue samples by capillary gas chromatography with electron-capture detection. *J Chromatography*. 1986;384:289-296.