Medical Xpress

# Why vaccines don't cause autism (Update)

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I have a unique perspective on the recent headlines surrounding vaccines and their alleged links to autism. I serve as President of the Sabin Vaccine Institute, a non-profit organization devoted to vaccines and immunization. In that role I am director of its product development partnership (PDP) based at Baylor College of Medicine – the Sabin Vaccine Institute and Texas Children's Hospital Center for Vaccine Development, which makes vaccines for neglected tropical diseases – a group of poverty-promoting parasitic and related infections – including new vaccines for schistosomiasis, Chagas disease, and leishmaniasis,

among others.

But I'm also a father of four children, including my adult daughter Rachel who has autism and other mental disabilities. These two parts of my life place me at an interesting nexus in a national discussion of autism and vaccines. My position is firm: there is no link and I also believe there is no plausibility to such a link. My position is mostly based on the scientific literature, together with my perspective as an autism father witnessing first-hand the impact of this condition on Rachel and our family.

Regarding the scientific literature, I thought it might be helpful to share with the community of interested individuals, the major peer-reviewed articles I consult regularly to back up my pro-vaccine sentiments and position. These are the papers I often cite when speaking with journalists and other interested individuals. Together they refute allegations that autism is linked to vaccination, including:

- the MMR vaccine,
- trace thimerosal used in some vaccines,
- the close spacing of vaccines.

## Papers refuting links between childhood vaccines and autism

First, are the recent studies (involving hundreds of thousands of children) showing no link and cited in my recent *PLOS Medicine* paper that predicts Texas will soon have measles epidemics due to widespread non-medical exemptions: The papers refute both the MMR vaccine and thimerosal as having any role in autism.

- Jain A, Marshall J, Buikema A, Bancroft T, Kelly JP,

Newschaffer CJ (2015) Autism occurrence by MMR vaccine status among US children with older siblings with and without autism. JAMA 313(15): 1534–40. doi: 10.1001/jama.2015.3077. pmid:25898051

- Uno Y, Uchiyama T, Kurosawa M, Aleksic B, Ozaki N (2015) Early exposure to the combined measles-mumps-rubella vaccine and thimerosal-containing vaccines and risk of autism spectrum disorder. Vaccine 33(21):2511–6. doi: 10.1016/j.vaccine.2014.12.036. pmid:25562790
- Taylor LE, Swerdfeger AL, Eslick GD (2014) Vaccines are not associated with autism: an evidence-based meta-analysis of case-control and cohort studies. Vaccine 2014; 32(29): 3623–9. doi: 10.1016/j.vaccine.2014.04.085. pmid:24814559.

The three epidemiological studies are the newest ones in addition to the 21 page list of papers compiled by the American Academy of Pediatrics (AAP) (pdf here).

## Paper refuting link between maternal immunization and autism

With regards to maternal immunization, there is a new 2017 *JAMA Pediatrics* article showing that maternal influenza immunization also has no impact on autism:

• Zerbo O, Qian Y, Yoshida C, Fireman BH, Klein NP, Croen LA (2017) Association Between Influenza Infection and Vaccination During Pregnancy and Risk of Autism Spectrum Disorder. JAMA Pediatr. 2017 Jan 2;171(1):e163609. doi: 10.1001/jamapediatrics.2016.3609.

## Non-human primate study

Beyond these epidemiological studies, are the important non-human primate experimental studies published in the *Proceedings of the National Academy of Sciences* USA showing that the infant vaccine series does not produce either autism-like behavior or neuropathology:

• Gadad BS, Li W, Yazdani U, Grady S, Johnson T, Hammond J, Gunn H, Curtis B, English C, Yutuc V, Ferrier C, Sackett GP, Marti CN, Young K, Hewitson L, German DC. Administration ofthimerosal-containing vaccines to infant rhesus macaques does not result in autism-like behavior or neuropathology. Proc Natl Acad Sci U S A. 2015 Oct 6;112(40):12498-503

Administration of thimerosal-containing vaccines to infant rhesus macaques does not result in autism-like behavior or neuropathology.

According to the paper summary: "Here we gave nonhuman primate infants similar vaccines given to human infants to determine whether the animals exhibited behavioral and/or neuropathological changes characteristic of autism. No behavioral changes were observed in the vaccinated animals, nor were there neuropathological changes in the cerebellum, hippocampus, or amygdala. This study does not support the hypothesis that thimerosal-containing vaccines and/or the MMR vaccine play a role in the etiology of autism".

Taken together these studies show that childhood or maternal vaccines do not cause autism.

## Absence of plausibility

I also point out that the lack of plausibility of any link between childhood vaccines and autism. Numerous studies indicate that autism is associated with changes neocortex of the brain in early pregnancy well before a child receives vaccines. The data are nicely presented in a *New*

*England Journal of Medicine* article by Eric Courchesne's group at the University of California San Diego:

• Stoner R, Chow ML, Boyle MP, Sunkin SM, Mouton PR, Roy S, Wynshaw-Boris A, Colamarino SA, Lein ES, Courchesne Patches of disorganization in the neocortex of children with autism. N Engl J Med. 2014 Mar 27;370(13):1209-19. doi: 10.1056/NEJMoa1307491.

Such studies, showing profound changes in the reorganization of the brain strongly reinforce the genetic and epigenetic basis of autism. A vaccine simply could not do this, and the data supports this.

Instead, there are a lot of exciting studies identifying new genes and epigenetics linked to autism. For example, this excellent overview in *Nature Neuroscience*. My position is that if there is also any environmental component to autism, it would have to be something that occurs early around the time of conception or in the first trimester of pregnancy. The major vaccine given in pregnancy regularly is flu vaccine, but as the paper in *JAMA Pediatrics* points out there is no link.

From my perspective the antivaxxer movement is growing in strength and momentum. In order to counter allegations that vaccines could cause autism, it is both useful and informative to have access the some key recent scientific literature.

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