

# Aluminum in Vaccines Linked to Persistent Asthma

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › Children who received all or most of the recommended childhood vaccines that contain aluminum had, at least, a 36% higher risk of developing persistent asthma than children who received fewer vaccines
- › There was a 1.26- and 1.19-times higher risk of persistent asthma for each additional milligram of vaccine-related aluminum exposure, respectively, for children with and without eczema
- › The featured study was funded by the CDC and conducted by current and former CDC staff members
- › A 2005 study found parents who refuse vaccinations reported less asthma and allergies in their unvaccinated children
- › Aluminum, a demonstrated neurotoxin, is added to certain vaccines to increase the immune response

Aluminum, the most commonly used vaccine adjuvant,<sup>1</sup> may be increasing the risk of asthma in children when injected as part of the standard childhood vaccine schedule. The finding comes from a study funded by the U.S. Centers for Disease Control and Prevention (CDC), raising concerns about the cumulative aluminum exposure children receive when they get their recommended shots.

Aluminum, a demonstrated neurotoxin, is added to certain vaccines to increase the immune response and, with that, theoretically generate a higher response of protective

antibodies. An increasing number of parents have expressed concern, however, that repeated exposure to vaccine components such as aluminum could be harming children.

In response to public concern about the childhood vaccine schedule, the Institute of Medicine endorsed the study to look into the risks of chronic conditions such as asthma following vaccination. The featured study, which involved a cohort of 326,991 children, set out to assess “the association between cumulative aluminum exposure from vaccines before age 24 months and persistent asthma at age 24 to 59 months.”<sup>2</sup>

## **Aluminum in Vaccines Associated With Asthma**

Animal studies previously found aluminum adjuvants may increase allergy risk due to their influence on T helper 2 cell (Th2)-biased immune response.<sup>3</sup> Th2 lymphocytes are known to affect airway inflammation and the hyper-responsiveness that occurs in children with allergic asthma.

The featured study, which was conducted by current and former CDC staff members,<sup>4</sup> found that about 6% of children with eczema and 2.1% of children without eczema developed persistent asthma.

Among children with and without eczema, exposure to vaccine-associated aluminum was positively associated with persistent asthma. There was a 1.26- and 1.19-times higher risk of persistent asthma for each additional milligram of vaccine-related aluminum exposure, respectively, for children with and without eczema.<sup>5</sup>

Children who received all or most of the recommended childhood vaccines that contain aluminum received a cumulative aluminum exposure dose of more than 3 milligrams (mg). This group had, at least, a 36% higher risk of developing persistent asthma than children who received fewer vaccines, and therefore had a less than 3-mg exposure to aluminum.<sup>6</sup>

## **Asthma Rates Increased With Aluminum-Containing Vaccines**

The study was observational in nature and stopped short of saying that it proves a link between aluminum-containing vaccines and asthma. The CDC also stated that it has no intention of altering its vaccine recommendations based on this study alone.<sup>7</sup> However, the researchers pointed out that rates of asthma in U.S. children steadily increased in the 1980s and 1990s, then remained steady since 2001.

The 2001 date is significant, as most aluminum-containing vaccines were added to the childhood vaccine schedule before 2001. This includes, for example, diphtheria, tetanus, and acellular pertussis (DtaP), hepatitis B, some formulations of Haemophilus influenzae type b (Hib) and pneumococcal conjugate vaccines. According to the study:<sup>8</sup>

*“There are many environmental and genetic risk factors for asthma, and any contribution from vaccine-associated aluminum has not been proven or supported through replication. However, because most aluminum-containing vaccines were added to the routine schedule prior to 2001 ... observed national trends in asthma prevalence during childhood are not incongruous with the effect estimates observed here.”*

## **Aluminum-Asthma Link ‘Biologically Plausible’**

The researchers also delved into the mechanisms behind aluminum’s potential to trigger asthma. “Aluminum adjuvants are used in vaccines precisely because they can generate an acute immunologic response with long-lasting effect,” they explained, pointing out that aluminum adjuvants can, in fact, produce asthma in experimental animal models.<sup>9</sup>

Mice, for instance, develop asthma-like airway inflammation when injected with a chicken protein and an aluminum adjuvant. “Based on what I consider limited animal data, there is a theoretical risk that the aluminum in vaccines could influence allergy risk,” the featured study’s lead author, Dr. Matthew Daley, told AP News.<sup>10</sup>

Even considering the differences between the development of asthma in children and the induction of asthma in experimental animal models, the researchers stated:<sup>11</sup>

*“[I]t appears biologically plausible that the intended effect of aluminum adjuvants (ie, enhanced immunogenicity against vaccine-preventable diseases) is not the only biologic effect of parenteral administration of aluminum adjuvants in early childhood.”*

A past study involving 167,240 children similarly found an association between Hib and hepatitis B vaccines and the risk of asthma.<sup>12</sup> Separate research has also found that environmental exposure to heavy metals may induce epigenetic changes, including DNA methylation in receptors involved in the development of asthma.

Specifically, a study published in Human & Experimental Toxicology found an association between increased blood aluminum concentration and the risk of uncontrolled asthma in children.<sup>13</sup> Aluminum works are also known to be at increased risk of developing asthma.<sup>14</sup> The fact is, experts have been raising concerns about the safety of aluminum vaccine adjuvants for some time.

In 2011, a paper by scientists with the Neural Dynamics Research Group at the University of British Columbia, Vancouver, BC, expressed that the scientific community’s understanding of aluminum adjuvants was “remarkably poor” and questioned their use in vaccines:<sup>15</sup>

*“There is ... a concerning scarcity of data on toxicology and pharmacokinetics of these compounds. In spite of this, the notion that aluminum in vaccines is safe appears to be widely accepted. Experimental research, however, clearly shows that aluminum adjuvants have a potential to induce serious immunological disorders in humans.*

*In particular, aluminum in adjuvant form carries a risk for autoimmunity, long-term brain inflammation and associated neurological complications and may thus have profound and widespread adverse health consequences. In our opinion, the possibility that vaccine benefits may have been overrated and the risk of potential adverse effects underestimated, has not been rigorously evaluated in the medical and scientific community.”*

## **Vaccine-Asthma Link Uncovered in 2005 Study**

While the CDC is just now getting around to studying the potential link between vaccination and asthma, the National Vaccine Information Center (NVIC) worked with asthma researchers at the University of Chicago to explore the issue in 2005.<sup>16</sup>

The study involved surveys sent to 2,964 U.S. households, which collected data on vaccination status and atopic disease. There were significant and dose-dependent negative associations between vaccination refusal and asthma or hay fever in children with no family history of the conditions.

Vaccination refusal was also negatively associated with eczema and wheezing. In other words, “Parents who refuse vaccinations reported less asthma and allergies in their unvaccinated children.” The CDC study now appears to support this early data.

Speaking with AP News, Michael Osterholm, director of the University of Minnesota’s Center for Infectious Disease Research and Policy, stated, “This is public health at its best. They are making every effort to find any possible signal that may be a concern. It’s our job to exhaustively examine that to see if that’s true.”<sup>17</sup> Indeed, lead author Daley even acknowledged that, if the results are confirmed, “it could prompt new work to redesign vaccines.”<sup>18</sup>

## **Vaccine Aluminum Safety Calculation Flawed**

A math error in a key study used to evaluate the amount of aluminum that can “safely” be injected into infants via vaccination has also previously been found. The error — revealed by scientists at Physicians for Informed Consent (PIC) — is in a key U.S. Food and Drug Administration (FDA) study.<sup>19</sup>

When the aluminum adjuvant was first approved for use in vaccines, more than 90 years ago, it was approved because of efficacy — safety studies weren’t performed. A 2002 document from the FDA even states:<sup>20</sup>

*“Historically, the non-clinical safety assessment for preventive vaccines has often not included toxicity studies in animal models. This is because vaccines have not been viewed as inherently toxic, and vaccines are generally administered in limited dosages over months or even years.”*

Still, in 2002, researchers with the CDC’s Agency for Toxic Substances and Disease Registry (ATSDR) released a study on medical aluminum exposure on public health in order to estimate the infant body burden of aluminum to infants following a standard vaccination schedule during the first year of life.<sup>21</sup>

They found that while the body burden of aluminum from vaccinations exceeded that from dietary sources, it was still below the minimal risk level established by ATSDR. In 2011, FDA scientists updated the 2002 study with a current pediatric vaccination schedule and other updated parameters,<sup>22</sup> and it’s there that what PIC described as a “crucial math error” occurred.

According to PIC, the study based its calculations on 0.78% of oral aluminum being absorbed into the bloodstream instead of the value of 0.1% used by the ATSDR. “As a result,” PIC noted, “the FDA paper assumed that nearly 8 (0.78%/0.1%) times more aluminum can safely enter the bloodstream, and this led the authors to incorrectly conclude that aluminum exposure from vaccines was well below the safety limit.”<sup>23</sup>

Christopher Shaw, a professor at the University of British Columbia who has studied the effects of injected aluminum, explained in a news release:<sup>24</sup>

*“We knew that the [2011] Mitkus et al. paper modeling aluminum clearance had to be inaccurate since it was assuming that injected aluminum kinetics were the same as the kinetics of aluminum acquired through diet.*

*Now, in addition, we see that they did their modeling based on using the incorrect level of aluminum absorption. What is particularly striking is that despite all these errors, since 2011, Mitkus et al. is used by CDC and other entities as the basis for claiming that aluminum adjuvants are safe.”*

# Aluminum Exposure From Vaccines Must Be Questioned

While researchers continue to raise red flags over the safety of injecting children with aluminum-containing vaccines, millions of children are being exposed to this toxin in the first years of their life. Aluminum adjuvants can persist in the body long-term and penetrate the blood-brain barrier.

They're also known to trigger adverse neurobehavioral outcomes in mice at vaccine-relevant exposures, leading researchers to conclude in 2013, "Efforts should be made to reduce Al [aluminum] exposure from vaccines."<sup>25</sup>

Research published in the *Journal of Trace Elements in Medicine and Biology* in 2020 also found the CDC's childhood vaccine schedule — when adjusted for bodyweight — exposes children to a level of aluminum that is 15.9 times higher than the recommended "safe" level.<sup>26,27</sup>

The study involved three models to estimate the expected acute and long-term whole-body accumulation of aluminum in children from vaccines, and the CDC's childhood vaccine schedule led to the greatest aluminum burden. The CDC's vaccine schedule modified to use low dose aluminum DTaP and aluminum-free Hib vaccines led to a lower burden.

However, the lowest expected aluminum burden came from a "vaccine-friendly plan" from Dr. Paul Thomas,<sup>28</sup> which recommends giving only one aluminum-containing vaccine per visit (max two) and delaying certain vaccinations.

Considering the serious questions about the safety of aluminum in vaccines, aluminum-free vaccines or at least limiting the number of aluminum-containing vaccines received at one time seems logical. What's more, further research into these options should be made a priority.

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