

Kennedy Sharpens Vaccine Attacks, Without Scientific Backing

Studies have shown aluminum adjuvant in hepatitis B, HPV and other vaccines does not cause autism, allergies or other health conditions in children.

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As the federal government prepares for the next meeting of its Advisory Committee on Immunization Practices, Health and Human Services Secretary Robert F. Kennedy Jr. has intensified his attacks on aluminum vaccine components used in many shots to boost the body's immune response.

Kennedy, a longtime anti-vaccine activist before seeking public office, [claims that aluminum adjuvants](#) are neurotoxic and tied to autism, asthma, autoimmune disease, and [food allergies](#).

But science and medicine advances a different view. Strong recommendations that parents introduce peanut-containing foods to infants early, for instance, have led to [a drop](#) in the incidence rate of peanut allergies.

Since taking office, Kennedy has ordered reviews of vaccine ingredients, citing aluminum as a top concern. A discussion of “adjuvants and contaminants” is on the vaccine advisory panel's [draft agenda](#).

A [Centers for Disease Control and Prevention webpage](#) that for years has assured the public vaccines do not cause autism was updated November 19 with new language stating that studies have not definitively ruled out a link between vaccines and autism.

He has also targeted scientists who have published studies showing aluminum adjuvants are safe. In August, Kennedy denounced [a large Danish study](#) finding no link between aluminum in vaccines and childhood disease, calling it a “[deceitful propaganda stunt](#)” and demanding its retraction. The Annals of Internal Medicine rejected the claim and refused to retract the study.

And, regarding the upcoming advisory panel meeting, HHS spokesperson Emily Hilliard said ACIP “is independently reviewing the full body of evidence on adjuvants and other vaccine components to ensure the highest safety standards.”

The stakes are high because Kennedy's push to cast doubt on aluminum isn't just about the ingredient itself. It's part of a [broader strategy](#) to foster uncertainty about vaccine safety and lay the groundwork to challenge the [National Vaccine Injury Compensation Program](#), which drug manufacturers say is essential to ensure a stable market for shots.

But researchers across infectious diseases, immunology, pediatrics, and epidemiology say the data is clear: Aluminum adjuvants are safe.

"Aluminum is the third most common element on the Earth's surface," said Paul Offit, a pediatrician and director of the Vaccine Education Center at Children's Hospital of Philadelphia. "So we're all exposed to aluminum all the time. The water that we drink has aluminum in it. The food that we eat has aluminum in it."

Vaccines add only a tiny amount of aluminum to the body — a combined total of about 8 milligrams — after the schedule of childhood vaccines is complete. Offit said that over the first 18 years of life, people naturally take in about 400 milligrams of aluminum from everyday sources.

"I don't know why there is so much concern," said Rajesh Gupta, a former FDA vaccine scientist. "Aluminum gets distributed in the body everywhere. It is ultimately excreted by the kidneys in the urine. So, it is not that aluminum stays in the body."

How They Work

The aluminum in vaccines isn't foil or metal. It's a compound of aluminum salts, such as aluminum hydroxide or aluminum phosphate, that help the vaccine work better.

It's a bit like zinc in cold tablets: Patients don't swallow chunks of metal, instead ingesting a zinc salt that dissolves safely in the body.

In vaccines, these aluminum salts give the immune system an extra nudge so it learns to recognize the target germ more effectively.

When injected, the vaccine stays near the injection site and causes mild, short-lived inflammation that summons immune cells. Those cells pick up the vaccine antigen, a harmless piece of a virus or bacterium, and carry it to nearby lymph nodes. There, the adjuvants show it around like a wanted poster so the body can identify and destroy the germ quickly.

Harm HogenEsch, a professor of immunopathology at the Purdue University College of Veterinary Medicine, said that aluminum adjuvants work only when they're injected in the same spot as the vaccine ingredient they're meant to boost, to help nearby immune cells learn to recognize the germ. If the two shots are given in different places, he said, "you don't see that effect."

In response to Kennedy's claims, scientists say that anything that acts as an adjuvant can, in principle, also boost an allergic response. But that doesn't mean aluminum-adjuvanted vaccines are turning children into food-allergic time bombs. Antigens in vaccines such as the hepatitis B

surface antigen or HPV proteins are not allergens, and no food proteins are put into vaccines.

Animal Experiments

Animal studies form the basis of Kennedy's claim that aluminum adjuvants in vaccines can create allergies. In these experiments, scientists deliberately sensitize rats or mice by injecting them with a food protein mixed with aluminum. The aluminum strengthens the immune response, but it does not cause an allergy by itself.

"That's the basis for a lot of the experimental mouse models, where you inject a food allergen with an aluminum adjuvant to sensitize the mice," HogenEsch said. "I'm not aware of any food antigen being included in vaccines, and so I don't really see a way by which this could happen."

Ross Kedi, a professor of immunology and microbiology at the University of Colorado Anschutz School of Medicine, went further, noting that there is no plausible route for vaccines to create a peanut allergy out of thin air. "Someone would have had to mix peanut proteins in with the actual vaccine prior to injection."

Stefan H. E. Kaufmann, director emeritus at the Max Planck Institute for Infection Biology in Berlin, said results from mice often don't match what happens in people, because "mice are much easier to push into allergic reactions than humans." In other words, what looks dramatic in a rodent study doesn't automatically apply to human immune systems.

And in this case, it's "important to distinguish between how aluminum behaves in lab animals versus people," Kaufmann said.

Human Studies

Beyond animal models and theoretical scenarios, scientists have looked hard for signals of harm in large human datasets.

In 2023, [a study](#) by the Vaccine Safety Datalink, a collaboration coordinated by the CDC, reported a slight increase in asthma among children with higher aluminum exposure before age 2, but the association disappeared in further analyses.

"That paper was roundly criticized," Offit said. "When they controlled for breastfeeding, the association between asthma and receipt of aluminum-adjuvant-containing vaccines disappeared."

"It should have never been published," he said.

Kathy Edwards, professor emerita of pediatrics at Vanderbilt University, said that false signals are common when large databases are mined for dozens of outcomes.

"When you look at a hundred different things, just by the law of percentages, some of those may look like there is a signal," she said. "The whole RFK Jr. assessment is really prone to cherry-

picking,” she said, adding that “there does need to be some kind of basic understanding of statistics for people to interpret this.”

Soon after the 2023 U.S. findings drew attention, scientists at the CDC contacted Anders Hviid, head of epidemiology research at the Statens Serum Institut in Copenhagen, Denmark, to see whether his team could replicate the work.

“It makes perfect sense to try to replicate findings of any kind in different data sources,” Hviid said.

[Hviid’s nationwide Danish study](#) followed 1.2 million children over two decades, using linked national health registries that record every vaccination and diagnosis.

“Our health care system is quite egalitarian. It’s free, and there’s universal access. And everyone is in these nationwide registers,” he said. Their findings: no increased risk of these conditions associated with increasing amounts of aluminum received through the vaccines.

Rare Bumps

Doctors have documented one genuine reaction to aluminum adjuvants: itchy nodules at the injection site, called “pruritic granulomas.” These small bumps are so rare that most allergists and pediatricians will never see a single case.

This reaction “doesn’t lead to something bad, and it really isn’t associated with anything other than that local irritation,” Edwards said.

Researchers believe these bumps represent a localized immune response — meaning only in the area of the injection, not a body-wide allergy — that is very different from the kind of immediate allergic reaction people treat with antihistamines. These include the reactions driven by food or bee stings, when histamine, the body’s own alarm signal, floods the system within minutes and causes hives, swelling, or breathing trouble. Kedl said that distinction often gets lost in public debate.

Eliminating Aluminum Adjuvants

For many experts, the real issue is not just whether aluminum is safe but what happens to the entire vaccine program if aluminum adjuvants are stripped out. For many modern vaccines that rely on a single purified protein — such as those for diphtheria and tetanus toxoids, hepatitis B, and HPV — adjuvants are crucial.

Edwards said that simply swapping in a different adjuvant isn’t realistic.

“They’re kind of all built on one another,” she said. Once a vaccine has been proved to work and become the standard of care, new or updated versions are generally no longer tested against a placebo in people who should be getting that vaccine. Instead, they’re tested against the existing

product, which means each approval rests on the one before it.

Core childhood vaccines would probably have to be reformulated, and large clinical trials would have to be repeated to prove the new products are safe and effective. Meanwhile, production gaps and shortages would have to be managed, potentially for years, while manufacturers and regulators start over — all while diseases such as whooping cough, hepatitis B, and HPV-related cancers gain more room to spread.

“The aluminum adjuvants have sort of hit the sweet spot in terms of being effective at inducing a robust antibody response that is protective for those vaccines in which they’re being used and being very safe,” HogenEsch said. “It would be quite frankly foolish to try to eliminate them.”

A Century of Safe Use

The DTap, hepatitis B, and HPV vaccines all contain aluminum adjuvants and have been in use for nearly a century. Large-scale studies show no link between aluminum and systemic allergic disease.

“We have had aluminum adjuvants in vaccines for decades,” Edwards said. “I have grandchildren. My grandchildren have received all of their vaccines. And I do not worry about the safety of them.”

If aluminum is falsely cast as the villain and vaccine uptake falls, experts warn, the consequences will not be theoretical: more measles in schools, more meningitis in college dorms, and more young adults dying of cancers that HPV shots could have prevented.

In their view, the real danger isn’t the trace amounts of a metal that children already encounter every day. It’s rolling back the protection aluminum-adjuvanted vaccines have provided for generations.

That’s the trade-off Offit hopes parents will see. “A choice not to get a vaccine is not a risk-free choice,” he said. “It’s just a choice to take a different risk.”

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