

Correlation and Causation: Understanding and Debunking Claims Linking Vaccines and Autism

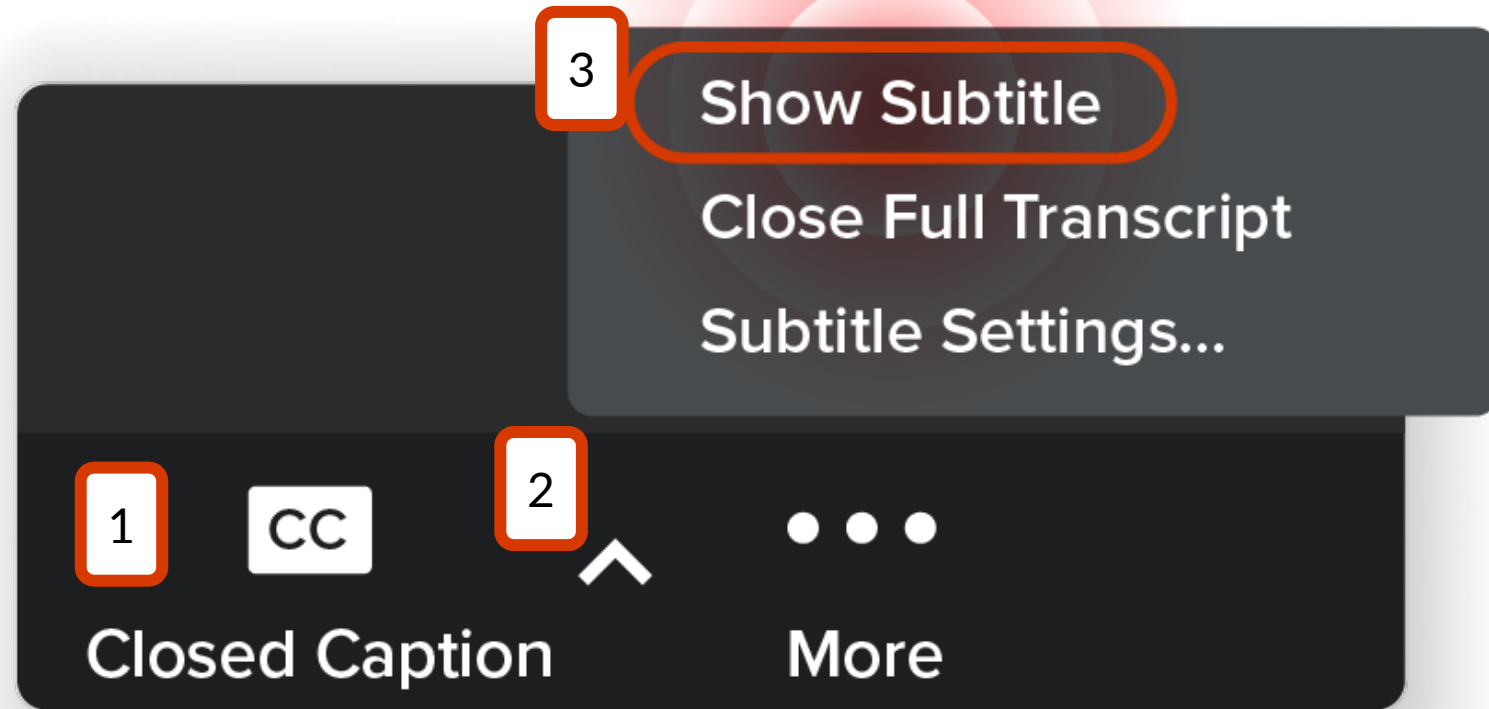
VACCINE CONFIDENCE WEBINAR SERIES

JUNE 24, 2025



Association of
Immunization
Managers

Closed Captions



Housekeeping



All registrants will receive an email shortly after the event with today's webinar slides and resources.



The recording, resources, and slides from today's webinar will be available on AIM's [Vaccine Confidence Toolkit](#) in the coming weeks.



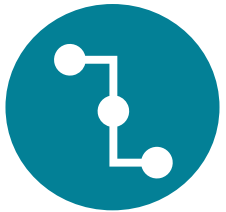
Add any questions you have for our panelists to the Q&A box, and they will be addressed at the end.



Take a few moments to answer the survey questions that pop up in your browser after the webinar.

AIM Vaccine Confidence Toolkit

Designed to equip AIM members and their staff with the tools and information necessary to promote vaccine confidence across the nation and its territories.



Connecting the Dots: one-page guide for key resources on effective communication, vaccine access, and addressing mis/disinformation.



Webinar Series: recordings and resources featuring evidence-based strategies for promoting vaccine confidence.



Resource Guide: lessons learned from programs and stakeholders experienced in addressing vaccine hesitancy in their communities.

[Visit the toolkit!](#)



Michelle Fiscus, MD, FAAP
Chief Medical Officer
Association of Immunization Managers

Correlation and Causation: Understanding and Debunking Claims Linking Vaccines and Autism

Michelle Fiscus, MD FAAP
Chief Medical Officer

June 24, 2025



Association of
Immunization
Managers

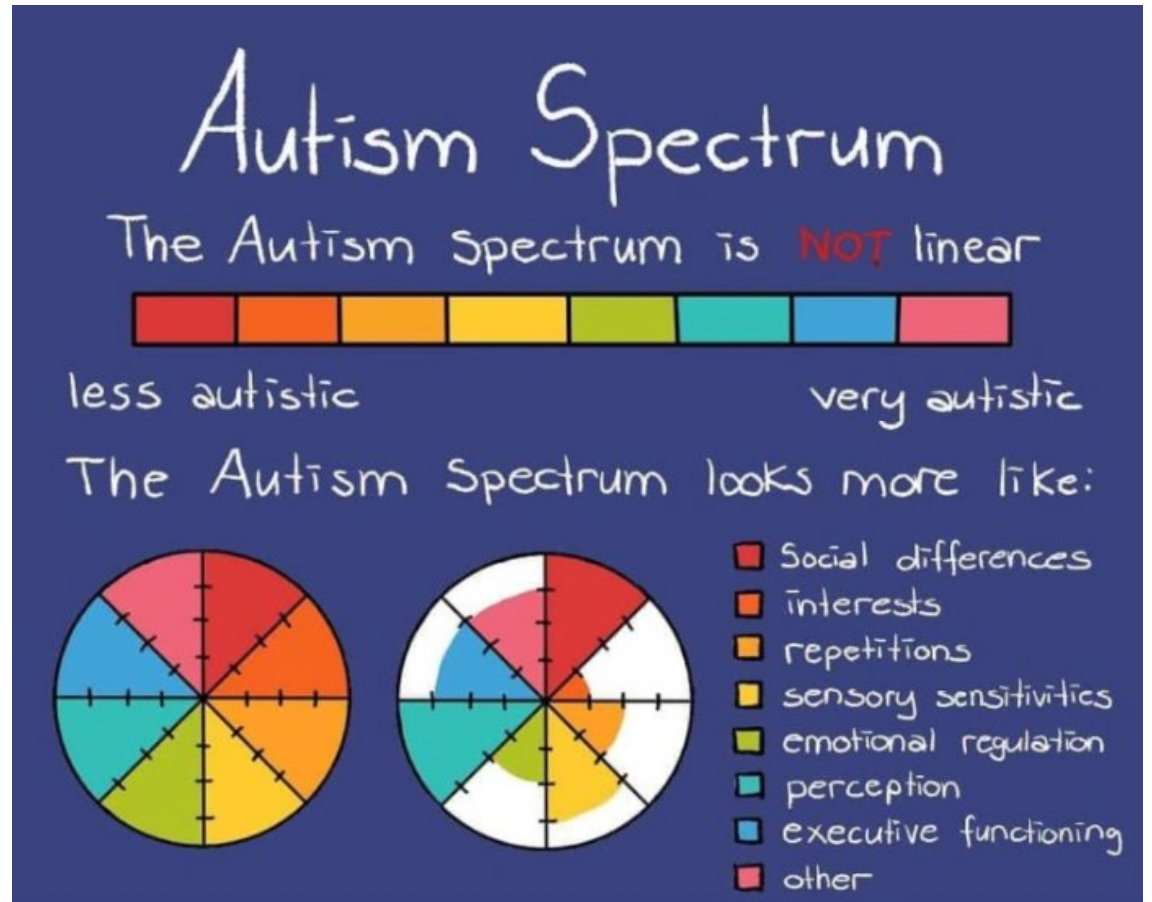
Agenda:

- What is autism?
- How did we get here?
- How do we address and correct misinformation?

Autism

“A neurological and developmental disorder that affects how people interact with others, communicate, learn, and behave.”

<https://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd>



<https://www.occuplaytional.com/2023/04/06/the-spectrum/>

Thoughts on Autism



Temple Grandin, PhD
2018 NIEHS Lecture

“I got to do a talk down at NASA. Let me tell ya, you got lots of people on the spectrum down there.

Another problem we have with the whole autism thing... it's a guideline. Nobody is sitting in a conference room at a Hyatt Hotel and changing the diagnosis of tuberculosis. You've either got it or you don't.

Hard core lab test.

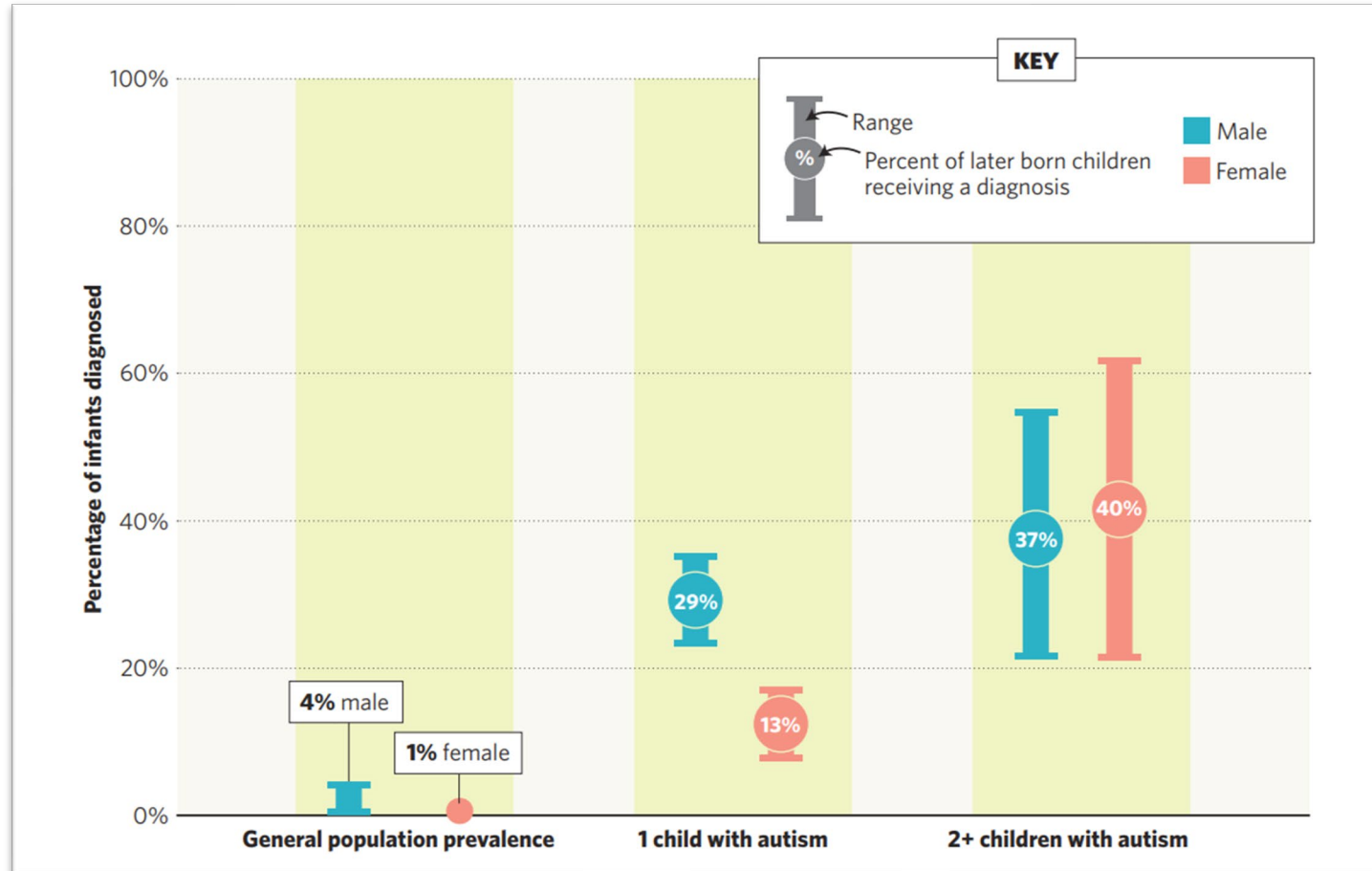
You know, I'd say it's half science, half squabbles at the American Psychiatric Association.

I think that socially awkward, geeky scientists are just part of normal genetic variation.

Remember, the diagnosis keeps changing over the years. It is not precise. People treat it like it's precise.”

Autism

- Prevalence in the general population is ~3% (4% of boys and 1% of girls)
 - By comparison: Down Syndrome prevalence is ~.1%
- Recurrence:



Autism

Criteria listed in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision
(DSM-5-TR©)

Deficits in Social Communication and Interaction

Must have all three of the following:

- Deficits in social-emotional reciprocity
 - e.g., difficulty reading and responding to social cues; unusual style of speech, limited ability to engage in reciprocal conversation; inability to spontaneously share enjoyment or achievements
- Deficits in nonverbal communicative behaviors used for social interaction
 - e.g., poor eye contact; does not use or understand gestures or tone of voice
- Deficits in developing, maintaining, or understanding relationships
 - e.g., limited interest in peers; rigid or atypical social interests and behaviors; inability to imitate others' personal behaviors

AND...

Autism

Restricted, Repetitive Patterns of Behavior, Interests, or Activities

Must have at least two of the following:

- Stereotyped or repetitive motor mannerisms
 - e.g., flapping, clapping, rocking, repetitive use of objects, use of odd phrases or words repeatedly
- Inflexible adherence to routines or ritualized patterns of verbal or nonverbal behavior
 - e.g., gets unusually upset if routine or environment changes; inability to tolerate unstructured time
- Highly restricted, fixated interests that are abnormal in intensity or focus
- Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment
 - e.g., hypo- or hyper-sensitive to certain stimuli; extreme negative response to certain neutral or pleasant stimuli; unusual attachment to objects

AND...

- Symptoms Present in the Early Developmental Period

AND...

- Clinically Significant Impairment in Social, Occupational, or Other Important Areas of Functioning

Autism Research on Causation

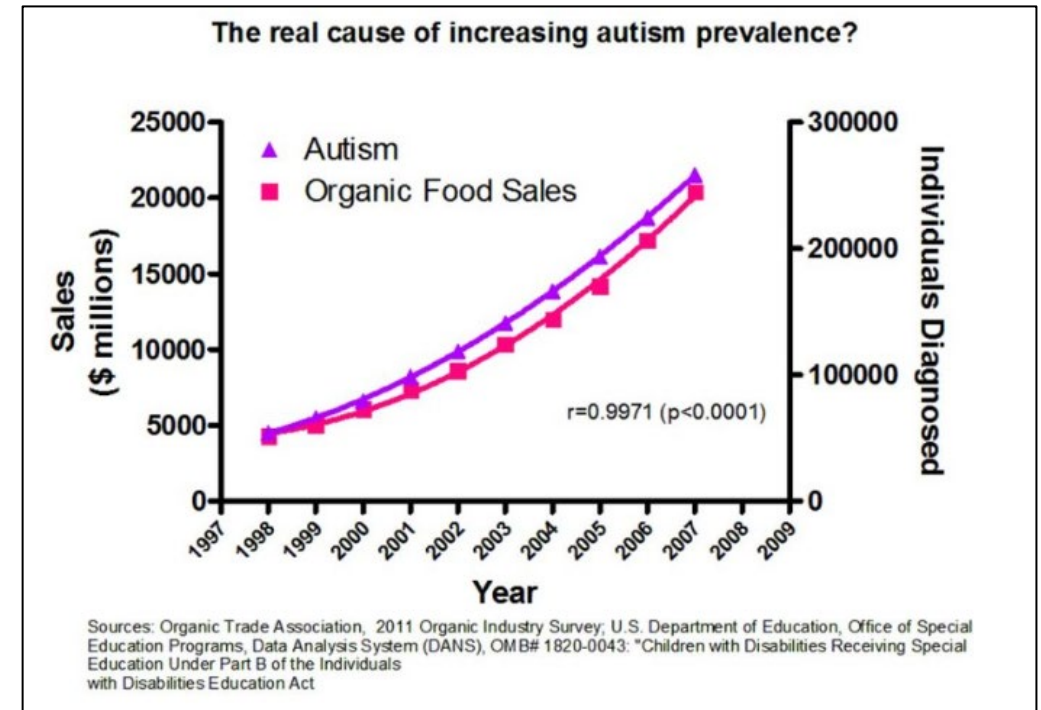
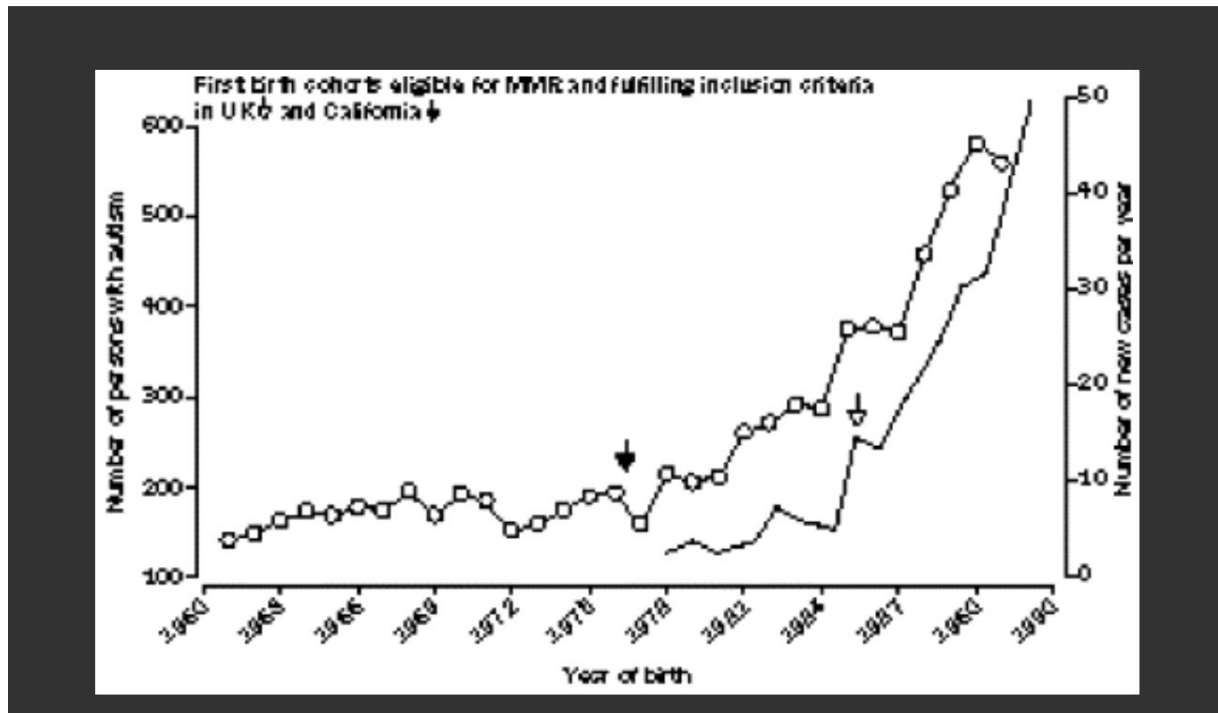
- Highly genetic
 - Identical twins: >90% chance of autism in the second twin
 - Fraternal twins: <10% chance of autism in the second twin
 - ~15% of cases can be linked to a specific gene mutation
 - Higher incidence in children with other genetic conditions
 - Fragile X syndrome
 - Tuberous sclerosis
 - Parental age is a risk factor
- Environmental factors
 - Prenatal rubella, measles, mumps, varicella, influenza, herpes, pneumonia, syphilis, zoster, and CMV infections
 - Maternal mental health conditions
 - Complications at birth
 - Maternal poverty
 - Certain chemicals and pollutants



<https://www.cdc.gov/autism/about/index.html>

Yes. Autism Diagnosis is Correlated with the Timing of Toddler Vaccines... and Organic Food Sales

MMR vaccination and autism



<https://www.thelancet.com/journals/lancet/article/PIIS0140673605756968/fulltext>

<https://ankewebstersmit.com/en/is-autism-related-to-glyphosate-or-to-organic-food/>

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The Catalyst: Wakefield's "Study"



<https://www.cmaj.ca/content/182/4/e199>

Published Feb 28, 1998

- Study of 12 children ages 3-10 years (11 boys)
- All had loss of acquired skills, including language, plus diarrhea and abdominal pain
- Parents associated onset with receiving MMR vaccine (8 children), measles infection (1 child), and otitis media (1 child)
- 11 of 12 had inflammatory bowel changes on colonoscopy
- ***"We did not prove an association between measles, mumps, and rubella vaccine and the syndrome described."***

[https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(97\)11096-0.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(97)11096-0.pdf)

So, if the study didn't prove an association, what happened?

The Fraud: Wakefield's "Study"

Lancet retracts MMR paper after GMC finds Andrew Wakefield guilty of dishonesty

THE LANCET

The Lancet, Volume 351, Issue 9103, Pages 637 - 641, 28 February 1998
doi:10.1016/S0140-6736(97)11096-0

This article was retracted

RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

Dr [AJ Wakefield](#) FRCS ^a, [SH Murch](#) MB ^b, [A Anthony](#) MB ^a, [J Linnell](#) PhD ^a, [DM Casson](#) MRCP ^b, [M Malik](#) MRCP ^b, [M Berelowitz](#) FRCPsych ^c, [AP Dhillon](#) MRCPsych ^a, [MA Thomson](#) FRCP ^b, [P Harvey](#) FRCP ^d, [A Valentine](#) FRCP ^e, [SE Davies](#) MRCPsych ^a, [JA Walker-Smith](#) FRCP ^a

Summary

Background
We investigated a consecutive series of children with chronic enterocolitis and regressive developmental disorder.

Methods
12 children (mean age 6 years [range 3–10], 11 boys) were referred to a paediatric gastroenterology unit with a history of normal development followed by loss of acquired skills, including language, together with diarrhoea and abdominal pain. Children underwent gastroenterological, neurological, and developmental assessment and review of developmental records. Ileocolonoscopy and biopsy sampling, magnetic-resonance imaging (MRI), electroencephalography (EEG), and lumbar puncture were done under sedation. Barium follow-through radiography was done where possible.

RETRACTED

<https://www.encyclopédie-environnement.org/en/zoom/a-scientific-fraud-with-tragic-consequences-the-mmr-vaccine-and-autism/>

- March 2004: Ten of the authors of the paper issued a retraction
- July 2007: UK General Medical Council hearing accuses Wakefield and 2 co-authors of "serious professional misconduct"
 - Children were handpicked for the study
 - Blood was drawn at a birthday party
 - Invasive procedures performed on children without proper consent (12 counts)
 - Received funding from the Legal Aid Board to investigate a link between MMR and autism
 - Involved in a patent for a potential competitor to MMR vaccine
- February 2, 2010: Lancet retracts the paper

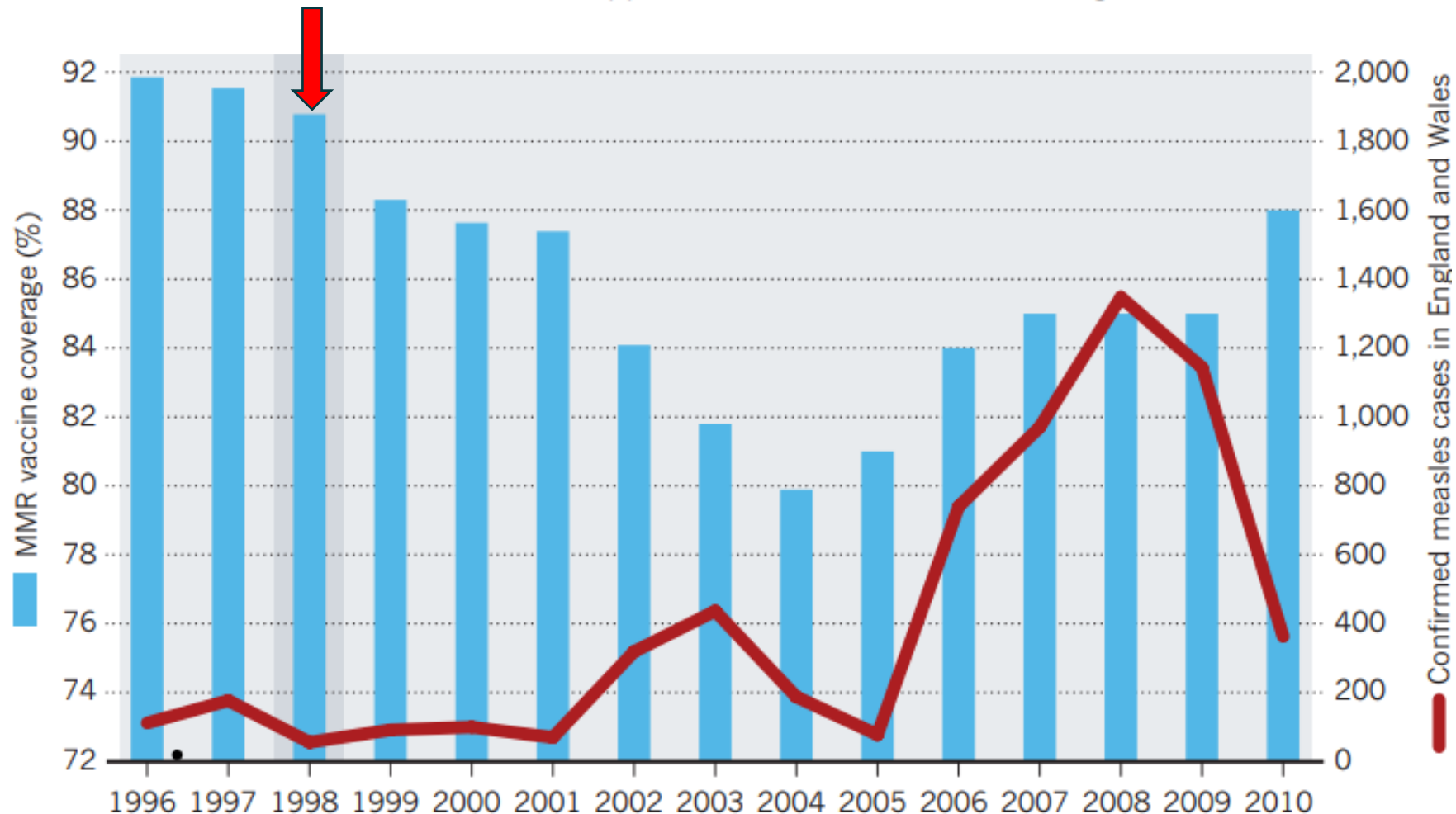
<https://pmc.ncbi.nlm.nih.gov/articles/PMC1914459/>

The Damage from Wakefield's "Study"

SOURCE: HEALTH PROTECTION AGENCY

THE COST OF A SCARE

In the wake of the now-debunked claims in 1998 of a link between the measles, mumps and rubella vaccine and autism, vaccination dropped and measles cases rose in England and Wales.



The Perfect Storm in the U.S.

DSM broadened the definition of autism

- Increased identification of cases
- Redefined cases previously under other diagnoses as cases of autism

FDA Modernization Act called for assessment of mercury in approved products

- Didn't distinguish between methyl mercury and ethyl mercury

1987

&

1994

1994

1989

Second dose of MMR recommended

1990

Amendment to the Individuals with Disabilities Education Act encouraged schools to screen for and diagnose autism

1998

Wakefield paper

1999

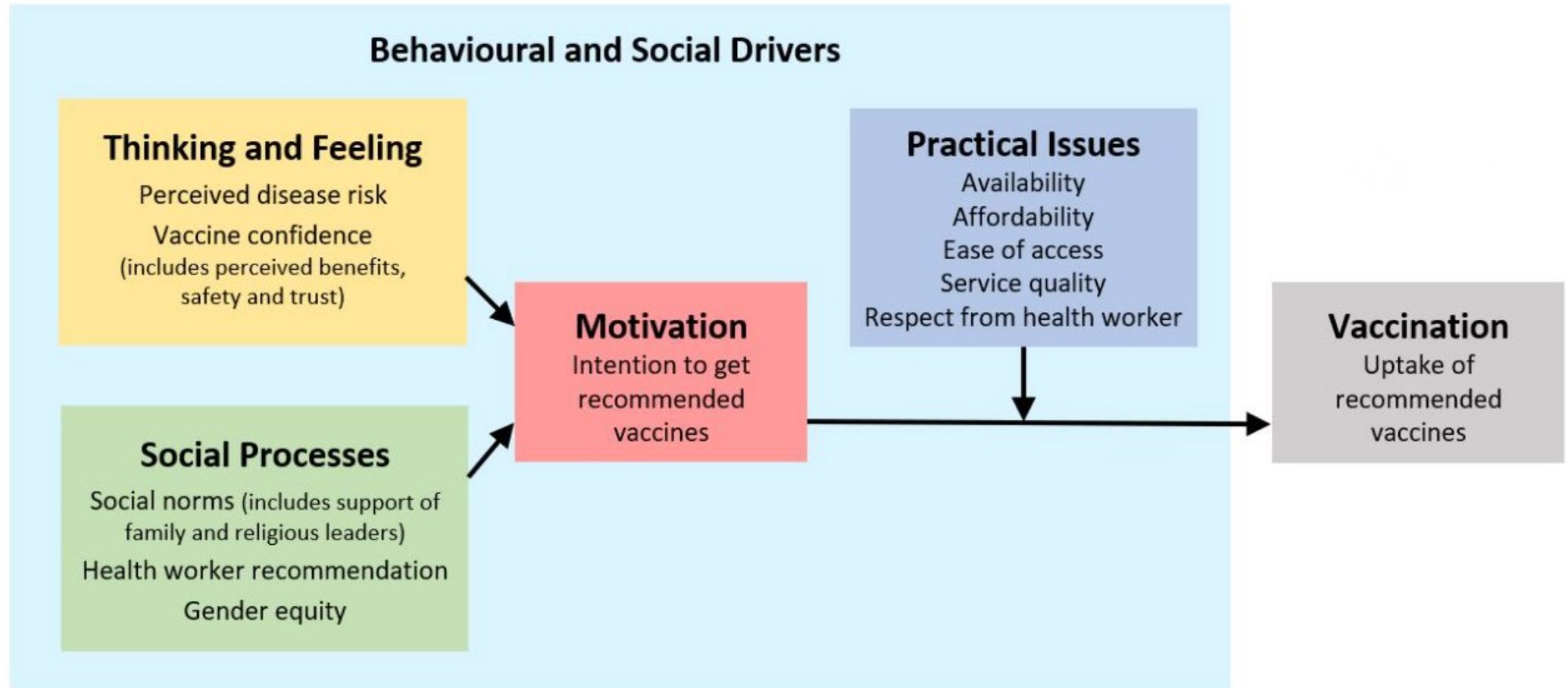
AAP and U.S. Public Health Service call for elimination/reduction of mercury in vaccines despite no evidence of harm (policy was retired in 2002)

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Behavioral and Social Drivers of Vaccination

Figure 1. Behavioural and social drivers of vaccination framework



The Behavioural and Social Drivers (BeSD) Framework. Source: The WHO BeSD working group. Based on Increasing Vaccination Model (Brewer et al., 2017)

Parents want...

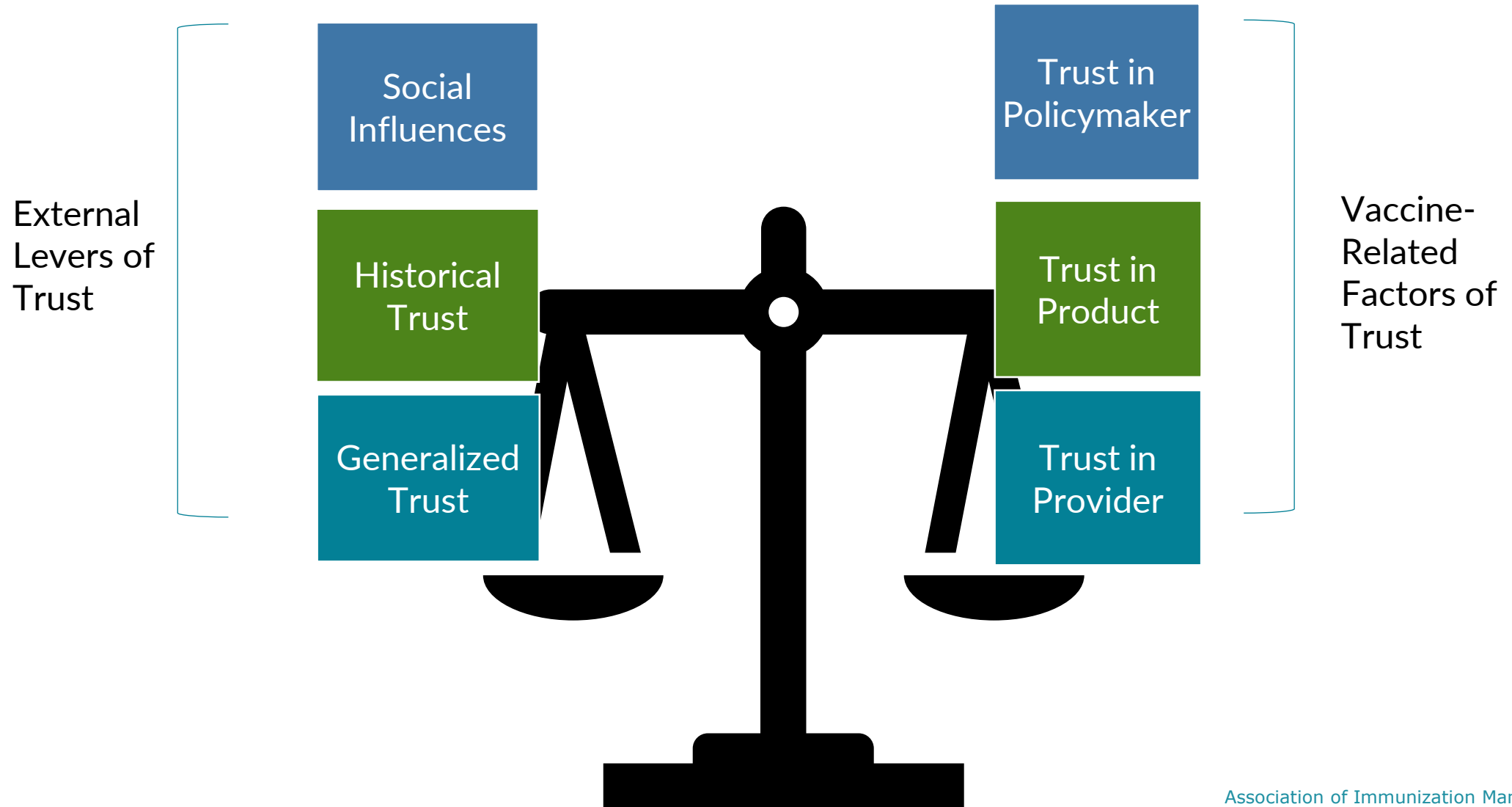
Someone to listen

Hope

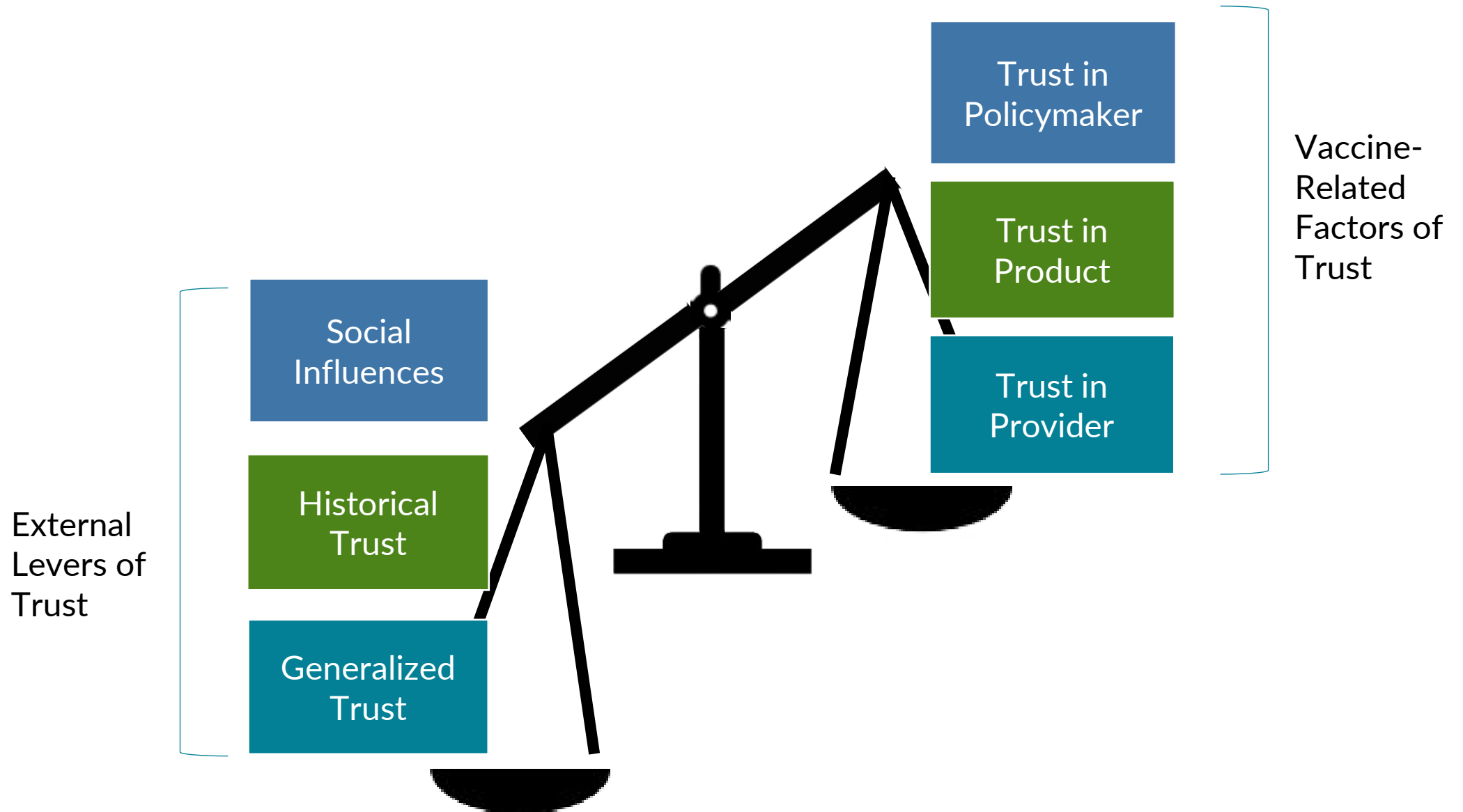
Someone who will validate their
feelings and concerns

Answers

Why Do U.S. Parents Say No?



Why Do U.S. Parents Say No?



The 3 Camps of Beliefs about Vaccines and Autism

Autism is caused by
toxins in vaccines
(mercury, etc.)

Autism is caused by
an immune
response to the
MMR vaccine
(Wakefield's theory
of an autistic
enterocolitis)

Autism is caused
by the increasing
number of
vaccines in the
childhood
immunization
schedule

Claim: “Autism is Caused by Toxins in Vaccines”

- MMR is a live attenuated virus vaccine
- Mercury:
 - MMR vaccine does NOT contain mercury-derived preservatives (e.g., ethyl mercury/thimerosal)
- Aluminum:
 - MMR vaccine does NOT use aluminum as an adjuvant
- Formaldehyde (critical for human metabolism and synthesis of DNA and amino acids)
 - MMR vaccine does NOT contain formaldehyde
- Polysorbate 80 (used as a stabilizer or is present as a residual of manufacturing)
 - MMR vaccine does NOT contain polysorbate 80
- SV40 (contaminate of polio vaccines prior to 1963)
 - MMR vaccine does NOT contain SV40
- Gelatin (protects vaccine from extreme conditions)
 - MMR vaccine DOES contain porcine gelatin and people with severe allergy (anaphylaxis) to gelatin should not receive MMR vaccine

Claim: “Autism is Caused by an Immune Response to MMR Vaccine” (Wakefield’s claim)

- Wakefield’s OWN Study (Am J Gastroenterol, 2000) of 7,616 people with diagnosed inflammatory bowel disease and complete vaccination data FAILED TO SHOW AN ASSOCIATION BETWEEN MEASLES VACCINATION STATUS AT 5 YEARS AND INFLAMMATORY BOWEL DISEASE OR DIABETES
- “Vaccination with MMR or other MCV, or the timing of vaccination early in life, did not increase the risk of IBD.” (Vaccine Safety Data Link, 2001) (US)
- “Measles virus RNA is not detected in inflammatory bowel disease...” (Wakefield, 1998)
- “No evidence was found to support a distinct syndrome of MMR-induced autism or of “autistic enterocolitis.” (Fombonne, 2001) (UK)
- “These findings provide no support for an MMR associated “new variant” form of autism with developmental regression and bowel problems, and further evidence against involvement of MMR vaccine in the initiation of autism.” (Taylor, 2002) (UK)
- “No effect of MMR withdrawal on the incidence of autism: a total population study” (Honda, 2005) (Japan)

Claim: “Autism is Caused by the Increasing Number of Vaccines in the Childhood Schedule”

- Theoretically, each infant has the capacity to respond to about 10,000 vaccines at any one time
- Today's vaccines expose children to far fewer antigens than vaccines from decades ago
 - 1980:
 - 7 different diseases (diphtheria, tetanus, pertussis, polio, measles, mumps, rubella)
 - ~3,041 antigens
 - 2000:
 - 12 different diseases (above plus hib, varicella, pneumococcus, hep B, flu)
 - 134-137 antigens
 - 2021:
 - 14 different diseases (above plus rotavirus, hep A)
 - 149-157 antigens
- “No difference in the relative risk of autism between those who did and those who did not receive MMR vaccine.” (Madsen, 2002) (Denmark study of 537,303 children)

Media wants...

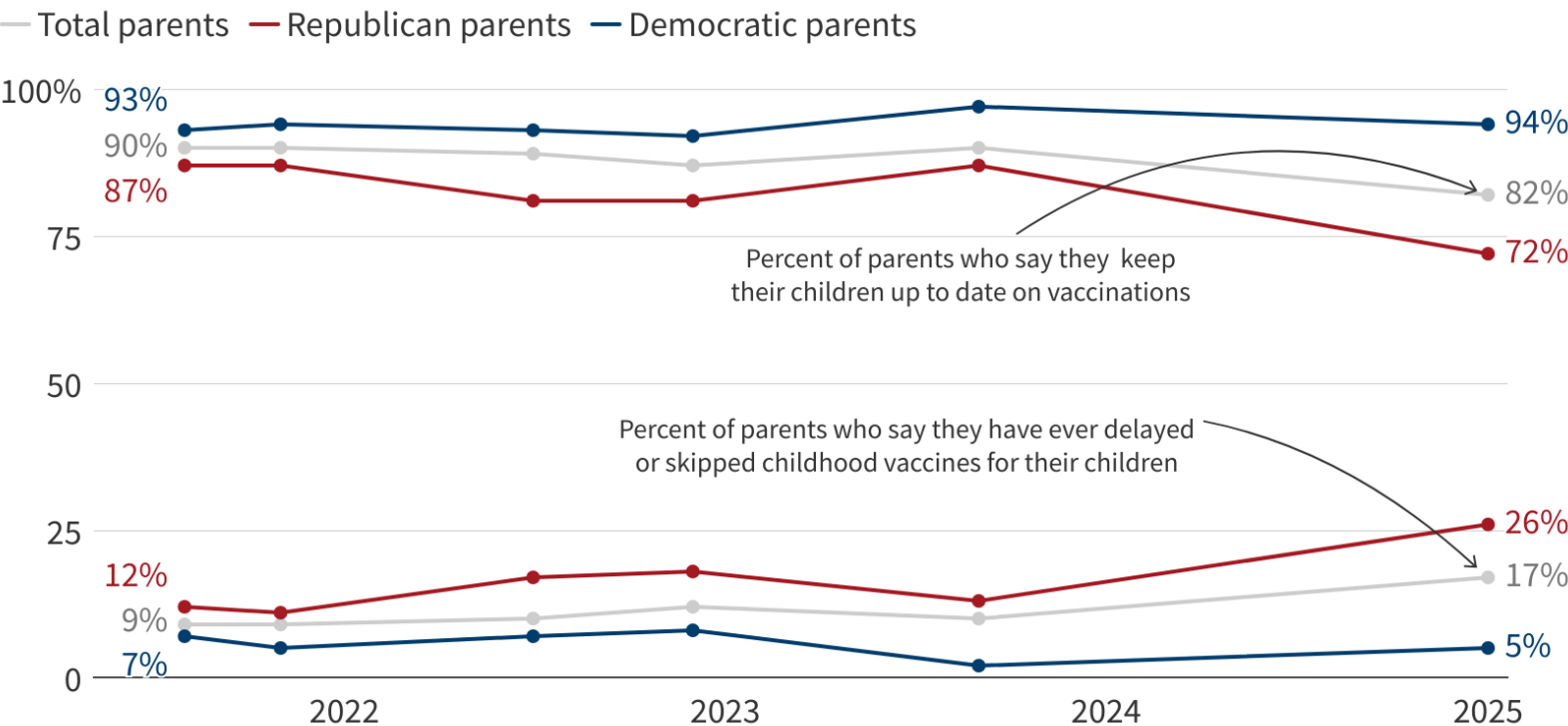
“The media tends to sideline groups that criticize vaccines until a prominent figure champions a theory against a backdrop of mistrust in government.”

-Julie Leask, PhD, MPH
May 2011

Identity Politics

Share Who Say They Keep Their Children Up to Date on Recommended Vaccines Has Dropped, Especially Among Republican Parents

Do you normally keep your children up to date with recommended childhood vaccines such as the MMR vaccine, or have you ever delayed or skipped some childhood vaccines for your children?



Note: Among parents or guardians of a child under the age of 18 living in their household. Partisans include those who identify as independent but lean towards either party. See topline for full question wording.

Source: KFF Health Tracking Polls

KFF

Fact Checked

“Most cases [of autism] now are severe. Twenty-five percent of the kids who are diagnosed with autism are nonverbal, non-toilet-trained, and have other stereotypical features.”

“The Amish are a perfect example of a large group of people who are largely unvaccinated and there’s no autism — we can’t find an autistic kid who was unvaccinated. It’s very, very rare. In the Amish community — very, very rare. You won’t find transsexuals. You won’t find homosexuals. You won’t find kids with ADD, with autoimmune disease, with PANDAS/PANS, with epilepsy. You just don’t find any of these chronic diseases in the Amish.”

The CDC published [data](#) in 2020 showing that 42 percent of people with autism had an I.Q. in the average or higher range, and another [study](#) has found that this figure could be as high as 60 percent.

“One [paper](#) from 2017 that studied an Amish community in northern Ohio found that 98% of the parents surveyed had immunized their children in whole or in part. Another [paper](#) from 2011 found that, of the parents surveyed, 85% had vaccinated at least some of their children.”

“Preliminary data have identified the presence of ASD in the Amish community at a rate of approximately 1 in 271 children using standard ASD screening and diagnostic tools although some modifications may be in order.”

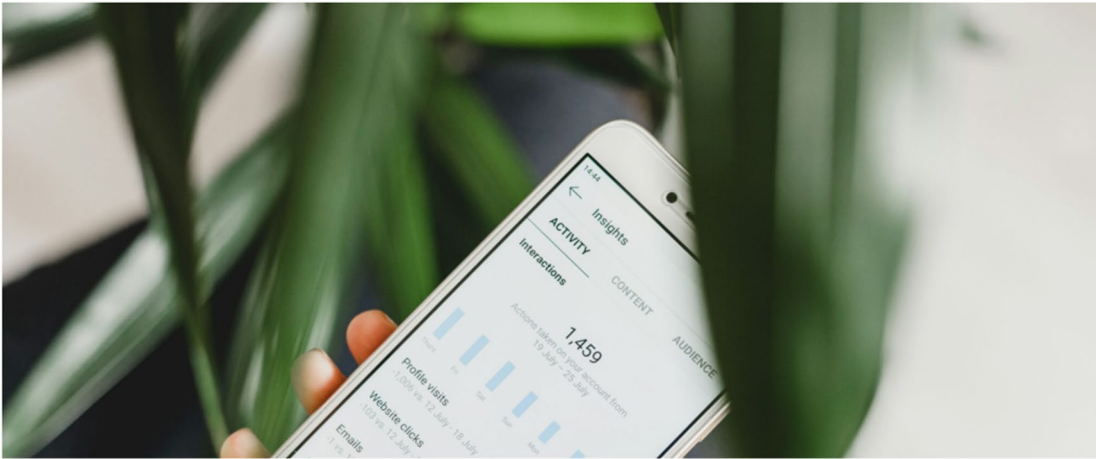
Mis/Dis-information Spreaders Want...

March 11, 2024

Q&A: How Instagram influencers profit from anti-vaccine misinformation

[Stefan Milne](#)

UW News



<https://www.washington.edu/news/2024/03/11/instagram-influencers-profit-anti-vaccine-misinformation-disinformation-wellness/>

The New York Times

The Most Influential Spreader of Coronavirus Misinformation Online

Researchers and regulators say Joseph Mercola, an osteopathic physician, creates and profits from misleading claims about Covid-19 vaccines.

<https://www.nytimes.com/2021/07/24/technology/joseph-mercola-coronavirus-misinformation-online.html>

The Bottom Line

- There is no credible evidence to support the notion that MMR, or any other vaccine alone or in combination, causes autism. **Fear of autism hurts autistic people.**
- The retracted Wakefield paper of 1998 had 12 pediatric subjects and even that paper failed to demonstrate a connection between MMR vaccine and autism.
- Dozens of papers in multiple countries involving millions of children have disproven the allegation of a connection between vaccines and autism.
- Parents want to make sure they're making the best choice for their children. Sometimes inaction feels safer than action.
- We need to give grace to parents who are searching for answers and who are afraid of harming their children while also providing a strong recommendation that they vaccinate their children.

We need to keep speaking up and sharing evidence-based information or the mis/dis-information will fill the void we leave

“I changed my denialist, hurtful views because of slow and steady exposure to information from trusted resources—and especially from trusted people.”

-Shannon Des Roches Rosa
Mom of a child with autism

“It became increasingly difficult for me to rail against vaccines and against autism when the people and resources I most respected were constantly posting information that caused me to question my fear-based opinions on vaccines and autism.”

Favorite Resources

CHOP.edu



<https://www.chop.edu/vaccine-education-center>



<https://autismsciencefoundation.org/autism-basics/>



Vaccine Safety: Examine the Evidence

Vaccines are under constant study. For a vaccine to be recommended—as part of the **childhood and adolescent immunization schedule**—it must be tested, found safe and closely monitored. Safety testing begins as soon as a new vaccine is made and **clinical trials** begin, and evidence of safety is gathered for as long as it is in use.



https://www.healthychildren.org/English/safety-prevention/immunizations/Pages/vaccine-studies-examine-the-evidence.aspx?_gl=1*1urxros*_ga*MTEwMjA2ODM2LjE3NDk1NjQ5MTk.*_ga_FD9D3XZVQQ*cze3NDk4NDk0MDQkbzckZzAkDDE3NDk4NDk0MDQkajYwJGwwJGgw



About Us

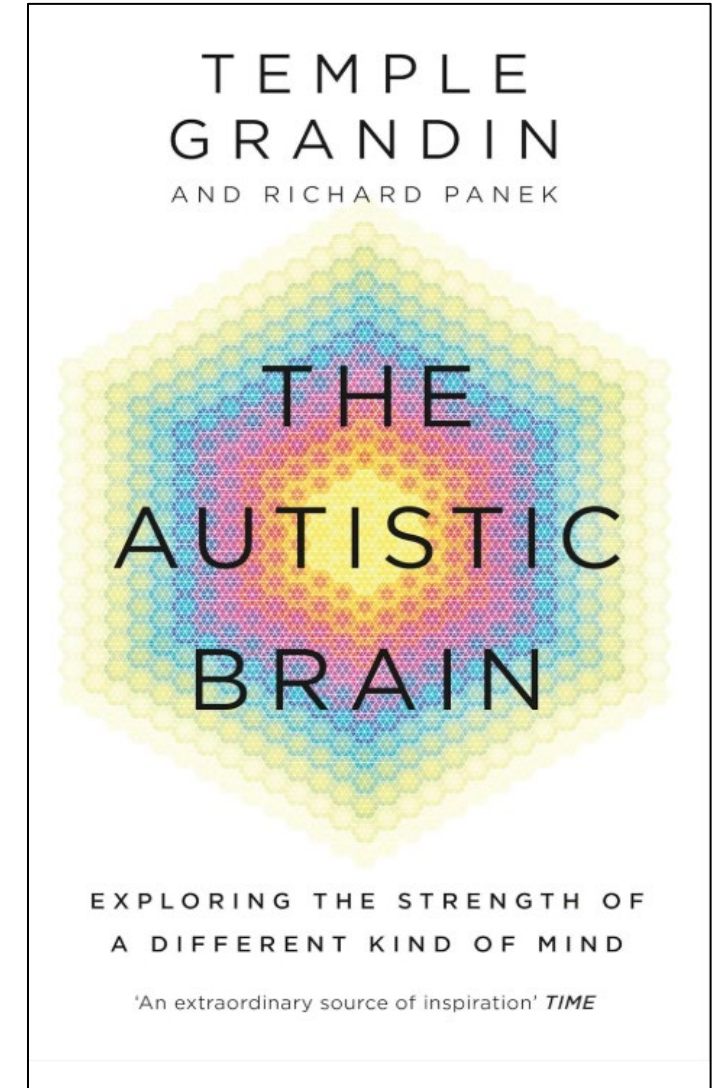
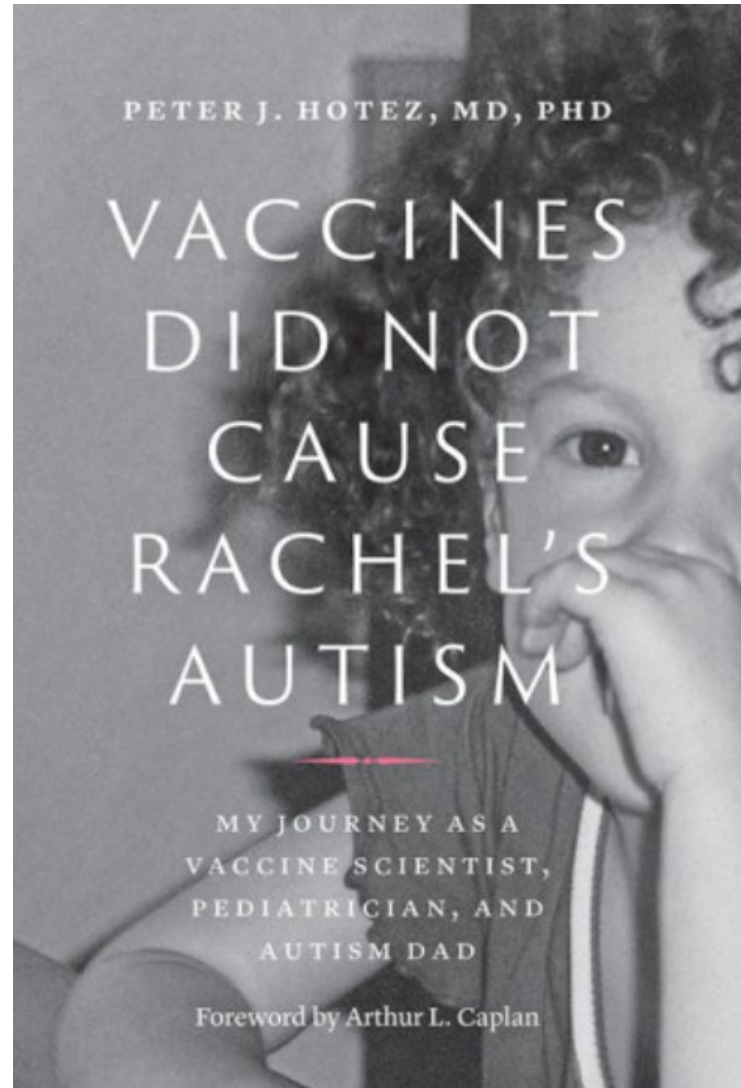
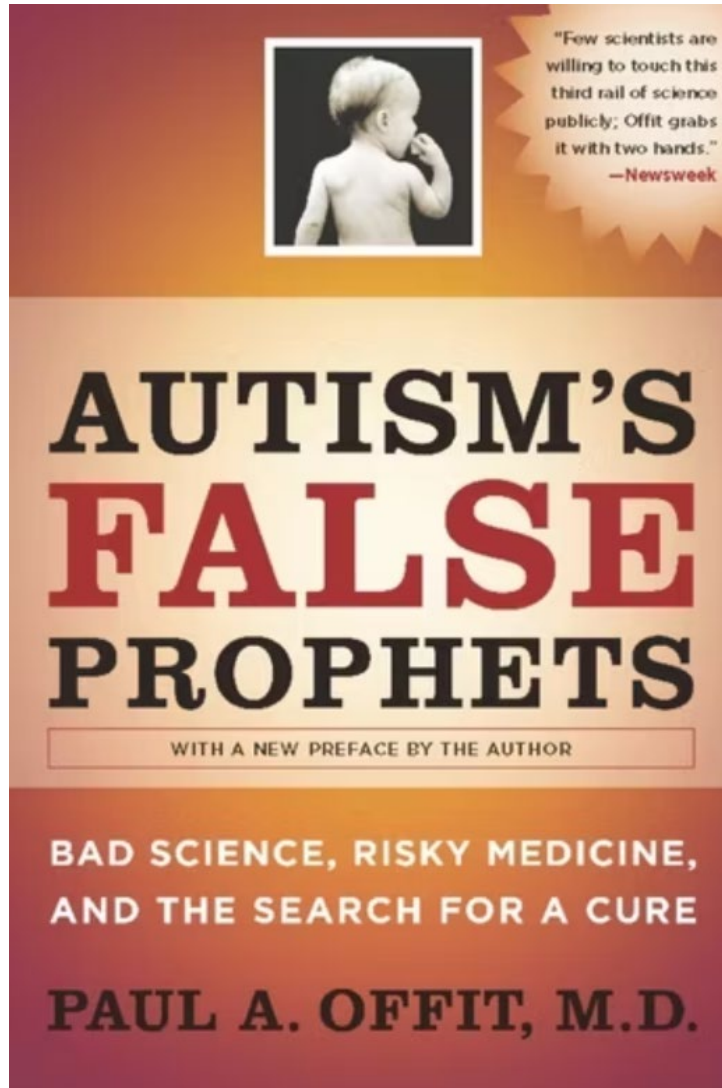
Vaccines

FAQs

Are Vaccines Safe?

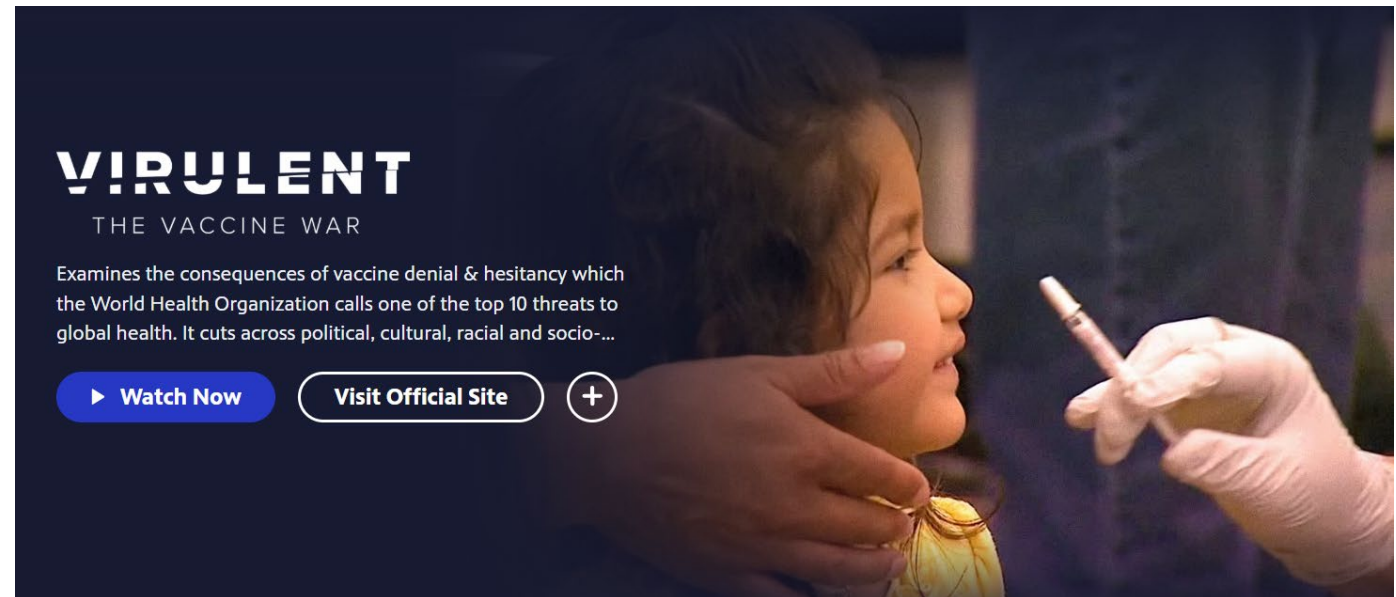
<https://vaccinateyourfamily.org/questions-about-vaccines/are-vaccines-safe/>

Favorite Resources





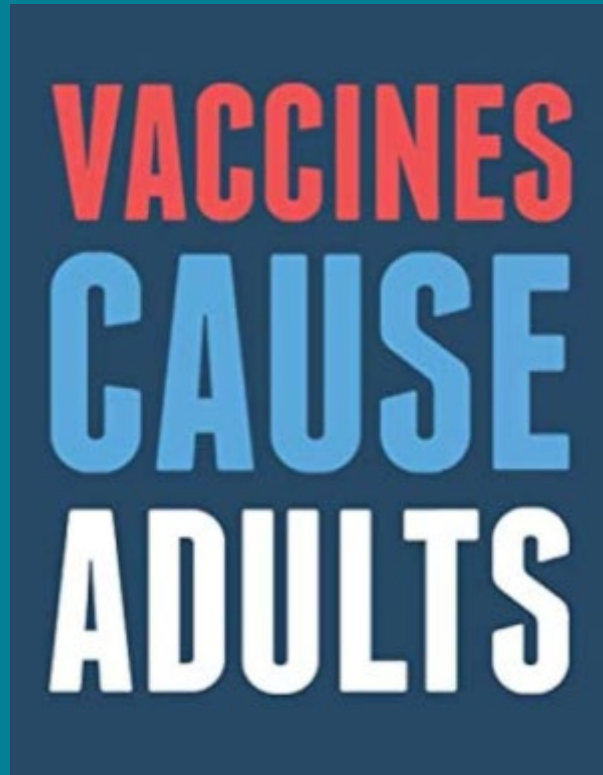
<https://www.pbs.org/show/shot-in-the-arm/>



<https://www.pbs.org/show/virulent-the-vaccine-war/>

Thank you!

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immunizationmanagers.org



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Association of Immunization
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Partner Resources

- Immunize.org:
 - [MMR Vaccine Does Not Cause Autism](#)
 - [Evidence Shows Vaccines Unrelated to Autism](#)
- American Academy of Pediatrics:
 - [Vaccine Safety: Examine the Evidence](#)
 - [Fact Checked: Vaccines: Safe and Effective, No Link to Autism](#)
- Vaccinate Your Family & Autism Science Foundation:
 - [The Truth About Autism and Vaccines](#)
- Public Health Communications Collaborative:
 - [Vaccines Do Not Cause Autism](#)

Evidence Shows Vaccines Unrelated to Autism

Erroneous claims that vaccines cause autism have led some parents to delay or refuse vaccines for their children. Some of the claims are that autism is caused by measles-mumps-rubella (MMR) vaccine, vaccines that contain thimerosal, or by too many vaccines. Many studies have been done to test these claims. None has shown that vaccines cause autism. The real causes of autism are not fully known, but the past

decade of research supports the role of genetics in an autism diagnosis. In fact, no scientific question into the causes of autism has been better researched, tested, and examined as the role of vaccines in autism. Volumes of evidence show no link between the two.

This sheet lays out the facts to help parents understand why experts do not think vaccines cause autism.

Medical and legal authorities agree that no evidence exists that vaccines cause autism.

The Institute of Medicine (now known as the National Academy of Medicine) is an impartial group of the world's leading experts that advises Congress on science issues. After reviewing more than 200 studies in 2004 and more than 1,000 studies in 2011, their report strongly stated that the evidence did not show a link between vaccines and autism.

In 2014, researchers from the RAND Corporation published an update to the 2011 Institute of Medicine's report. In a systematic review of the evidence published on vaccine safety to date, they found the evidence was strong that MMR vaccine is not associated with autism.

In 2009, the U.S. federal court reviewed 939 medical articles in their hearings. The court found the evidence was "overwhelmingly contrary" to the theory that autism is linked to MMR vaccine, thimerosal, or a combination of the two. Since then, additional scientific evidence adds evidence to the conclusion that neither vaccines, nor the thimerosal in vaccines, was linked to autism.

Based on the research, the World Health Organization, the European Medicines Agency, Health Canada, and other national and international health agencies have concluded that no link can be found between

REFERENCES

Institute of Medicine. *Adverse Effects of Vaccines: Evidence and a Response*. National Academies Press, 2011. www.nationalacademies.org/immunization
Institute of Medicine. *Immunization Safety Review: Measles, Mumps, and Rubella Vaccines*. National Academies Press, 2004. www.nationalacademies.org/immunization
Magione MA, Das L, Raen L, et al. Safety of MMR vaccine in children with autism spectrum disorders. *Archives of Pediatrics and Adolescent Medicine*. 2013;167(10):937-941. https://doi.org/10.1093/pediatrics/kps111



The causes of autism are not fully understood, but the evidence does not point toward vaccines.

Parents often first notice the behaviors of autism when their child is 18–24 months old – the age by which most childhood vaccines have been given. Because of this, parents may incorrectly associate vaccination with the onset of autism. However, the data show otherwise. For the past 20 years, clinicians have been closely studying the infant siblings of children with an autism diagnosis. These children have up to a 30x likelihood of a diagnosis compared to those with no family history. As infants, they start to show early developmental delays as young as 6 months of age. If you have a family history of autism, please tell your pediatrician so your child can be closely monitored. Unfortunately, past research has shown that these infants are less likely to be vaccinated, but still more likely to develop an autism diagnosis. New technologies have allowed scientists to investigate brain development in infants with a higher likelihood of a diagnosis. Their brain development shows differences from typical infants as early as 6 months of age. The developmental cascade that leads to an autism diagnosis starts well before parents see noticeable symptoms.

This is only part of the evidence that demonstrates that heritable factors, including genetic and environmental factors,

Vaccines Do NOT Cause Autism

A science-based guide about vaccine safety for parents and caregivers



Housekeeping



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Thank you!



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