THE EVIDENCE HASN'T CHANGED:

Communicating Vaccine Science When the Landscape Has

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Co-Founder, The Evidence Collective

NDSU CIRE Webinar • March 13, 2026

Disclosures

1. Dr. Steier has received funding from pharmaceutical companies for independent educational activities: Pfizer (COVID-19/flu vaccine communication escape room), CSL Seqirus (influenza vaccine communication escape room), and Moderna (CME module on mRNA vaccine technology). All relevant financial relationships have been mitigated.
2. All industry-funded activities were for independent educational content only — not promotional. Dr. Steier retained full editorial control.
3. This presentation was not funded by any pharmaceutical company and reflects independent scientific analysis.
4. AI tools (Claude AI) were used in presentation preparation and disclosed per NDSU CIRE policy.

Learning Objectives

By the end of this session, participants will be able to:

1. Summarize the current state of vaccine safety evidence — including what research does and does not show regarding commonly cited concerns.

2. Identify how recent policy and institutional changes affect where and how healthcare and public health professionals access reliable vaccine information.

3. Discuss evidence-based communication strategies to address vaccine misinformation and build trust in clinical and public health settings.

We Are in Uncharted Territory.

The science on vaccine safety and efficacy has not changed.

What HAS changed: the policy environment, the information landscape,

and the questions patients are bringing to the exam room.

This session gives you the evidence — and the language — to navigate both.

POLICY CONTEXT

A Policy Landscape That Moved Fast

Dec 5, 2025 — ACIP meeting: vaccine schedule changes presented

Dec 19, 2025 — News breaks about proposed schedule changes

Jan 5, 2026 — HHS releases memo aligning U.S. schedule with 'other high-income countries'

Jan 2026 — AAP, ACOG, AAFP reaffirm original schedule recommendations

Feb 2026 — Coverage & reimbursement questions emerge for providers

HHS Press Release, January 5, 2026; ACIP Meeting Presentation, December 5, 2025; NYT, 2025; The Evidence Collective, 2025

What Changed — and What Didn't

WHAT CHANGED

- Federal vaccine schedule recommendations
- Removal of some vaccines to 'shared clinical decision-making'
- Institutional review processes bypassed
- Public and provider confusion about what's 'recommended'
- Insurance coverage uncertainty for some vaccines

WHAT DIDN'T CHANGE

- The scientific consensus (vaccine safety and efficacy data are unchanged)
- AAP, ACOG, AAFP recommendations — all reaffirm original schedule
- Vaccine availability (all vaccines remain available)
- Coverage through end of 2026 for ACIP-recommended vaccines (AHIP)

The Evidence Base Is Strong — and Unchanged

30+

Years of rigorous post-licensure surveillance via VAERS, VSD, CISA

9

Independent federal and global agencies that have reviewed and endorsed the U.S. schedule

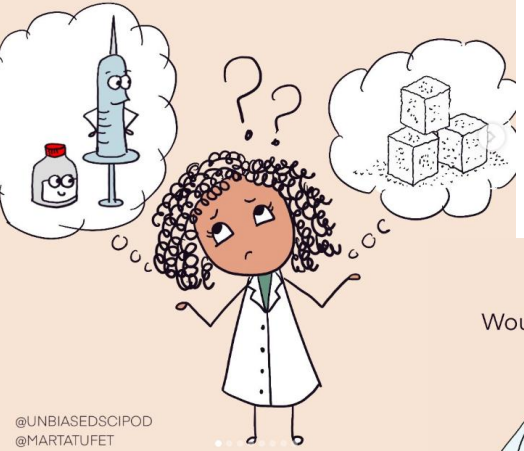
500M+

Illnesses prevented by vaccines given to children born 1994–2023 (CDC estimate)

Calls for 'new placebo-controlled trials' of approved vaccines misunderstand both the evidence and medical ethics. The current review process IS the gold standard of care.

Should we test every new vaccine with a placebo?

Some people think so. But it misses a critical point about ethics and science.

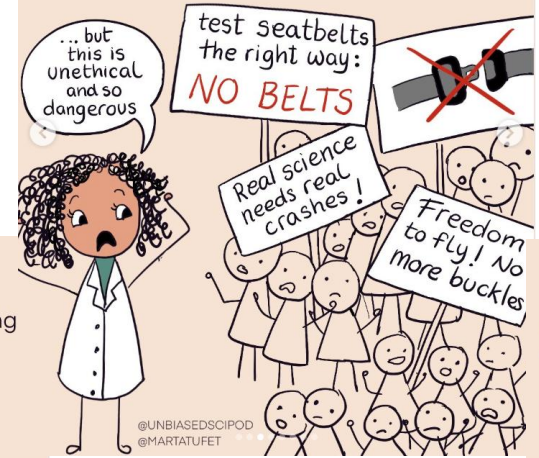


Imagine this

Would we test new seatbelts by leaving half the kids without one?

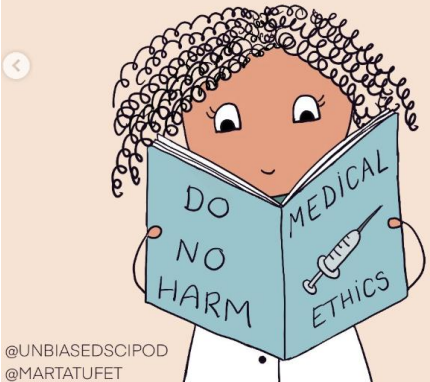
Of course not!

Once we know something prevents serious harm, leaving people unprotected just to "test it" again is unethical



That is why we don't use placebo trials when a vaccine for the disease already exists

Ethical research must protect people — not put them at risk on purpose



Unbiased Science, Marta Tufet [@unbiasedscipod]. (2025). https://www.instagram.com/unbiasedscipod/p/DJZglMbA9mc

"Too Many Too Soon" — What the Data Show

The Claim

"Children receive too many vaccines."

- Counts doses, not protection
- Inflates totals with annual flu/COVID
- Counts combination vaccines as multiple
- Ignores how immune system capacity works

The Reality

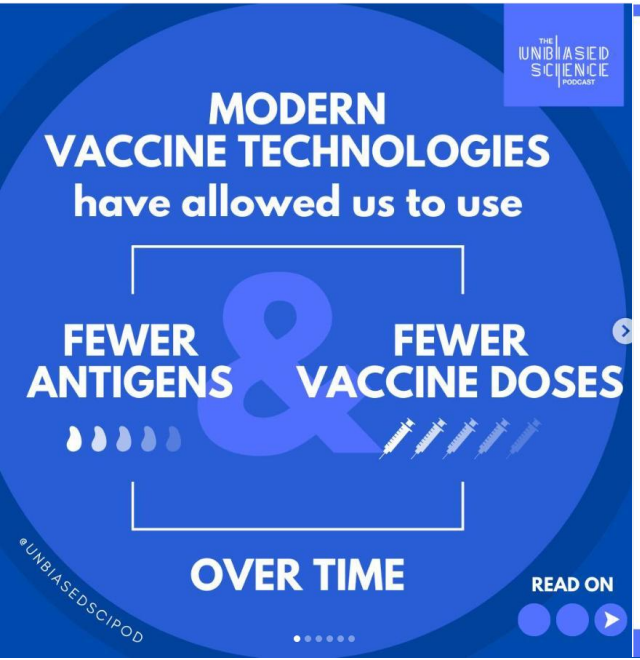
More vaccines, fewer antigens

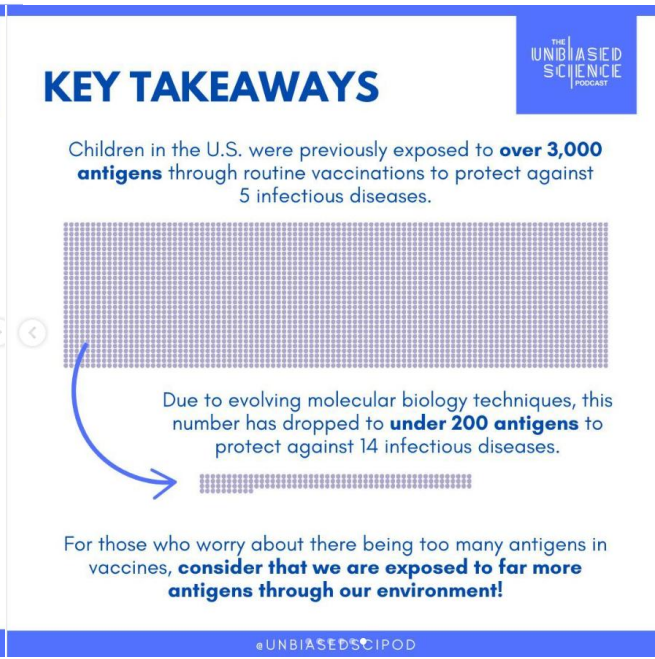
1900: ~200 immunogenic proteins (smallpox alone)

1960s–70s: ~3,200 proteins (pertussis era)

Today: ~146–160 proteins — a fraction

An infant's immune system encounters thousands of antigens daily. Vaccine antigens represent a tiny fraction of immune system capacity.





Children's Hospital of Philadelphia, Vaccine Education Center. *Vaccine history: Developments by year*, https://www.chop.edu/vaccine-education-center/science-history/vaccine-history/developments-by-year

The 'Other Countries Do Less' Argument — Examined

The HHS memo argued the U.S. schedule is out of step with peer nations. The data tell a different story.

Most peer nations protect against 11–14 diseases by age 5 — the U.S. is at the upper end but not an outlier.

Denmark (oft cited as 'doing less') is the true outlier and tolerates thousands of preventable hospitalizations annually.

Where schedules differ, it reflects differences in disease burden and infrastructure — NOT a safety signal

Denmark = ~6M people (≈Wisconsin). U.S. = 343M people. Direct comparison requires context.

Why the Hep B Birth Dose Matters: A Case Study

90%

of infants infected at birth
develop chronic Hep B infection

Why Denmark can skip the birth dose:

- Screens ~100% of pregnant women for Hep B
- Centralized medical records
- Reliable maternal-infant follow-up
- Universal healthcare ensures care continuity

Why the U.S. cannot simply follow suit:

- About 1 in 8 pregnant women are never tested for Hep B
- Even when we find a positive case, only 35% complete follow-up
- Fragmented records & inconsistent care
- Universal birth dose protects when screening and follow-up fail

AAP, 2025; Scott, STAT, 2025; Mandavilli, NYT, 2025; Pham et al., Am J Prev Med, 2024

CLINICAL SCENARIO #1

A parent arrives for her 12-month-old's well visit. Before you say anything, she says:

"I saw on the news that the government changed the vaccine schedule. So, I guess we don't have to do all of them today?"

What do you lead with?

A Explain the HHS memo and what it actually changed vs. didn't change.

B Acknowledge what she's seen, distinguish policy from science, then share your recommendation clearly.

C Reassure her that nothing has changed and proceed with the full schedule.

D Ask her what specific vaccines she has concerns about before addressing anything.

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Let’s Talk About Trust

1 in 4

Americans believe current vaccine recommendations were based on science and facts

Trust doesn't erode overnight.

Decades of:

Dismissed patient concerns

Overpromising ('safe and effective' without nuance)

Inadequate transparency on what we know vs. don't know

Social media amplifying doubt faster than science can respond

...have created fertile ground for misinformation to take hold.

KFF Tracking Poll on Health Information and Trust, September 23–29, 2025 (*Among parents/guardians with children under 18)

DISPERSION OF AUTHORITY: PEERS ON PAR WITH SCIENTISTS

Percent trust

GLOBAL 26 Excl China, Saudi Arabia

Distrust (1-49) Neutral (50-59) Trust (60-100)

I trust each to tell me the truth about **new innovations and technologies**

2024 Edelman Trust Barometer. TRU_PEP_TCNG. Below is a list of categories of people. For each one, please indicate how much you trust that person or group of people to tell you the truth about new innovations and technologies. 9-point scale; top 4 box, trust. Question asked of half the sample. General population, 26-mkt avg. "Government leaders" not asked in China or Saudi Arabia.

The Information Deficit Model Doesn't Work.

The assumption that people reject vaccines because they lack information is not supported by evidence. People reject vaccines because of trust, identity, fear, and social context.

More information:	Can actually increase resistance in people who distrust the source
Fear appeals:	Often backfire — triggering defensive processing rather than behavior change
Condescension:	The single fastest way to lose a hesitant patient permanently
What actually works:	Connection, narrative, humor, visualization, and meeting people where they are

Nyhan et al., Pediatrics, 2014; Kahan, J. Risk Research, 2017; Lewandowsky et al., The Debunking Handbook, 2020

BARRIER
"Complex scientific language"

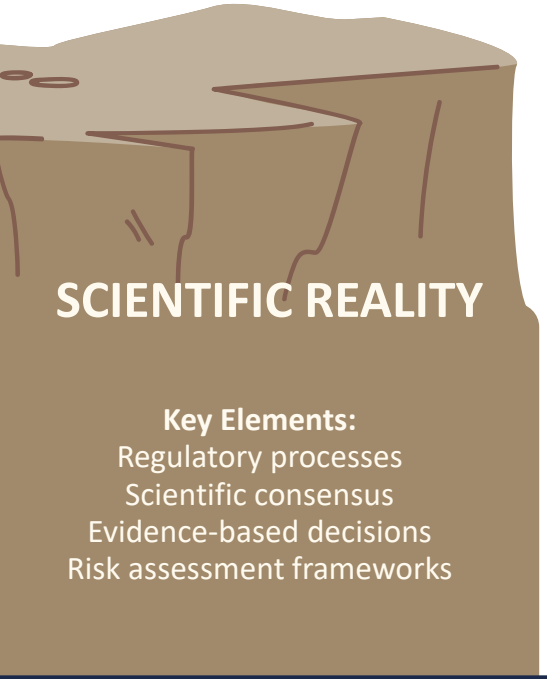
BARRIER
"Perceived conflicts of interest"

BARRIER
"Historical mistrust"

BARRIER
"Lack of transpar-ency"

BARRIER
"Information overload"

THE TRUST GAP

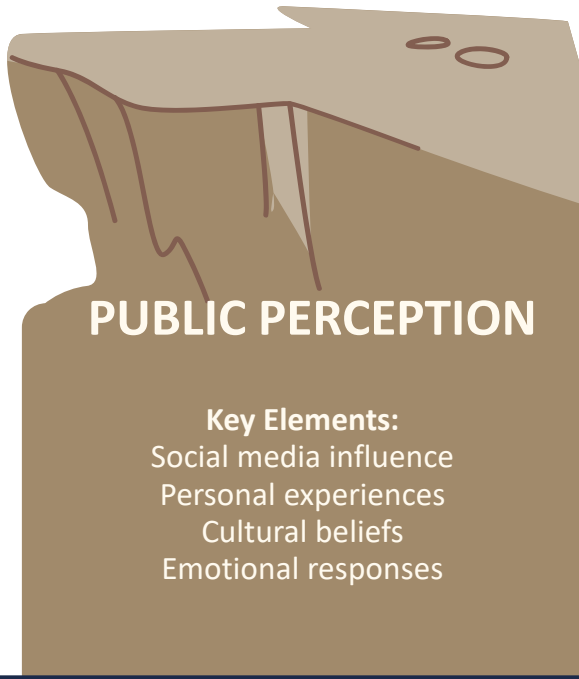


SCIENTIFIC REALITY

Key Elements:
Regulatory processes
Scientific consensus
Evidence-based decisions
Risk assessment frameworks

Most Trusted Information Sources:
Friends/family recommendations
Social media influencers
Local food producers
Health/wellness bloggers

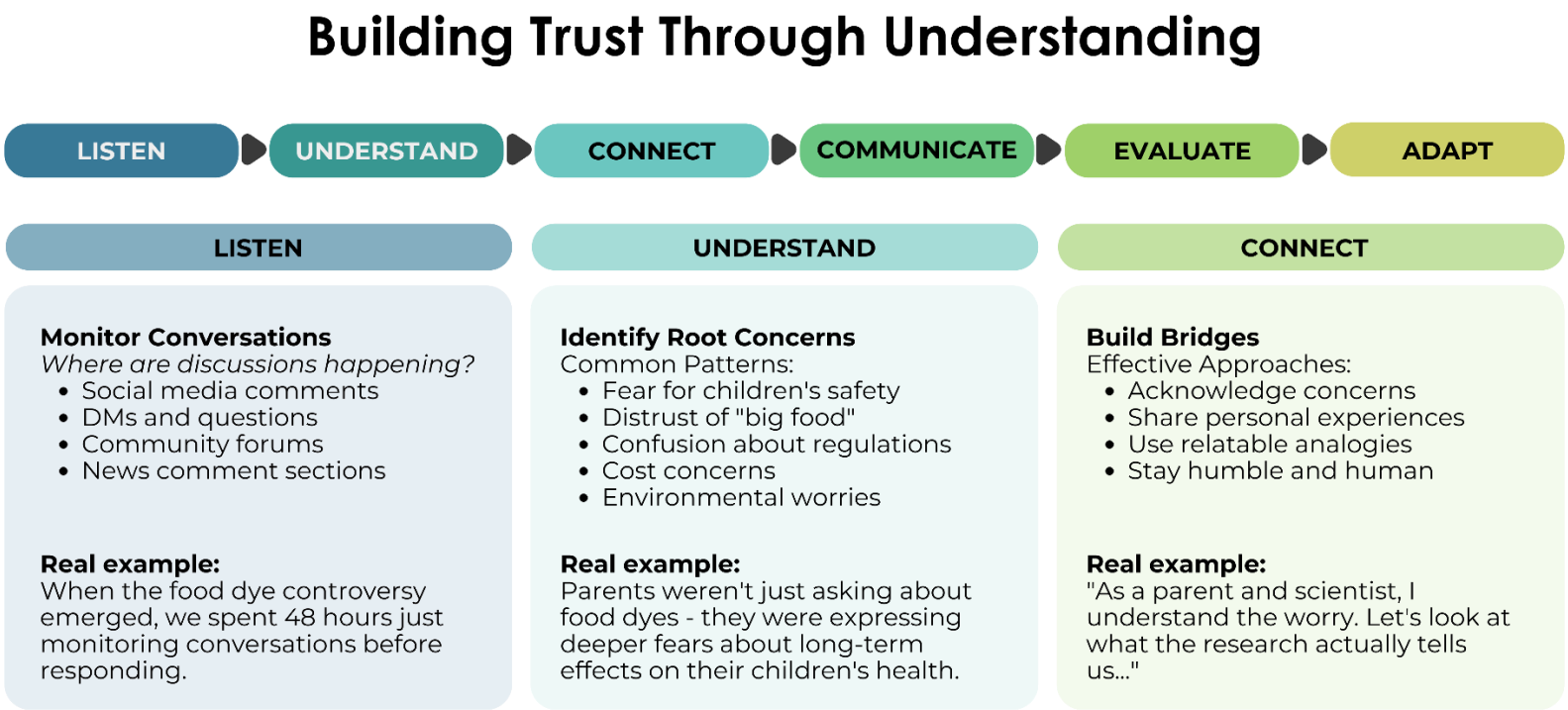
Less Trusted Information Sources:
Traditional media
Government agencies
Scientific institutions
Pharma/Industry
Corporations



PUBLIC PERCEPTION

Key Elements:
Social media influence
Personal experiences
Cultural beliefs
Emotional responses

The Listen-first Approach



Kedl R. The value of listening in public science communications. *AAI News*. May 29, 2025. https://news.aai.org/2025/05/29/value-of-listening-in-public-science-communications/

COMMUNICATION

Connection Before Correction

Recognize that your friend or family member has a whole life's worth of experiences that affects how they engage with whatever they read online or hear on the news.
"So often people's memories really shaped the ways that they engage with current ways with political systems and their media environments."

— Rachel Kuo, University of Washington | NPR Life Kit, September 30, 2024

People trust sources from their own cultural context

Familiar messengers matter more than expert credentials alone

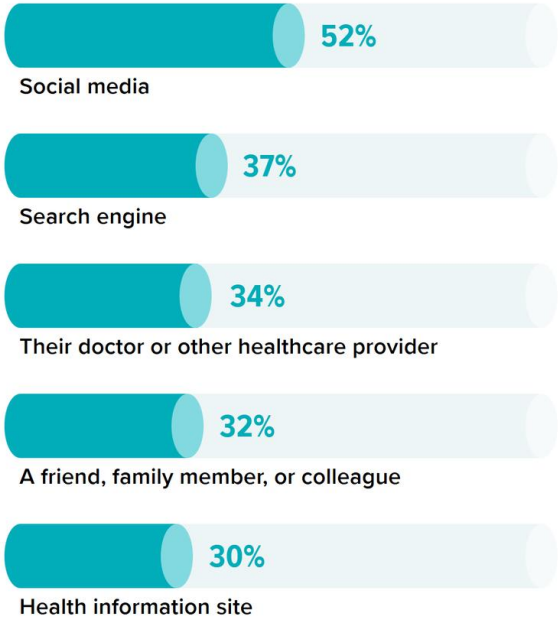
Correcting misinformation often fails short-term

"Belief regression" is real — corrections work best when repeated over time within trusted relationships

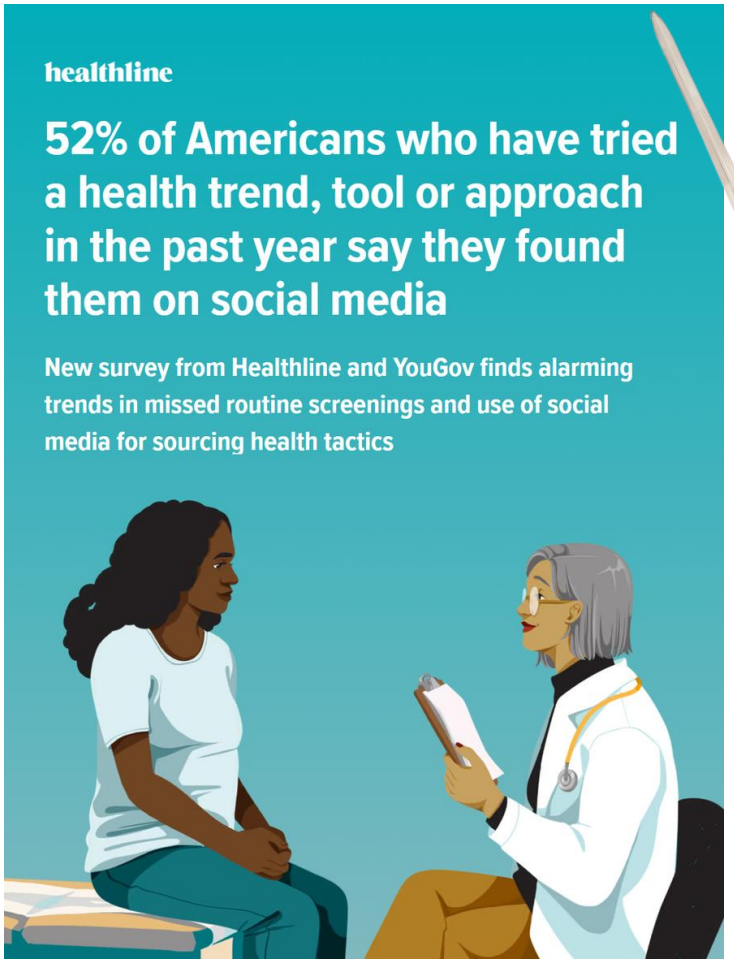
Ask about evidence, open a dialogue

"What is the evidence?" is more effective than "that's false" — it opens dialogue about trust, not just facts

Where did Americans learn about health tactics* they've tried in the past year:



*health tactic defined as health and wellness tools, resources, trends, or products



DOUBLE-EDGED SWORD

"State of Consumer Health." Healthline, 8 Oct. 2024, https://www.healthline.com/health/consumer-health-survey.

COMMUNICATION

Storytelling: The Evidence

Humans are storytellers by nature. Stories change minds in ways that statistics alone cannot.

Stories delay counterarguing

Narrative communication creates openness to information by slowing the instinct to push back — the key mechanism behind attitude change.

Chou et al., Patient Education & Counseling, 2023

Narrative transportation = persuasion

When people are absorbed in a story, they experience reduced counterarguing and increased persuasion. The more transported, the stronger the effect.

Green & Brock, J. Personality & Social Psychology, 2000

Stories work where statistics fail

Simply providing more data doesn't change beliefs. Stories that connect to lived experience reach audiences that fact-sheets never will.

Kreuter et al., Health Communication, 2007

Especially effective for vaccines

Personal vaccine narratives — including hesitancy-to-acceptance stories — show measurable impact on knowledge, attitudes, and behavior.

Shelby & Ernst, Human Vaccines & Immunotherapeutics, 2013

USING STORYTELLING TO EDUCATE

A Public Health Scientist Walks Into a Bar: Science, Skepticism, and Finding Common Ground

Why I interrupted four strangers to talk about mRNA (and lived to tell about it)

Dr. Jess Steier 13 min read · Sep 4, 2025

1.7K 49

Steier J. Unbiased Science, Substack. September 3, 2025. Steier, J. Stat News, September 4, 2025.

CASE STUDY

A PUBLIC HEALTH SCIENTIST WALKS INTO A BAR

THE SCENE

Mom's last night in town. Dive bar. Brandy Alexanders.

Four guys at the next table, talking about how the COVID vaccines were "rushed" and mRNA was an "experiment."

As a Brooklyn Jew who talks with her hands, I physically sat on my hands to stay quiet.

It didn't work.

WHAT HAPPENED

Four men. Seated clockwise by skepticism level.

15-20 minute respectful conversation about mRNA, lab leaks, the CDC, and vaccine safety.

Most of their skepticism came from incomplete information, not anti-science ideology.

Three of them shook my hand at the end.

The fourth? Some people can't be convinced. But maybe I made him think.

Steier J. Unbiased Science, Substack. September 3, 2025.

COMMUNICATION

Humor in Health Communication

Humor lowers people's tendency to counterargue — the same mechanism that makes it harder to reach vaccine-hesitant patients. When people are entertained, their defenses come down.

Increases attention & retention

Humorous health messages improve both initial attention and memory of the message over time.

Miller et al., Health Promotion International, 2021

More shareable on social media

Humorous content is significantly more likely to be shared — extending reach far beyond the original audience.

Sukalla et al., 2024

Reduces defensive processing

Works best for stigmatized or high-resistance topics, where fear-based messaging would trigger avoidance.

Yoon, Health Communication, 2017

Use it strategically

Humor must land as funny to work. Pretest with your audience. Humor that misses can undermine credibility.

Oxford Research Encyclopedia of Communication, 2017

PEOPLE ALSO APPRECIATE A DOSE OF COMEDY AND CLEVER PHRASING!

"NOSTALGIA IS NOT A PUBLIC HEALTH STRATEGY"

Aleccia, PBS News, 2024; Branswell, Stat News, 2024; CBS News, 2024; CDC, 2024; CDC, 2025; Crezo, Center for Science in the Public Interest, 2024; Dairy Farmers of Canada, 2021; FDA, 2025; Flynn, Food Safety News, 2024; Goodman, CNN, 2024; Macdonald et al., J Food Prot., 2011.

Data Visualization & Contextualizing Risk

People are not bad at understanding risk. They are bad at understanding risk presented as abstract statistics.

Natural Frequencies Work

Instead of:

"The risk of febrile seizure from MMR is 0.003%"

Try:

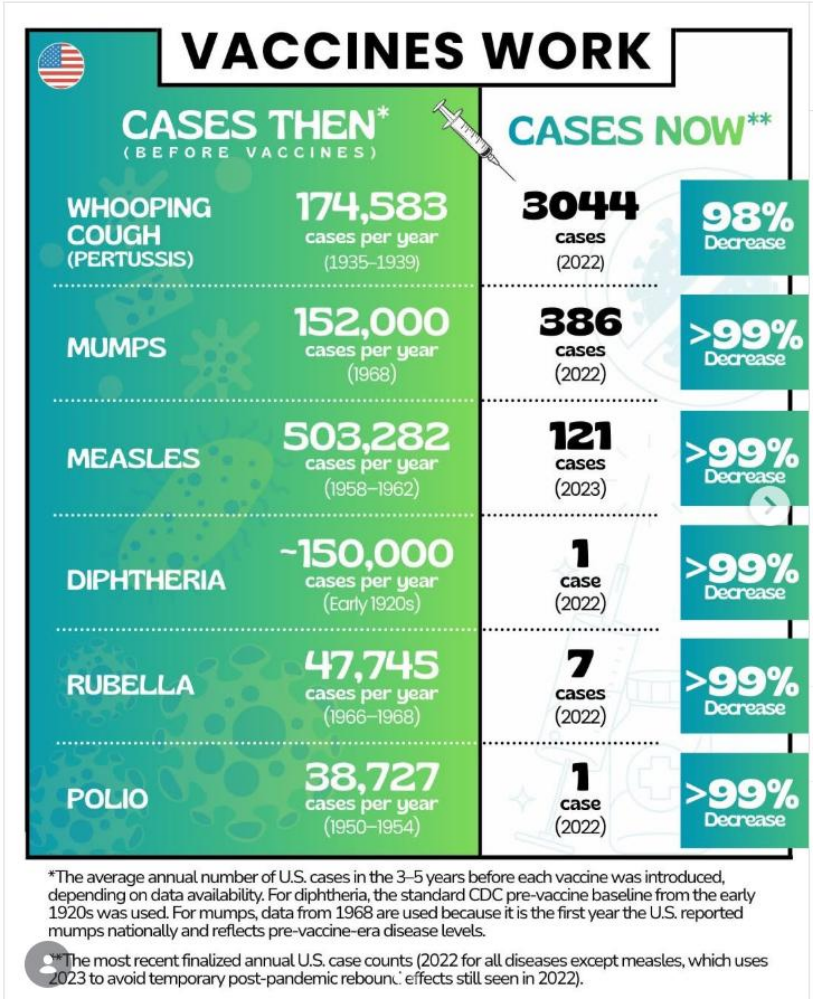
"About 3 in 100,000 children — roughly 1 child in a stadium of 33,000 people — may experience a brief fever-related seizure. All recovered without lasting harm."

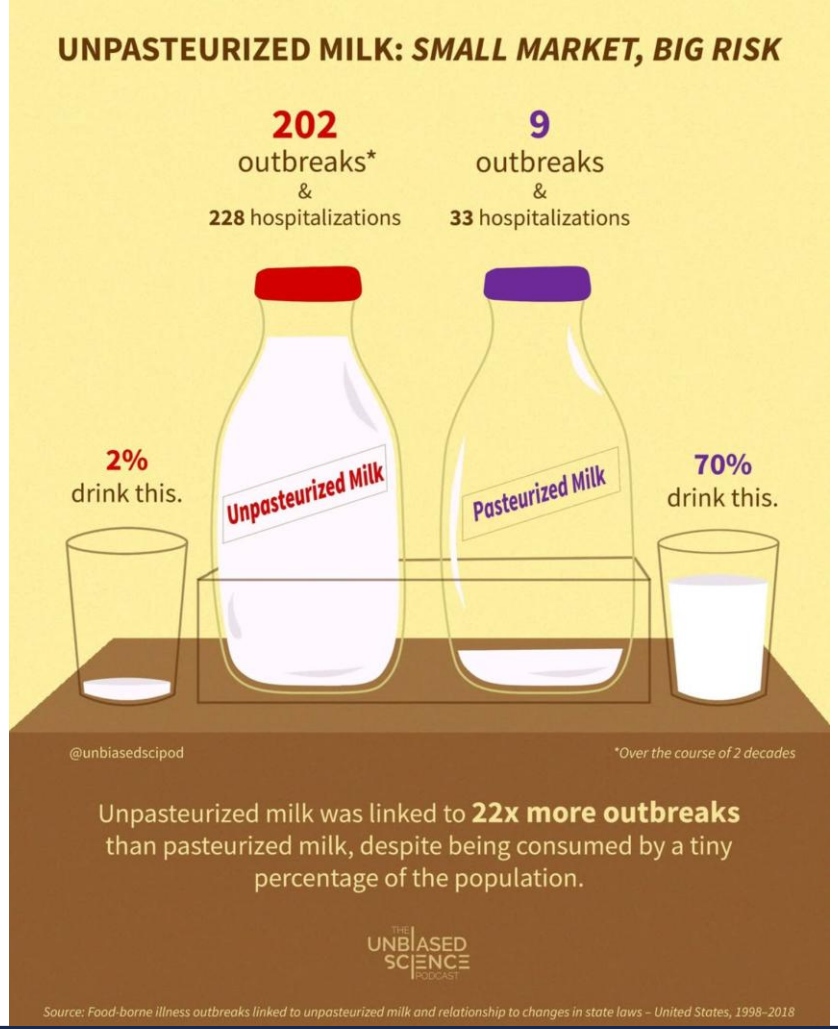
Gigerenzen: natural frequencies (1 in X) are understood 4–6x more accurately than percentages.

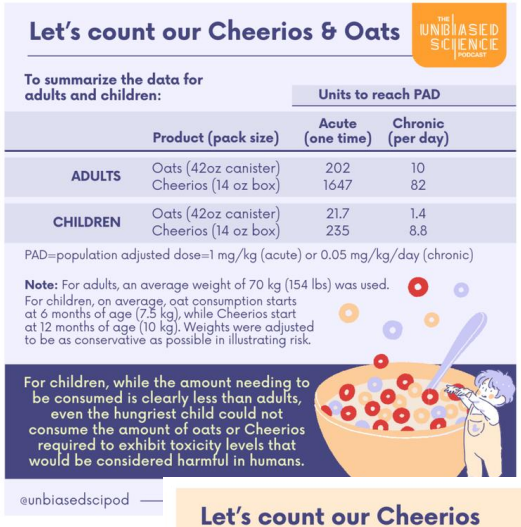
Visuals Reduce Cognitive Load

- Before/after disease burden
- Side-by-side risk comparisons
- Icon arrays (people icons, not pie charts)
- Timeline graphics showing disease decline
- *"A picture changes the meaning of the statistics because it creates a context in which we evaluate the data." — FrameWorks Institute*

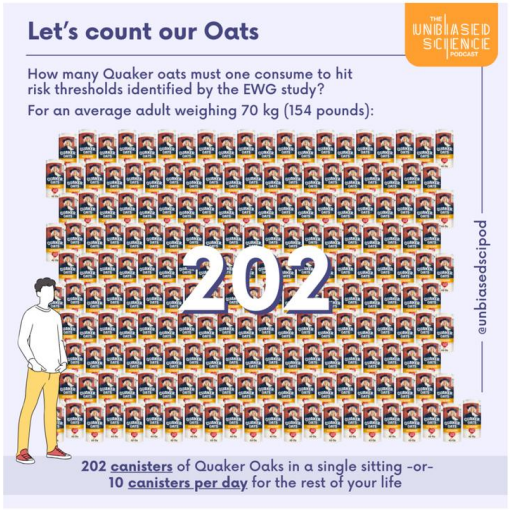
Gigerenzen, Calculated Risks, 2002; FrameWorks Institute; Garcia-Retamero & Galesic, BMJ, 2010; Fagerlin et al., Health Psychology, 2011


VACCINES WORK
CASES THEN*
(BEFORE VACCINES)
CASES NOW**
WHOOPING COUGH (PERTUSSIS)
174,583 cases per year (1935–1939)
3044 cases (2022)
98% Decrease
MUMPS
152,000 cases per year (1968)
386 cases (2022)
>99% Decrease
MEASLES
503,282 cases per year (1958–1962)
121 cases (2023)
>99% Decrease
DIPHTHERIA
~150,000 cases per year (Early 1920s)
1 case (2022)
>99% Decrease
RUBELLA
47,745 cases per year (1966–1968)
7 cases (2022)
>99% Decrease
POLIO
38,727 cases per year (1950–1954)
1 case (2022)
>99% Decrease
*The average annual number of U.S. cases in the 3–5 years before each vaccine was introduced, depending on data availability. For diphtheria, the standard CDC pre-vaccine baseline from the early 1920s was used. For mumps, data from 1968 are used because it is the first year the U.S. reported mumps nationally and reflects pre-vaccine-era disease levels.
**The most recent finalized annual U.S. case counts (2022 for all diseases except measles, which uses 2023 to avoid temporary post-pandemic rebound effects still seen in 2022).

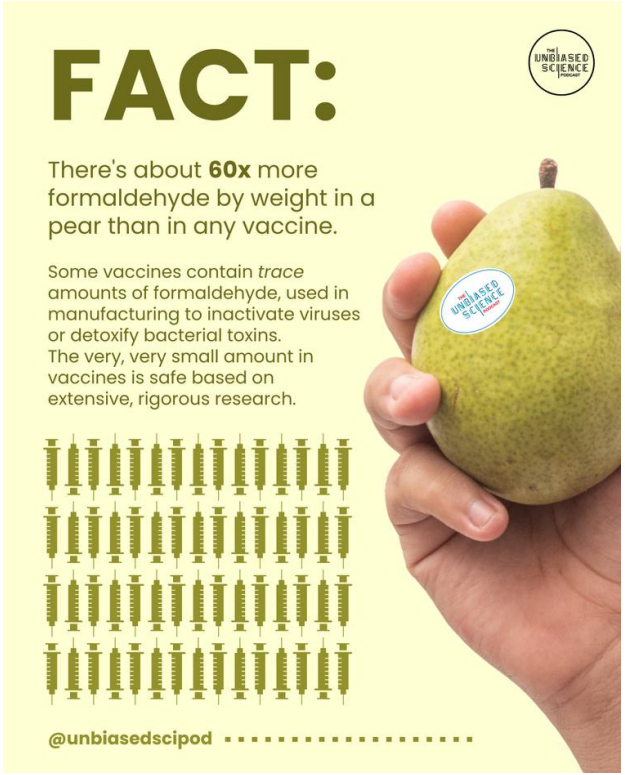

UNPASTEURIZED MILK: SMALL MARKET, BIG RISK
202 outbreaks* & 228 hospitalizations
9 outbreaks & 33 hospitalizations
2% drink this.
Unpasteurized Milk
Pasteurized Milk
70% drink this.
@unbiasedscipod
*Over the course of 2 decades
Unpasteurized milk was linked to 22x more outbreaks than pasteurized milk, despite being consumed by a tiny percentage of the population.
THE UNBIASED SCIENCE PODCAST
Source: Food-borne illness outbreaks linked to unpasteurized milk and relationship to changes in state laws – United States, 1998–2018

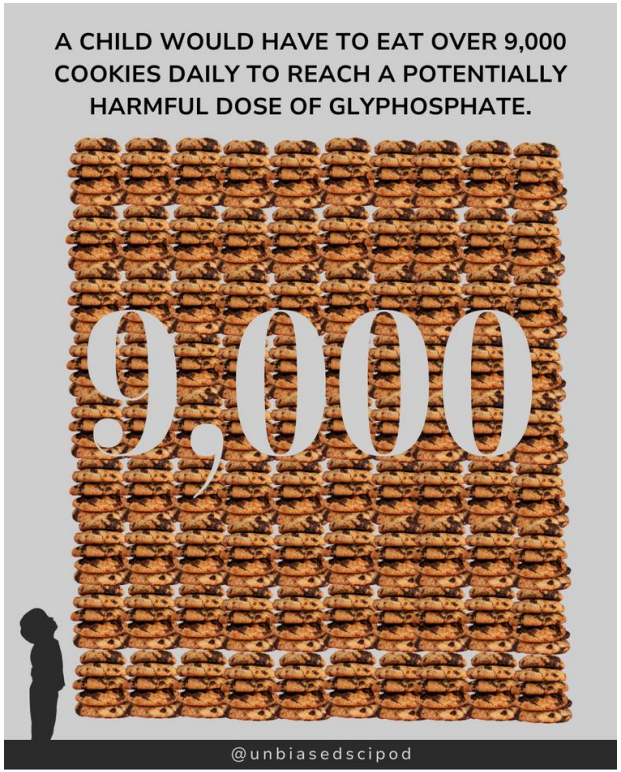


PEOPLE APPRECIATE CONTEXT AND REAL-WORLD APPLICATION



Ankley et al., Environ Toxicol Chem, 2010; Araujo et al., Metabolites, 2021; EFSA, 2008; EPA, 2023; Lacey & Temkin, Environmental Working Group, 2024; Liu et al., Reprod Toxicol, 2019; Sorensen & Danielsen, Int J Androl, 2006; Sorensen et al., Animal, 2009.





EFSA, accessed February 2025; EPA, updated 2000; FAO & WHO, 2011; FDA, 2024; FDA, 2025; Hartzler & Owen, Iowa State University Extension and Outreach, 2011; Immunize Kansas Coalition, accessed February 2025; Louie et al., Food and Chemical Toxicology, 2021; Myers et al., Environ Health, 2016; Unbiased Science, 2025.

COMMUNICATION

My Attempt To Use All These Techniques

"The Playbook Used to 'Prove' Vaccines Cause Autism" | New York Times, August 19, 2025

Storytelling

Opens with Wakefield as a narrative — a character, a fraud, a consequence. Not a list of debunked studies.

Data visualization

70+ studies mapped visually by decade, outcome, and author. The pattern is legible at a glance.

Connection before correction

Acknowledges why flawed research resonates (people want answers about autism) before explaining why it's wrong.

Risk contextualization

Frames the 26 pro-link studies in context: 18 by two people, 4 retracted, 1 published on WordPress.

Accessible analogies

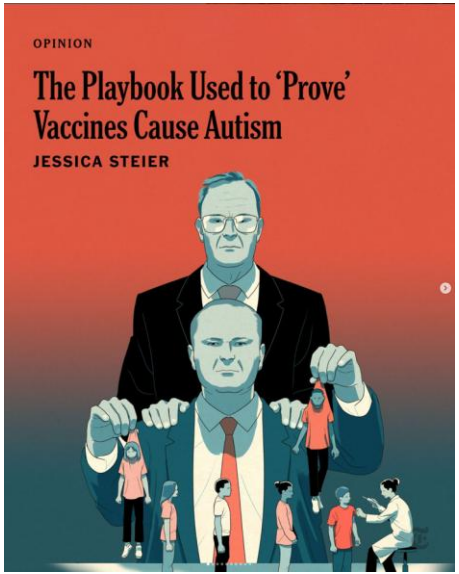
The p-hacking and confounder explanations use plain language, not statistical jargon.

Strategic word choice

"This is the cruelest irony: that those who claim to champion people with autism are denying them real research."

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

MAIN THESIS



- The upcoming federal autism study led by RFK Jr. and David Geier (?) threatens to repeat decades of debunked anti-vaccine pseudoscience
- Understanding the “anti-vaccine research” playbook helps identify shoddy studies and protect public health

By Jessica Steier
Graphics by Sara Chodosh and Taylor Maggiacomo
Dr. Steier is a public health scientist who specializes in science communication.
Aug. 19, 2025

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

PRE-BUNK FORMULA

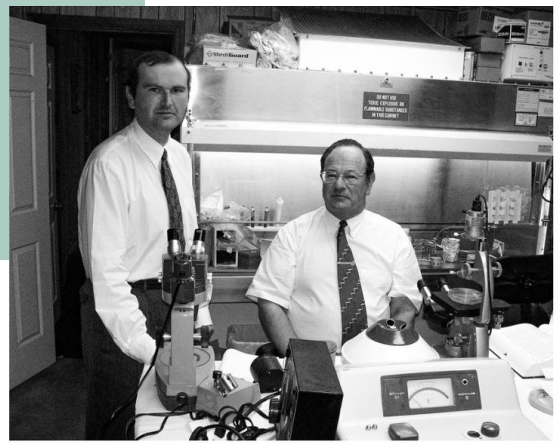
1. Source Credibility Assessment
- Professional/ethical standing in the field
- Financial motivations and conflicts of interest
- Pattern of past claims and methods

2. Evidence Landscape Mapping
- Overall volume and balance of research
- Quality markers that distinguish good from bad studies
- Common manipulation tactics to watch for

3. Alternative Explanation for the Phenomenon (Rising Autism Diagnoses)
- What's actually driving the apparent increase in diagnoses
- Evidence supporting the real explanation
- What legitimate factors do and don't contribute to the rise

"In the scientific community, Mr. Geier is infamous for the deeply flawed studies he conducted with his father, Mark Geier, claiming that vaccines cause autism. Researchers have long called attention to the serious methodological and ethical defects in their work."

JESSICA STEIER



David Geier, left, and his father, Mark Geier, in their home laboratory in 2005. Marty Katz

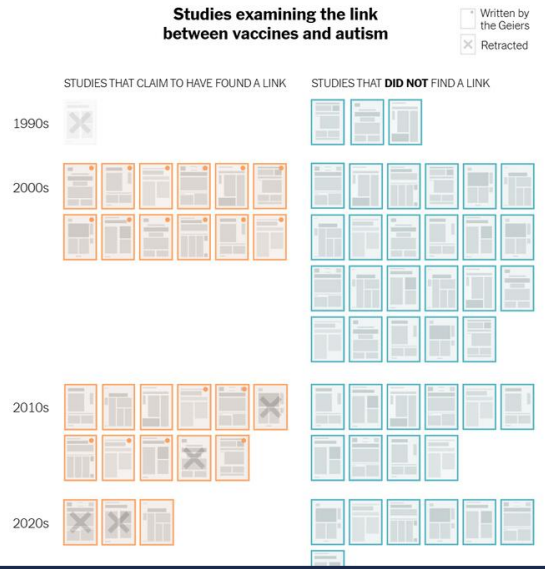
THE GEIER PROBLEM

- David Geier and his father Mark are infamous for deeply flawed studies claiming vaccines cause autism
- Created an illegitimate review board composed of themselves and associates
- Promoted Lupron (chemical castration drug) as autism "treatment" at $5K-$6K/month
- Mark's medical license revoked in all 12 states; David fined for practicing without a license
- This isn't specific to the Geiers; many others we suspect are eyed for this research have questionable backgrounds

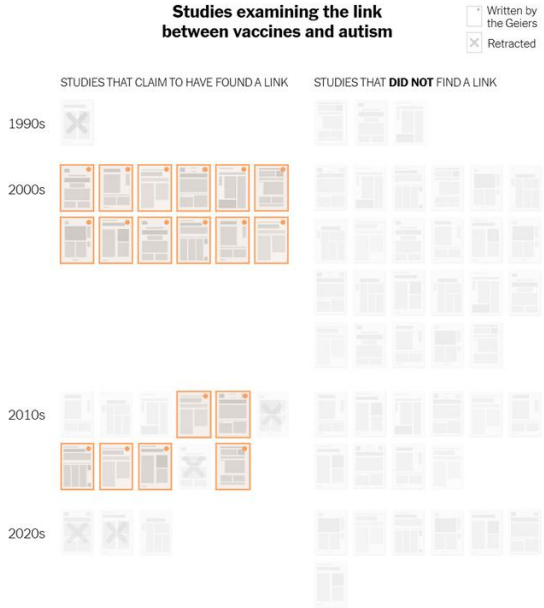
Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

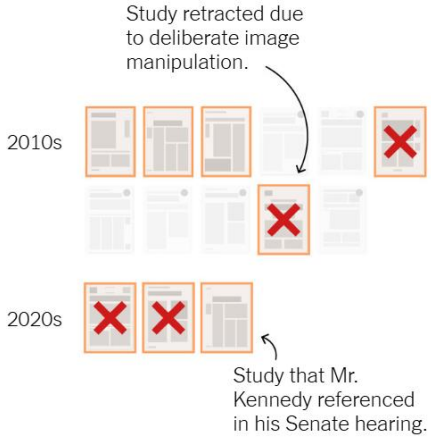
This controversy started when Andrew Wakefield, a British doctor, published a study in 1998 that linked the measles, mumps and rubella (M.M.R.) vaccine to autism. He was later found to have falsified data and received funding from lawyers in lawsuits against vaccine manufacturers. The paper was ✕ retracted, and he was barred from practicing medicine in Britain, but not before vaccination rates began dropping and measles outbreaks began rising again.

There have been some 70 studies since Mr. Wakefield's looking for any link between vaccines and autism. Of these, 26 have linked vaccines to autism in some way, and 43 found no connection between vaccines and autism.



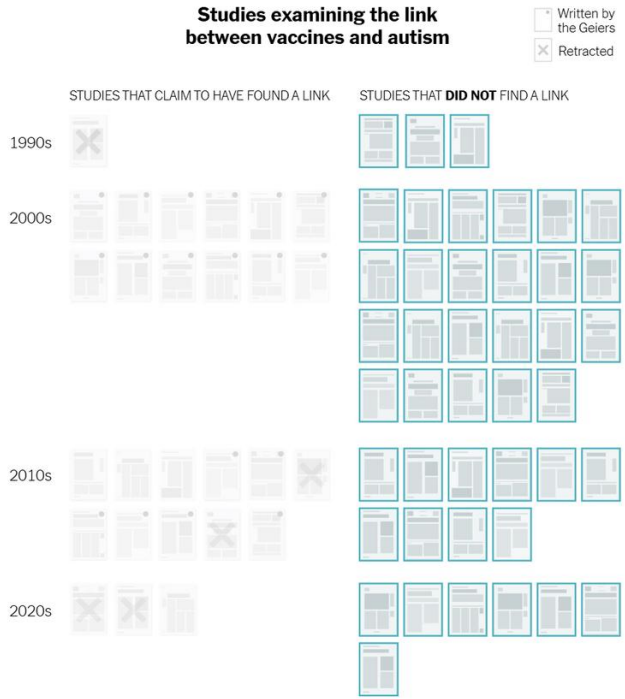
A whopping two-thirds of studies that claimed to have found a link were written by David and Mark Geier. These studies have been heavily criticized for using deceptive research techniques and flawed data.





Among the eight other studies that found a link, four were retracted for data manipulation, flawed methods or undisclosed conflicts of interest. Most of the authors have been involved in anti-vaccination campaigns and have had other papers retracted.

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html



Fortunately, independent scientists have conducted more than 40 high-quality studies since 1998 involving over 5.6 million people across seven countries. All found **no connection between vaccines and autism**. These studies were rigorously designed, were reviewed by independent peers and do not contain telltale signs of data manipulation, as the Geier studies do.

THE SCIENTIFIC REALITY

- ~70 studies have examined vaccines and autism since 1998
- 43 high-quality studies (5.6 million people, 7 countries) found NO connection
- A recent study out of Denmark is very robust; it examined 50 different health outcomes (including autism) and found no association between vaccines and autism, ADHD, asthma, and others.

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

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Analytical methodology

Increased risk for an atypical autism diagnosis following Thimerosal-containing vaccine exposure in the United States: A prospective longitudinal case-control study in the Vaccine Safety Datalink

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ABSTRACT

Background: Thimerosal is an organic-mercury (Hg)-containing compound (49.55% Hg by weight) historically added to many multi-dose vials of vaccine as a preservative and still added to some vaccines today. Concerns about the toxic effects from Thimerosal-containing childhood vaccines and the risk of an atypical autism diagnosis were evaluated in this study.

Methods: A hypothesis-testing, prospective longitudinal, case-control study assessed exposure to Hg from Thimerosal-containing hepatitis B vaccines (TM-HepB) among cases diagnosed with atypical autism (n = 164) and controls (n = 15,216). Automated medical records for subjects born from 1991 to 2000 and continuously enrolled in the Vaccine Safety Datalink (VSD) database were examined.

Results: Cases diagnosed with atypical autism were statistically significantly more likely to have received greater overall and dose-dependent exposures to Hg from TM-HepB vaccines administered within the first month of life, first two months of life, and first six months of life than the controls. Similar phenomena were observed when cases and controls were separated by gender.

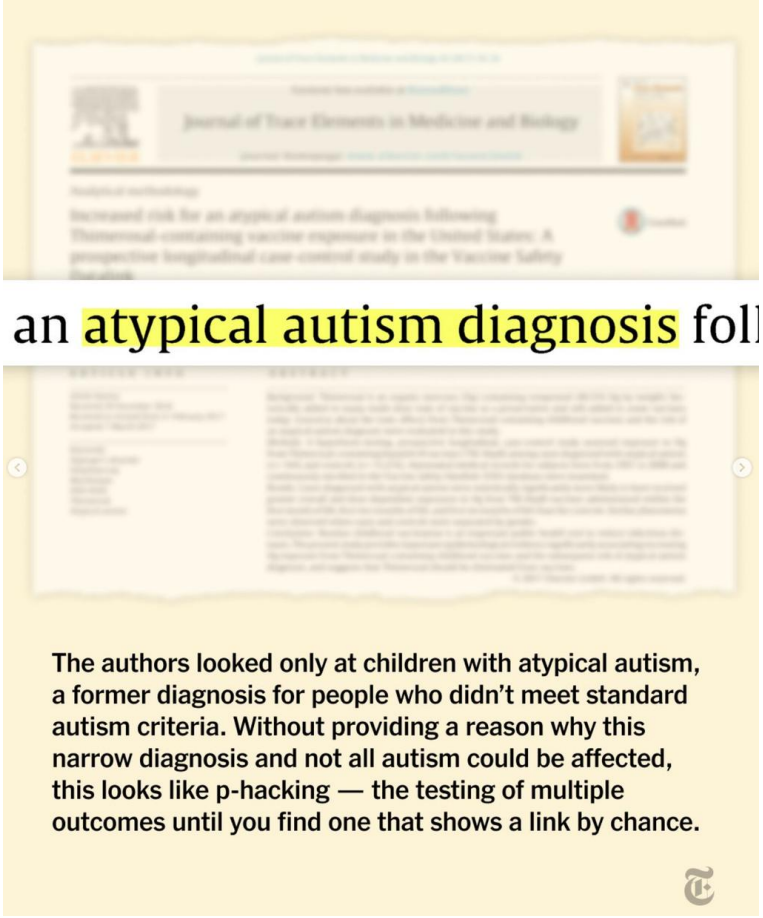
Conclusions: Routine childhood vaccination is an important public health tool to reduce infectious diseases. The present study provides important epidemiological evidence significantly associating increasing Hg exposure from Thimerosal-containing childhood vaccines and the subsequent risk of atypical autism diagnosis, and suggests that Thimerosal should be eliminated from vaccines.

To show how Mr. Geier makes his research look credible, we're highlighting tactics he has employed on multiple occasions, using a 2017 paper on thimerosal as our example.

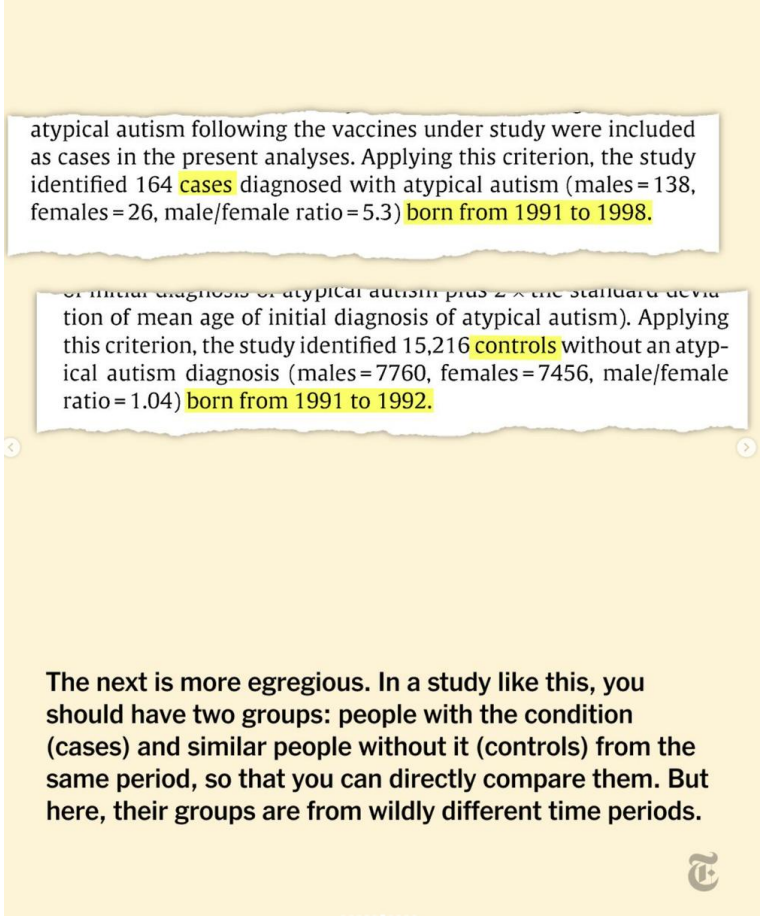
THE PLAYBOOK (RED FLAGS OF POOR STUDY DESIGN)

- P-hacking: Testing multiple outcomes until finding one by chance (e.g., only "atypical autism")
- Mismatched comparison groups: Cases from 1991-1998 vs. controls from only 1991-1992
- Ignoring confounders: Not accounting for healthcare access, socioeconomic status, parental age
- Self-citation loops: Using only their own flawed studies as evidence
- Misrepresenting sources: Citing fish mercury studies to make claims about vaccine thimerosal

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html



The authors looked only at children with atypical autism, a former diagnosis for people who didn't meet standard autism criteria. Without providing a reason why this narrow diagnosis and not all autism could be affected, this looks like p-hacking — the testing of multiple outcomes until you find one that shows a link by chance.

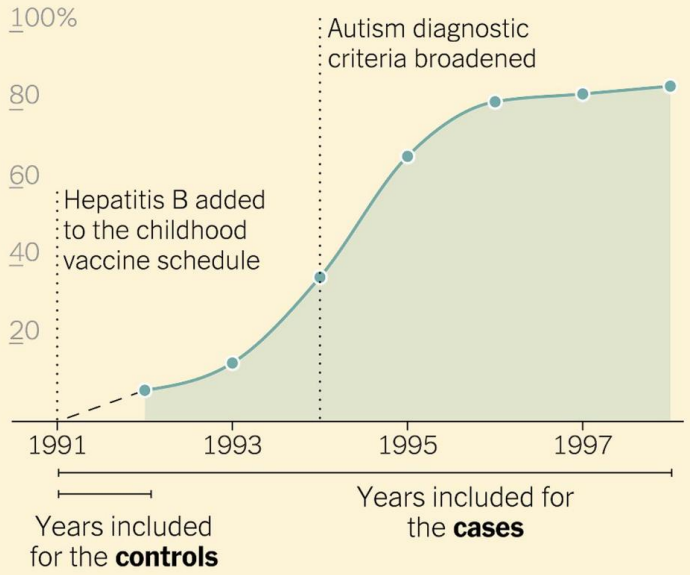

atypical autism following the vaccines under study were included as cases in the present analyses. Applying this criterion, the study identified 164 cases diagnosed with atypical autism (males = 138, females = 26, male/female ratio = 5.3) born from 1991 to 1998.

tion of mean age of initial diagnosis of atypical autism). Applying this criterion, the study identified 15,216 controls without an atypical autism diagnosis (males = 7760, females = 7456, male/female ratio = 1.04) born from 1991 to 1992.

The next is more egregious. In a study like this, you should have two groups: people with the condition (cases) and similar people without it (controls) from the same period, so that you can directly compare them. But here, their groups are from wildly different time periods.

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

HEPATITIS B VACCINATION RATE FOR
19- TO 35-MONTH-OLD CHILDREN



The study is comparing children with high vaccination rates and a broad definition of autism (cases) to children with low vaccination rates and stricter autism criteria (controls). The result is manufactured from the beginning.

Among the potential limitations of the present study, it was possible that unknown biases or confounders could be present in the data examined. This seems unlikely because several previous studies have examined the VSD database for such phenomena by examining control outcomes that did not have a biologically plausible link to postnatal Hg exposure from Thimerosal-containing vaccines and none found a similar pattern for control outcomes overall or on a dose-dependent basis similar to those observed for AD [23,24], autism spectrum disorder [23], or PDD diagnoses [25,26].

They also ignored confounders — outside factors, like health care access or family history of autism, that can create the appearance of a connection between two things. They dismiss the idea, claiming that other studies — all of them their own — found that they had no effect.

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

The researchers dismiss the need to include confounders, claiming that other studies using the same data set found that they had no effect.

But many known confounders for vaccines and autism should have been taken into account, including health care access, socioeconomic status, parental age, family history of autism, birth weight and environmental exposures. Without controlling for any of these factors, the study can't actually tell us anything.

Even worse, all of the studies they cite as justification for ignoring confounders are their own. This is a pattern for the Geiers.

While some personal citing is normal, relying solely on your own work to prove your argument suggests that there's not much evidence in your corner.

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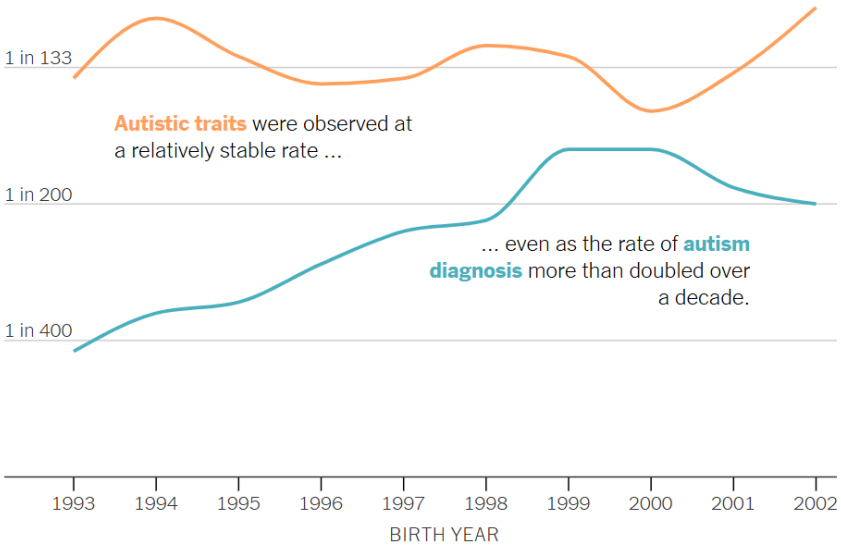
A Swedish study illuminated the difference between autism as a diagnosis and autism as a condition



Source: Lundstrom et al., The BMJ (2015)

WHY AUTISM DIAGNOSES HAVE INCREASED

- Better awareness and screening
- Broadened diagnostic criteria (especially 1994 changes)
- Swedish twin study: autism traits stable while diagnoses increased
- Some genuine factors: older parental age (modest effect)

Conclusions The prevalence of the autism symptom phenotype has remained stable in children in Sweden while the official prevalence for registered, clinically diagnosed, autism spectrum disorder has increased substantially. This suggests that administrative changes, affecting the registered prevalence, rather than secular factors affecting the pathogenesis, are important for the increase in reported prevalence of autism spectrum disorder.

Lundström, Sebastian, et al. "Autism Phenotype versus Registered Diagnosis in Swedish Children: Prevalence Trends over 10 Years in General

ZOOMING OUT: HOW TO SPOT FALSEHOODS

- Reliance on a single study (or subset of studies) that goes against the overwhelming scientific consensus and body of evidence
- The use of pre-clinical or in vitro research to extrapolate to humans
- When talking about risk, not specifying dose (“the dose makes the poison”)
- Improper study design - always look at the groups being compared to make sure it’s apples to apples
- Proper controls for confounders
- Not all studies are created equal, and every study has limitations
  - Experimental versus observational studies
  - Ethical considerations (re: placebo)

Steier J. New York Times Opinion. August 19, 2025. nytimes.com/2025/08/19/opinion/vaccines-autism-geier-kennedy.html

The Framework in Practice

The instinct to correct misinformation immediately often backfires.

1	**LISTEN FIRST**	Understand what the patient actually believes and why. Don't assume the claim — ask open questions.
2	**VALIDATE THE CONCERN**	"I understand why you'd wonder about that." Dismissing concerns shuts down the conversation.
3	**FIND SHARED VALUES**	Most parents want the same thing: a healthy child. Start there, not with data.
4	**THEN SHARE EVIDENCE**	Offer information in plain language. Less is more — one or two clear facts outperform a data dump.
5	**END WITH AGENCY**	"I'm here to help you make the best decision for your family." Preserves the relationship long-term.

CLINICAL SCENARIO #2

A father of a 2-month-old says, very calmly:

"I've done a lot of research and I just don't think all these vaccines are necessary for a healthy kid. Can we just skip most of them?"

Which response is most likely to preserve the relationship AND move toward vaccination?

A Explain the full vaccine schedule rationale and share data on disease burden.

B Ask what he's most concerned about, acknowledge he clearly cares deeply about his child's health, and find out what 'a lot of research' looked like for him.

C Tell him you understand but that skipping vaccines puts his child at serious risk.

D Offer to spread out the schedule as a compromise so he leaves with at least some vaccines today.

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Gaps in Science Literacy Share Themes

Lack of fundamental science knowledge
(e.g., misconception of sugar composition of common sweeteners)

Vulnerability to logical fallacies
(e.g., appeal to nature)

Overconfidence in scientific knowledge
(e.g., Dunning-Kruger effect)

Lack of understanding of research design and implications for validity and reliability of findings
(e.g., the use of control groups as a proxy for the counterfactual)

SUGAR COMPOSITION OF COMMON SWEETENERS:

Spoiler: they all have nearly identical sugar compositions

Honey
49% fructose
43% glucose

Table Sugar (aka sucrose)
50% fructose
50% glucose

Cane Sugar (aka sucrose)
50% fructose
50% glucose

High Fructose Corn Syrup
42-55% fructose
42-53% glucose
**plain corn syrup is 100% glucose*

A common misconception is that less processed sweeteners such as honey and cane sugar are 'superior' to table sugar or HFCS, when in reality, they are nearly identical in sugar composition.

While everyone should try to limit **excess** consumption of everything (including sugars), sugars themselves - in whatever source you choose - are not the cause of health issues.

THE UNBIASED SCIENCE PODCAST

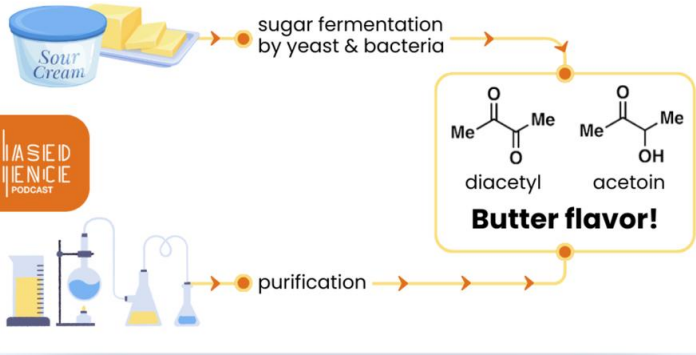
@unbiasedscipod

FLAVORINGS:

NATURAL Vs ARTIFICIAL

The appeal to nature fallacy and the health halo

Natural and artificial flavor chemicals are the **exact same molecules**, chemically speaking. They are named such to reflect the raw materials that were sourced to make them.



THE UNBIASED SCIENCE PODCAST

But if someone reads 'natural' flavors, they might perceive that it is 'healthier' or safer than artificial flavorings, even though the chemical composition may be exactly the same!

@unbiasedscipod

FDA, 2018; FDA, accessed December 2023; Flavor & Extract Manufacturers Assoc., accessed December 2023; Nakrani et al., StatPearls, 2023; National Honey Board, accessed February 2023; Roper & Chaudhari, Nat Rev Neurosci., 2018; ScienceDirect Topics, "Sugarcane," accessed February 2023.

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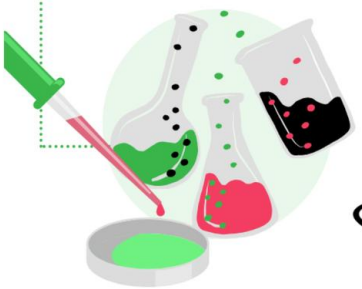
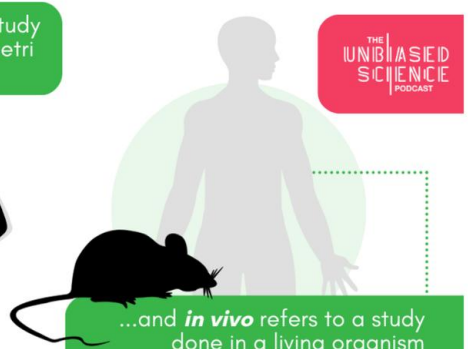
IN VITRO & IN VIVO STUDIES

Are important steps in research and development, but cannot replace clinical studies. Findings from *in vitro* and *in vivo* studies cannot be used to make conclusions about what happens in a whole organism (e.g. a human).

If you've read a scientific study, you may have seen the phrases ***in vitro*** and ***in vivo***. These are from the Latin 'in glass' and 'within the living'.

Essentially, ***in vitro*** refers a study done using cells grown in a petri dish or test tube...





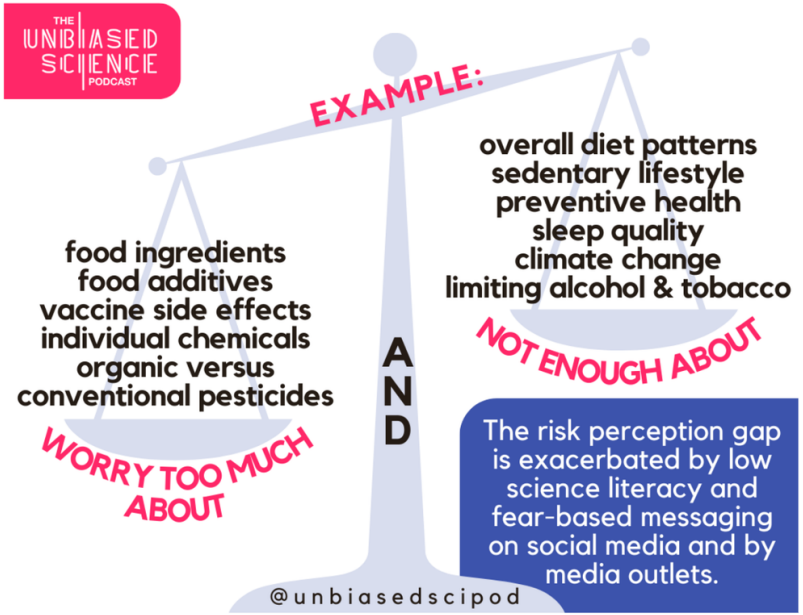
...and ***in vivo*** refers to a study done in a living organism (typically non-human).

THE UNBIASED SCIENCE PODCAST

Eske, Medical News Today, updated September 2023; Levy, Int J Stroke, 2012; McMahon et al., Am J Physiol., 1994; Otabe et al., Regulatory Toxicology and Pharmacology, 2019; Tarpey et al., Exerc Sport Sci Rev., 2022; Tarpey et al., J Physiol., 2018.

THE RISK PERCEPTION GAP:

The public is often more afraid of certain risks than evidence warrants but less worried about things that pose more risk.



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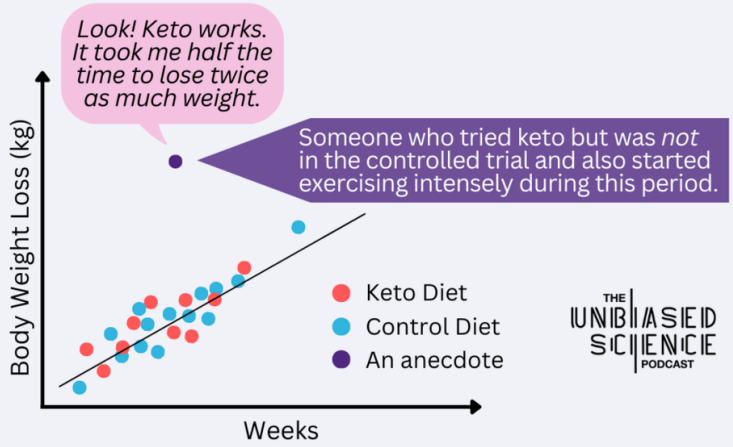
ANECDOTES ARE DATA POINTS, THEY ARE NOT EVIDENCE IN AND OF THEMSELVES.

This doesn't mean that your experience is not valid, it's just that there are likely other factors impacting your experience.



Anecdotes are prone to bias and they cannot automatically be generalized to others. They may provide valuable insights when appropriately combined with other data points in a way that controls for variables that impact them *(confounders)*.

Brown, Environ Health Perspect., 2014; Hipolito & Diele-Viegas, Nature, 2022; Jardine et al., J Toxicol Environ Health B Crit Rev., 2003; Michal et al., Cogn. Research, 2021; NCBI Bookshelf, "Smart Health Choices: The weakness of one," accessed November 2023; Renn, Food Addit Contam., 2005; Ropeik, Food and Chemical Toxicology, 2012; Ropeik, Hum Exp Toxicol., 2009; ScienceDirect Topics, "Risk Perception," accessed November 2023; Science.gov, "Risk Perception Gap," accessed November 2023; Shermer, Scientific American, 2008; Tversky & Kahneman, Science, 1974.

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ARE FOODS IN OTHER COUNTRIES

ACTUALLY SAFER THAN IN THE U.S.?

NO.

Food regulation in each country depends on many factors, including:

- FOOD PRODUCTION SYSTEMS
- RESOURCES
- FOODBORNE ILLNESS OUTBREAK HISTORY

THE UNBIASED SCIENCE PODCAST

HOW A FOOD IS REGULATED IN ANOTHER COUNTRY IS NOT AN INDICATION OF SAFETY.

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In the field of food safety assessment, both hazard-based and risk-based approaches are used to ensure food safety.

HAZARD vs. RISK

POTENTIAL TO CAUSE HARM

LIKELIHOOD OF CAUSING HARM

HAZARD-BASED APPROACHES:

Simply the **presence of a potentially harmful agent at a detectable level in food** is used as a basis for legislation and/or risk management action.

THE UNBIASED SCIENCE PODCAST

RISK-BASED APPROACHES:

Try to establish **health-based guidance values for human exposure** to chemicals, such as **acceptable or tolerable daily intakes**, using toxicological data.

Barlow et al., Food and Chemical Toxicology, 2006; Crevel et al., Risk Management for Food Allergy, 2014; FAO, "Chemical Risks and JECFA," accessed July 2023; FAO, "Microbiological Risk Assessment (CAC/GL-30)," accessed July 2023; FDA, updated 2018; FDA, updated 2025; International Food Additives Council, accessed July 2023; ScienceDirect Topics, "Food Science," accessed July 2023; U.S. Consumer Product Safety Commission, 1997.

CHOOSE YOUR WORDS CAREFULLY.

Example: natural immunity versus “survivor immunity”

What This Sounds Like

PATIENT CONCERN: "I've heard vaccines cause autism."

Avoid:

"That study was retracted. Vaccines don't cause autism."

Try instead:

"That fear is really common — and I understand why. Can I share what the research actually shows? Over 20 studies involving millions of children have looked at this specifically and found no link. What would help you feel more confident?"

PATIENT CONCERN: "My child doesn't need Hep B — we're not at risk."

Avoid:

"All babies need it. That's the recommendation."

Try instead:

“I understand why you think this— Hep B is most known as an adult disease. The reason we give it at birth is that about 1 in 8 pregnant women who have the virus don't know it, and if a baby is exposed at birth, there's a 90% chance of lifelong infection. The birth dose is a safety net for when screening misses something."

Talking to Patients About the Policy Changes

> *"You may have seen news about changes to the vaccine schedule. I want you to know: the scientific consensus hasn't changed. What you're seeing is a policy decision — not a safety signal. My recommendation, and that of the AAP, remains the same."*

Acknowledge what they've seen

Patients are reading the news. Pretending the policy change didn't happen undermines trust.

Distinguish policy from science

Make clear that government decisions and scientific evidence are separate things.

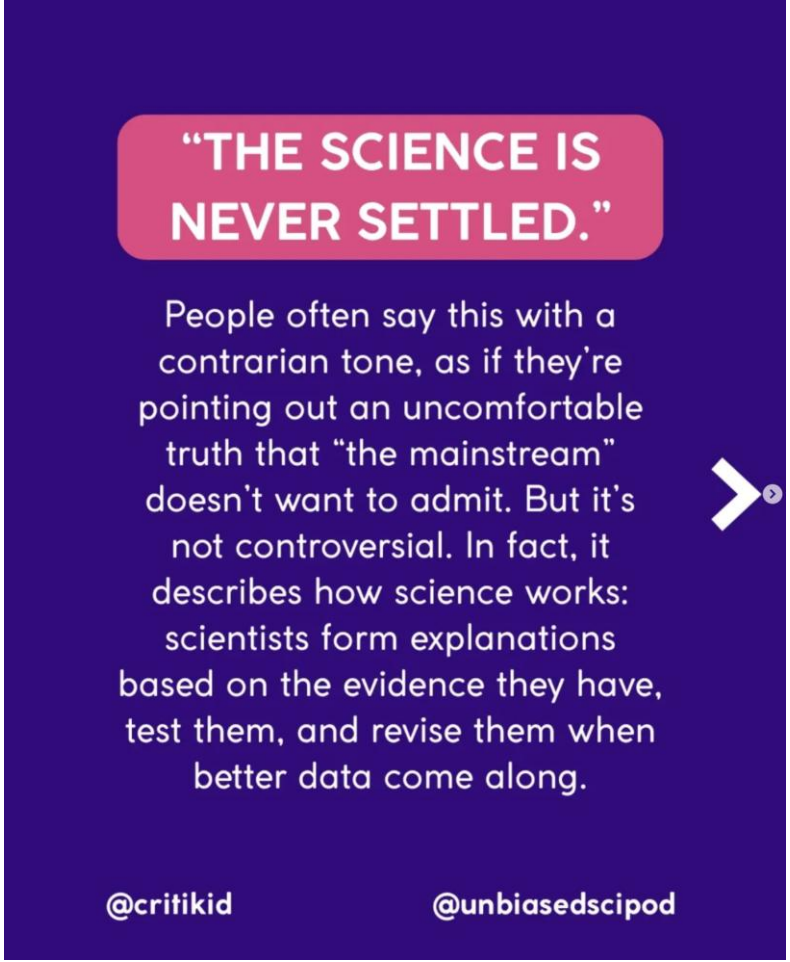
Lead with your recommendation

Don't make patients feel they need to convince you. State your recommendation clearly, then open the floor.

Know your EHR prompts

SCDM vaccines may no longer auto-populate. Build your own clinical workflow to ensure consistent counseling.

AAP, 2026; ACIP, 2025; Leask et al., 2012; Opel et al., 2013


"THE SCIENCE IS NEVER SETTLED."
People often say this with a contrarian tone, as if they're pointing out an uncomfortable truth that "the mainstream" doesn't want to admit. But it's not controversial. In fact, it describes how science works: scientists form explanations based on the evidence they have, test them, and revise them when better data come along.
@critikid
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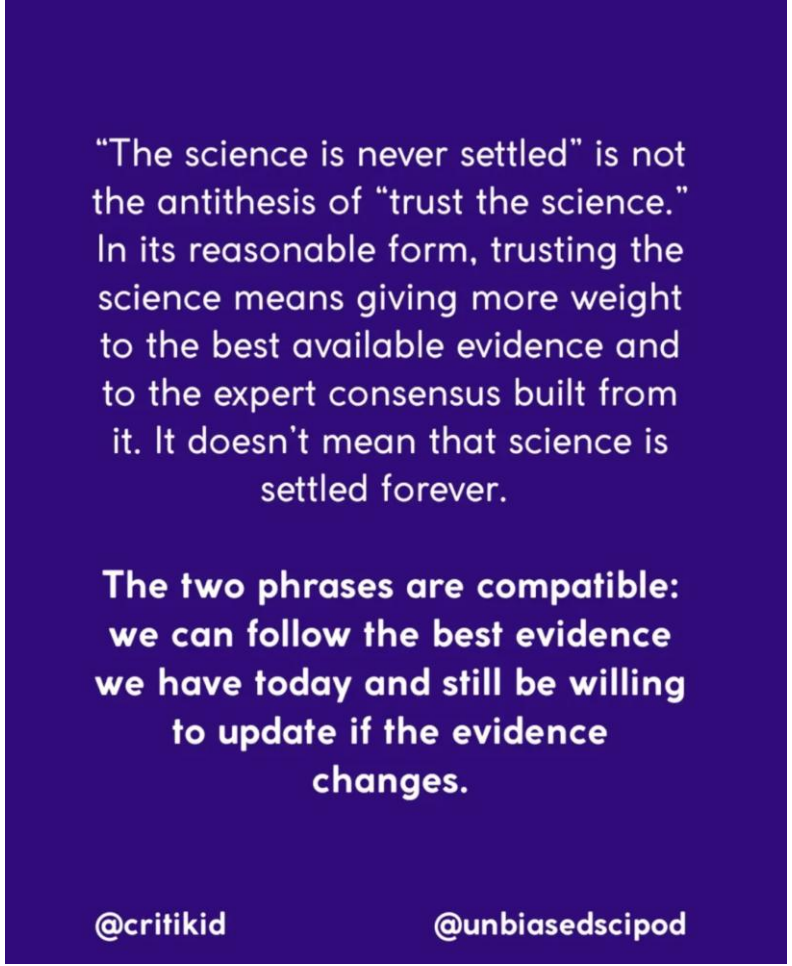
"The science is never settled" is not the antithesis of "trust the science." In its reasonable form, trusting the science means giving more weight to the best available evidence and to the expert consensus built from it. It doesn't mean that science is settled forever.
The two phrases are compatible: we can follow the best evidence we have today and still be willing to update if the evidence changes.
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RESOURCES

Navigating a Fragmented Information Landscape

With federal guidance in flux, providers need trusted independent sources.

AAP (American Academy of Pediatrics)

healthychildren.org

Maintains the original recommended schedule; updates for providers

CHOP Vaccine Education Center

chop.edu/centers-programs/vaccine-education-center

Evidence-based vaccine information; parent and provider tools

CDC Pink Book

cdc.gov/vaccines/pubs/pinkbook

Epidemiology and prevention of vaccine-preventable diseases

CIDRAP (Univ. of Minnesota)

cidrap.umn.edu

Vaccine Integrity Project; independent policy tracking

The Evidence Collective

evidencecollective.org

Rapid-response science communication; 25+ independent communicators

Unbiased Science

unbiasedscience.org

Plain-language vaccine and health policy explainers

SUMMARY

What We Hope You Take Away Today

✓ **The science has not changed.**	The evidence base for vaccine safety and efficacy is strong. Policy changes are not safety signals.
✓ **Standard review processes were bypassed.**	No public comment, no ACIP deliberation, no formal evidence evaluation preceded these changes.
✓ **Major medical organizations still recommend the original schedule.**	AAP, ACOG, and AAFP all reaffirm the previous schedule.
✓ **You have the tools to have these conversations.**	Connection before correction. Listen, validate, find common ground, then share evidence.
✓ **Storytelling, humor, and visualization are not soft skills.**	They are evidence-based strategies that change minds when facts alone don't.

HHS, 2026; AAP/ACOG/AAFP, 2026; CIDRAP, 2026; AHIP, 2026; Kreuter et al., 2007; Miller et al., 2021

REMEMBER:

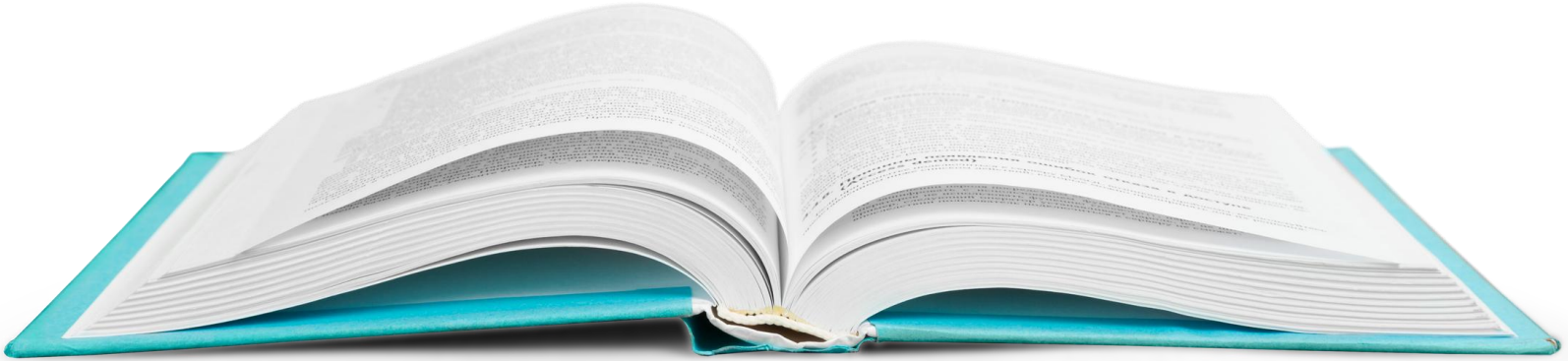
The mother who chooses not to vaccinate her child believes she's making the right decision. Everyone is doing their best with the information they have. Effective communication begins by meeting people where they are, not where we think they should be.

OUR IMPACT EXTENDS BEYOND DIRECT EDUCATION.

Sometimes, our greatest contribution is equipping others with the tools to engage their own communities. This is how we break through echo chambers and amplify science's reach—by empowering advocates within networks we could never access alone.

SCIENCE WITHOUT HUMANITY IS JUST A TEXTBOOK.

This is the only way we will reach the people most likely to harbor some level of skepticism or be most vulnerable to mis- and disinformation.



The evidence hasn't changed.

Your patients need to know that —

and to hear you say it with confidence.

Dr. Jessica Steier, DrPH, PMP

Founder & CEO, Unbiased Science

Executive Director, Center for Unbiased Science & Health

Co-Founder, The Evidence Collective

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Thank you — and thank you to NDSU CIRE for this opportunity to serve your audience.