DREXEL UNIVERSITY
A.J. Drexel
Autism Institute

Autism Science and Facts Panel from the AJ Drexel Autism Institute

Thank you to all who attended our webinar on Monday September 29, 2025, titled "Virtual Panel on Autism: Science and Facts in a Time of Confusion." For anyone who would like to watch the recording, you can find it here: Webinar Video. This document serves to provide an executive summary of the webinar's key points and address questions that we were not able to address during the webinar, as well as more detailed responses to questions we received. We also may add to it based on future activities.

Executive summary

There has been a lot of media attention in recent weeks on some possible causes of autism. The science and the facts point to a few important findings. **First, use of Tylenol by pregnant women does not cause autism.** Although some studies show a weak association (Note. ***Associations, or correlations, do not prove causation***) between Tylenol use and autism, studies that carefully control for other important factors, such as genetics, show no association. Tylenol is the safest pain reliever during pregnancy, and use of Tylenol to control fever and illness is important – we urge people to consult with their healthcare professionals to make medical decisions.

Second, vaccines and the components of vaccines do not cause autism. Recommendations to space out vaccines rather than getting combination vaccines leave children vulnerable to the diseases that vaccines prevent.

Third, leucovorin (folinic acid) is not recognized as an effective treatment for autism. Several very small studies suggest it may help some people, but much more research needs to be done.

Finally, our recorded webinar and the questions and answers below offer a lot of resources for people who want to learn more. Please continue reading to better understand how scientists measure prevalence (how many people have a condition), how healthcare professionals can communicate with patients and their families about autism, how people can advocate for access to high quality autism services, and more.

Version 1.0, October 17, 2025

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Questions related to Tylenol (Acetaminophen)

Q: What does current research say about the connection between Tylenol, glutathione, and autism—and why do such claims continue to circulate?

Q: "Can you talk about glutathione? There's misinformation circling social media about what Tylenol does to our glutathione levels, and its relationship to autism."

A: Several studies over the past few years have identified an association between acetaminophen use during pregnancy and certain developmental disorders, including autism, ADHD, and intellectual disability. However, it is essential to keep in mind that **an *association*, or correlation, does not prove *causation*.** A correlation is when two things occur at similar levels. For example, ice cream sales are associated with shark attacks. Both ice cream sales and shark attacks are more common in the summer and less common in the winter. If we ban ice cream sales in the summer, it will not affect shark attacks. In order to show that one thing causes another, we need carefully designed research to specifically test that question with minimum error.

In addition, these studies did not carefully control for other factors that might explain the association, called "confounds" or "confounding variables." Possible confounds include genetics, the illness or condition that led a person to take Tylenol, and medical history. Two recent very large studies did account for some of these confounds. In a very large population-based Swedish study of almost 2.5 million children, **acetaminophen use during pregnancy was not associated with children's risk of autism, ADHD, or intellectual disability when unaffected siblings were used as control subjects**, suggesting that associations observed in other studies may have been attributable to genetic factors, not acetaminophen. A Japanese study of 217,602 children also examined the association between maternal acetaminophen use during pregnancy and diagnoses of neurodevelopmental disorders in offspring after accounting for confounds – this study also found **no evidence that acetaminophen use during pregnancy was associated with autism, ADHD, or ID.** These two studies are strong evidence that **acetaminophen use during pregnancy does not increase the risk of autism or other developmental disorders.**

On the other hand, untreated maternal pain and fever can have a negative impact on the pregnant woman and her fetus, so avoiding acetaminophen (which has no or low risk) may open the door to risk from pain or fever and do more harm than good.

The American College of Obstetricians and Gynecologists **views acetaminophen as safe for use during pregnancy.**

Glutathione is a natural antioxidant that the body uses to neutralize certain harmful substances. Chronic acetaminophen overuse, or an acute overdose, can deplete the liver's glutathione stores. However, **normal acetaminophen use is safe and does not result in the depletion of the body's glutathione stores to anywhere near the level that would cause any clinical problem**.

There is not convincing evidence that glutathione levels (during pregnancy or in children) have any connection to the cause of autism.

Also, glutathione supplements haven't shown reliable benefits for autism in well-done studies. If you're pregnant or caring for a child and have questions about fever, pain, or supplements, the safest move is to **talk with your clinician** about options and dosing that fit *your* situation.

Questions related to vaccines

Q: How can families evaluate claims about vaccine safety, spacing schedules, and ingredients like aluminum in a science-based way?

A: To evaluate claims here are some questions you can ask yourself:

Who says this? Trust organizations like the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), and the World Health Organization (WHO). Be very careful with blogs or influencers who do not have scientific or medical training – often their conclusions are not based on knowledge developed from sound research.

Is it real research? Look for large studies published in medical journals. Even among studies published in journals, know that not all research is equal in quality. Scientific organizations like those listed above (CDC, AAP, WHO) often will comment on the quality of research.

What's the dose? Aluminum in vaccines is one concern that has been raised, but babies get **less aluminum from vaccines** than from breast milk or formula. There is no evidence that any aluminum or other elements that compose vaccines are dangerous.

What about spacing and timing? The **recommended schedule** protects children *when they're most at risk*. Delays or spacing out vaccines means children are unprotected for longer periods at ages when they are most likely to get sick. Spacing out vaccines also means that families need to take their children to more appointments, and this means that some children will not get all of the recommended vaccines because they miss these extra appointments. For more information on vaccines, click here.

Research, Policy, and Broader Science Questions

Q: How do large-scale studies aim to clarify questions about autism causes and prevalence trends?

Big studies help answer big questions.
Research projects like ECHO (Environmental Influences on Child Health Outcomes) supported by NIH or the national register-based studies in the Nordic countries look at large groups of people over time to understand how **genes, environment, and everyday experiences** may work together in autism. Studying many families helps scientists see patterns that smaller studies can't.

They focus on facts, not fears.
By collecting reliable data from thousands of participants, researchers can test common questions—like whether certain exposures, medications, or life factors truly affect the likelihood of a child developing autism. The goal is to separate **what's real** from **what's rumor** and give families trustworthy answers.

They help track prevalence over time.
Large studies examine prevalence, or the number of cases, over time. They also look at **why autism seems to be diagnosed more often now**—whether that's because of broader awareness, better screening, changes to the diagnostic criteria, or true changes in occurrence. Understanding these trends helps schools, healthcare systems, and communities plan for services and supports.

Families play a key role.
These studies depend on "common" experiences and data created by and with disabled persons and those who care for them. By participating, parents and autistic individuals help shape the science that can improve screening, healthcare, and inclusion for future generations.

Take-home message:
Big, long-term studies like HHH are designed to bring clarity—not confusion. They help researchers move beyond guesses and focus on solid, evidence-based answers about autism's causes, patterns, and how best to support autistic people across all ages.

Q: Why do autism prevalence rates differ across states and cultures, and what can these differences teach us about access to services, education, and diagnosis?

A: Different places (and different studies) measure prevalence differently.
Autism isn't more or less "common" just because of geography. Often, the numbers

depend on **how and when children are screened or diagnosed, or how prevalence is evaluated.** Some states or countries have stronger early screening programs, while others may have fewer specialists or different record-keeping systems. The Centers for Disease Prevention and Control (CDC) prevalence studies review medical and educational records for eight-year-old children to measure prevalence in the U.S. Other studies use Medicaid claims data, other healthcare data, and survey data. When you look across these different studies, you can see that the age of individuals, the strategies to identify autism, and likely also local/regional differences in access to services contribute to the differences in autism prevalence.

Awareness makes a big difference.

In communities where teachers, doctors, and parents know more about the early signs of autism, then **more children get identified**—and earlier. In places where awareness is lower or stigma is higher, **fewer people are diagnosed**, even if the same number of children are autistic. There are also diagnostic deserts, defined as areas that have shortages of qualified professionals who can diagnose autism and the co-occurring conditions that evolve from years of misdiagnosis or under-diagnosis of autistic adults. This is particularly a challenge for those with multiple marginalized identities (people assigned female at birth, persons of differing ethnicities and races and economically disadvantaged individuals and families.

Differences in access matter.

Differences in **healthcare, education, language access, and insurance** can affect who gets evaluated and supported. Families with fewer resources or from minority backgrounds are sometimes diagnosed later, which can make it seem like autism rates are lower in those groups when they're not.

We also know that there is a true undercount of autism older teens and adults but we do know that more and more underserved adults are finding their way in identifying, knowing, and integrating their autistic diagnosis and identity. And for many, the diagnosis of a child in the family (child, or grandchild) can lead to under-identified and underserved adults obtaining their first ever diagnosis.

Culture shapes understanding.

Every culture has its own way of describing social and developmental differences. Some families may not have a direct word for "autism," or may see it through a spiritual or behavioral lens. Learning from these perspectives helps professionals communicate with more respect and sensitivity.

What these differences teach us.

When we look at the big picture, we learn that **autism exists everywhere**—but **opportunity for diagnosis doesn't.** The real goal isn't to even out the numbers, but to make sure every child and adult—no matter where they live or what language they speak—can get understanding, diagnosis, and support when they need it.

Questions related to care of autistic individuals

Q: How can healthcare providers effectively communicate about autism—reducing stigma, addressing fears about diagnosis or vaccines, and helping families make informed risk-benefit decisions?

Lead with respect and understanding.
Families often come to these conversations with big feelings—hope, worry, confusion, or fear. Healthcare professionals can make a huge difference by starting with empathy: "I know this can feel overwhelming. You're not alone, and we'll figure this out together."

Use clear, honest, and kind language.
Avoid medical jargon when possible. Instead of "screening positive on an Autism measure," try "the screening suggests your child may have some differences in communication or behavior that we can explore further." Families appreciate words that feel human, not clinical.

Separate facts from fear.
When families worry that vaccines or other medical treatments cause autism, healthcare professionals can calmly explain that **decades of large, careful studies show no link** between vaccines and autism. They can also remind families that vaccines protect children from serious illnesses, and that choosing to vaccinate is an act of care and protection.

Emphasize the purpose of diagnosis.
A diagnosis isn't about assigning a label—it's a **tool for understanding and identifying what supports and services might help a person address challenges, and even thrive.** It helps families access therapies, school services, and community resources. Framing it as a pathway to empowerment can reduce fear and stigma. For many adults for whom diagnosis was not available in childhood, a diagnosis is a gateway to self-awareness, understanding and community, reducing isolation and enhancing outcomes.

Focus on strengths and next steps.
Families benefit from hearing that autism is a **different way of experiencing and interacting with the world**, not a failure or tragedy. Healthcare professionals can highlight each child's unique abilities and connect families to early intervention, support groups, and advocacy organizations.

Create a safe space for ongoing dialogue.
Invite questions at every visit: “What are you hearing online?” or “Is there anything you’re unsure about?” Keeping the door open builds trust and helps families make informed, science-based decisions over time.

Q: What tools, training, or networks can help clinicians interpret autism research responsibly and connect families (including adults) with knowledgeable providers?

Reliable, science-based resources.
Clinicians can stay up to date through trusted organizations that summarize new autism research in clear, balanced ways. These include:

- **CDC’s “Learn the Signs. Act Early.”** for developmental milestones and screening tools.
- **Autism Speaks Autism Care Network** for best-practice clinical guidelines.
- **Autism Intervention Research Network on Physical Health (AIR-P)** for summaries of emerging studies.
- **Autism Services, Education, Resources and Training (ASERT)** - resources for Pennsylvania residents.
- **Philadelphia Autism Project (PAP)** – Philadelphia local resources and events

These sources help professionals separate solid evidence from hype or social media rumors.

Continuing education and professional training.
Workshops, webinars, and certifications—such as **ADOS-2 and ADI-R training**, and **ECHO Autism** programs—help clinicians interpret studies responsibly and translate findings into real-world care. Training programs such as **ISLEA** and **SPIRIT** integrate current scientific knowledge with lived experience to help clinicians, paraprofessionals, medical professionals, teachers, and families to more effectively and humanely support and care for autistic people.

Building connections and referral networks.
Families and adults often need coordinated care—developmental pediatricians, speech and occupational therapists, psychologists, systems navigation help, and social workers. Providers can join or create **local autism referral networks** or partner with **state developmental disability programs**, **university clinics**, and **family support groups**.

For adults, connecting with **neurodiversity-affirming providers** through directories like: **Psychology Today ECHO Autism for Primary Care**, or **ASAN (Autistic Self Advocacy Network)** can make a big difference.

Listening to autistic voices.
Clinicians who read, attend panels, or follow content created by autistic researchers and advocates gain a deeper perspective on lived experience. This helps them see the long-term implications and trajectories for their consumers. Leaders in our research community are beginning to understand that bringing an autistic person with them to execute a talk, or training enhances the nuances of the information, while also empowering autistic leadership. Always talk with families and individuals in ways that are understandable, individualized, and enriching.

Q: How can communities and families advocate effectively for funding and access to quality autism services?

Start locally —your voice matters.
Families can make a big difference by sharing their stories with local leaders, school boards, and legislators. Real-life experiences help decision-makers understand why services like early intervention, therapy, job training, and respite care matter so much.

Team up with others.
Joining forces multiplies impact. Parent groups, advocacy coalitions, and organizations such as **The Arc**, **Autism Society**, or **Family Voices** can help families learn how to speak up together for funding and fair policies. These groups often offer training on how to meet with policymakers or testify at hearings.

Know your rights.
Families can use laws like the **Individuals with Disabilities Education Act (IDEA)** and the **Americans with Disabilities Act (ADA)** to ensure access to education, community supports, and health care. Knowing what's guaranteed helps you advocate with confidence.

Push for fairness, not just access.
True fairness means every family—no matter their income, language, or location—can reach quality services. Communities can work to expand programs in underserved areas, encourage bilingual providers, and support transportation or telehealth options that remove barriers.

Partner with professionals.
Clinicians, educators, and researchers can be strong allies. Families can invite them to join local advisory boards or awareness events so that policies are shaped by both science **and** lived experience.

Leucovorin, Folic Acid, MTHFR, and Genetic Testing Questions

Q: "How is leucovorin different from a vitamin that contains 3.5 mg folic acid?"
Q: "Besides constipation, what are other risks in prescribing leucovorin?"
Q: "Leucovorin dosage, duration before you see effects, what happens once you stop, is it recommended for autistic adults?"

A. Leucovorin is another name for folinic acid, which is a biologically active form of folic acid. Adequate folic acid (folate) intake during pregnancy is important in reducing the risk of certain neurologic and neurodevelopmental disorders. Recent attention has been focused on the possibility of decreased cerebral folate levels in children with Autism Spectrum Disorder (autism), based on several studies of varying quality. Some very small studies have suggested that some improvements in certain developmental skills might be seen in children treated with leucovorin. However, the size and quality of these studies is such that it remains very uncertain whether leucovorin is truly beneficial. The doses of folinic acid that are currently being promoted in Autism are much higher compared to the folic acid currently found in usual multivitamins. The main side effect is that gastrointestinal issues are common in individuals taking folinic acid, especially when it is given in high doses. Other potential safety risks of high dose folinic acid are not yet known - additional well-designed studies would be needed. **At present, leucovorin therapy is not recognized as an effective treatment of autism by expert specialty groups such as the Society for Developmental and Behavioral Pediatrics. Please see additional information here:**

SDBP Statements regarding leucovorin, Tylenol and autism - Society for Developmental and Behavioral Pediatrics

Q: "I researched Dr. Richard Frye and leucovorin back in March when an article went viral. We tried leucovorin then but stopped when we titrated close to max dose due to GI issues. He recommends a FRAT test to determine if the medication will work. Insurance doesn't cover this test (runs about $200). Can you explain the FRAT test and what that shows?"

A: Antibodies to a protein called the folate receptor have been a subject of study in a range of neurological conditions. Some studies have indicated that folate receptor antibodies are common in children with autism. However, one study showed that the presence of these antibodies was also equally common in the unaffected siblings of children with autism. A majority of their parents also had these antibodies. Folate receptor antibodies have also been found in individuals with other conditions, such as depression and schizophrenia. To further confuse the issue, at least one study showed that folate receptor antibodies were seen less frequently in a group of children with autism. The FRAT® test is designed to measure the level of these antibodies. This test must be ordered from a specific company – it is not something that is done by your hospital lab or other reference labs. **At this time, there is considerable uncertainty about the significance, if any, of these antibodies in autism, and testing for these antibodies is currently not recommended in practice guidelines published by the American Academy of Pediatrics.**

Q: "Should we be telling parents to get their child tested for MTHFR mutation?"
Q: "Do you see a link with MTHFR and autism?"
Q: "Can you speak to the MTHFR and COMT genes?"

A: The MTHFR gene contains the instructions to make a protein called methylenetetrahydrofolate reductase, which is an enzyme that helps the body process folate. Folate is needed for DNA and protein production. COMT is a different gene that contains the instructions for another enzyme, catechol-O-methyltransferase, that is involved in the inactivation of certain neurotransmitters, including dopamine. Currently, there is no convincing evidence that the COMT gene is associated with autism or response to any autism therapy. Several "variants" in the MTHFR gene are common, including one referred to as C677T (which refers to the specific change in the genetic code). A person can have one or two copies of this gene variant. Several medical issues are associated with the C677T variant, most of which occur in individuals with 2 copies of this gene variant – please refer to this resource for additional information:
https://www.cdc.gov/folic-acid/data-research/mthfr/index.html

Some researchers have found that the MTHFR C677T variant may be more common in individuals with autism spectrum disorder. However, the C677T variant is very common overall in most populations – for instance, among the white population, roughly 40% of individuals carry at least one copy of this gene variant. There is not currently any strong evidence that this gene variant predicts response to any particular autism therapy. **Because of these issues, MTHFR testing is not clinically useful as part of autism evaluation or treatment and is not recommended in practice guidelines published by the American Academy of Pediatrics.**

Autism Identity, Neurodiversity, and Collaboration

Q: How can researchers, clinicians, and families work together to ensure autism research respects neurodiversity while still addressing real support needs?

Listen to autistic voices from the start.
It is important that research begins by asking, *"What matters most to autistic people and their families?"* When autistic adults, parents, and clinicians help shape the questions, the research becomes more meaningful and respectful.

Value neurodiversity and support needs at the same time.
Respecting neurodiversity means recognizing that autism is a natural part of human variation—**not something to "fix."** At the same time, research can focus on **reducing challenges** that affect quality of life—often the implications of co-occurring conditions such as anxiety, sleep problems, or access to employment and healthcare. Both goals can exist together.

Educate yourselves about the diverse lived experiences across the spectrum of needs within the autistic community. When these experiences inform the questions we ask, research becomes more inclusive, respectful, and practical. This includes learning from autistic individuals who can communicate about their lives, as well as from those who cannot advocate for themselves due to the extent of their support needs. Gaining insight into the realities of individuals with more profound support needs—often through the perspectives of their caregivers—is particularly important, as these experiences are more frequently marginalized and underrepresented in both research and media portrayals. We must also recognize that the experiences of autistic self-advocates with fewer support needs do not necessarily reflect those of individuals requiring more substantial support.

Use language that builds understanding, not stigma.
Researchers and clinicians can choose wording that emphasizes strengths and individuality—like "autistic person" or "person on the autism spectrum"—based on what individuals and communities prefer. Also consider using "autism" instead of "autism spectrum disorder" or "ASD" as no one wants to be referenced as "disordered". Clear, compassionate language helps everyone feel included.

Share findings in ways families can use.
Research shouldn't stay locked in journals. Scientists and providers can partner with families to turn findings into **practical tools, guides, or community workshops** that make everyday life easier.

Create ongoing partnerships.
Instead of just engaging for one-time studies or connecting with community partners only to share out research findings, researchers can form **long-term collaborations** with autistic advocates, community groups, and family organizations. This helps ensure new discoveries always reflect real-world needs.

Take-home message:
When researchers, clinicians, and families work together—with autistic people leading the way—autism science becomes more caring, more accurate, and more useful. Respect and collaboration help everyone move toward understanding and real-world support.

Q: What are the best ways to shift the public conversation from "fixing" autism to celebrating strengths and promoting inclusion for all autistic people?

Change the story we tell.
Instead of talking about autism as something "wrong," we can talk about it as a **different way of thinking, communicating, and experiencing the world.** Every person—autistic or not—has strengths and challenges. When we focus on what people *can* do, we open doors instead of closing them. We also can address the challenges associated with autism and related conditions, capitalizing on an individual's strengths. Also, we need to embrace that despite the subjective view of a person's expression of autism, true suffering and difficulty can exist below the surfaces. Presume competence and unconditionally acknowledge and support the needs, whether the needs are visible to others or not.

Highlight real examples of success and talent.
Sharing stories of autistic artists, scientists, advocates, and everyday community members shows that autism is part of human diversity. Schools, media, and workplaces can feature these voices to help others see the full picture—not just the struggles.

Encourage inclusive spaces.
Inclusion isn't just about being in the same room—it's about belonging. Communities can make events, classrooms, and workplaces sensory-friendly, flexible, and welcoming to different communication styles. Small changes—like quiet spaces or visual schedules—can make a big difference.

Support families and educators in learning new perspectives.
When families and teachers understand autism through a **strengths-based lens**, they can better support growth, independence, and confidence. Training programs, parent groups, and school workshops can help shift mindsets from "How do we fix this?" to "How do we support and include everyone?"

Center autistic voices.
Listening to autistic people—of all ages and backgrounds—is the most powerful way to change the conversation. Their experiences remind us that acceptance and respect go hand in hand with progress and support.

Take-home message.
When we celebrate neurodiversity and focus on understanding, inclusion, and strengths, we help build a world where autistic people can thrive as their authentic selves—and where every person's differences are valued.

Employment

Q: What programs or employers are known for supporting and hiring autistic adults, and how can job seekers connect with them?

A: Many employers are opening doors. Across the country, several large companies have **neurodiversity hiring programs** that focus on matching people's strengths with meaningful work. Examples include:

- **SAP's Autism at Work program** – technology and data roles
- **Microsoft's Neurodiversity Hiring Program** – software, IT, and operations
- **IBM, EY (Ernst & Young), and Dell Technologies** – inclusive hiring pipelines and job coaching
- **JPMorgan Chase's Autism at Work** – finance and operations jobs

  These companies focus on supportive interviews, clear communication, and on-the-job coaching to help employees succeed.

Local and community options.
In many regions, smaller businesses and nonprofits also value neurodiverse talent. **Vocational rehabilitation services, state developmental disability offices**, and **community colleges** often partner with local employers for training and placement.

Helpful job networks and program.
Job seekers can explore:

- **Neurodiversity in the Workplace (NITW)** – connects autistic job seekers with inclusive employers.
- **Easterseals Employment Services –** provides coaching and workplace support.
- **JobPath, The Arc@Work, and Autistic Women & Nonbinary Network** – support diverse career goals.
- **Workforce Innovation and Opportunity Act (WIOA)** programs – offer free job readiness and training services through local career centers
- **ASERT (Autism Services, Education, Resources, and Training Collaborative)**- A Pennsylvania-statewide initiative providing information, training, and support to families and professionals to improve access to quality autism services.
- **NEXT for AUTISM -** A national nonprofit that designs, funds, and supports programs to enhance opportunities and services for autistic people and their families.
- **American Job Centers** - A U.S. Department of Labor network of "one-stop" career centers that help job seekers with resumes, training, job search, and employer services.

Tips for job seekers.

- Build on **strengths**—whether that's focus, creativity, or attention to detail.
- Ask about **accommodations** (quiet workspace, flexible schedule, communication preferences).
- Use **LinkedIn** or local advocacy groups to find mentors who've navigated similar paths.

Circumcision

Q: Is circumcision related to autism?

A: It was reported in the media in October 2025 that early circumcision is associated with autism. However, this comment was based on a study of poor quality, as noted in a subsequent systematic review.

Two important things to remember are that (1) a correlation, also called an association, is not the same as causality. See the Tylenol section above for more detail. (2) It is important to evaluate the quality of research studies reporting associations. In many cases, the studies do not control for other important factors that might affect the outcome. For other examples of this, see the Tylenol discussion above.