Approved November 2025

ACMT Position Statement: ACMT Responds to the Acetaminophen and Autism Controversy

The American College of Medical Toxicology

The position of the American College of Medical Toxicology (ACMT), is as follows:

Acetaminophen is the most commonly used analgesic and anti-pyretic. Approximately 60% of women use acetaminophen during pregnancy[1]. In September of 2025, the announcement of a reported association between autism spectrum disorder (ASD) and acetaminophen use during pregnancy generated a storm of media attention. While numerous studies have investigated a possible correlation between ASD and acetaminophen, the preponderance of evidence demonstrates no such association nor a causal link. Therefore, ACMT asserts the safety of acetaminophen in pregnancy based on the latest clinical evidence and reaffirms its support for continued research to better understand the causes and treatment of autism spectrum disorders.

ACMT is a professional group of medical toxicologists, including pediatricians, who specialize in the management of adverse effects from medications in the setting of both therapeutic use and overdose. Medical toxicologists provide care for patients of all ages, including those who are pregnant. Our specialists have expertise in developmental toxicology and pharmacology, including developmental pharmacology, risk assessment, and decades of experience managing the complications of acetaminophen use and overdose. Acetaminophen is safe and effective when taken as intended. Because of its safety profile and absence of teratogenic effects, acetaminophen has been considered the medication of choice for fever and pain relief during pregnancy.

Review of Evidence:

Autism Spectrum Disorder (ASD) is a pervasive neurodevelopmental disorder that is still not fully understood. The development of ASD has been linked to a variety of environmental and maternal causes including advanced parental age, air pollution and preterm delivery interacting with polygenic factors[2]. Importantly, multiple studies have failed to show that autism is directly caused by any single factor under parents' control. In the case of acetaminophen, the best available evidence shows no association nor causal relationship in the development of ASD.

Recent statements from government officials point to work done by Prada et al., whose paper "Evaluation of the evidence on acetaminophen use and neurodevelopmental disorders using the Navigation Guide methodology" asserted a link between acetaminophen use during pregnancy and neurodevelopmental disorders[3]. This paper describes no new evidence, and while

ambitious in its attempt to review and understand existing evidence, is limited in several key ways. First, it relies on Navigation Guide Methodology, a literature review method that depends on the subjective interpretation of the authors to determine the strength of the evidence presented[4]. This is in contrast to other better validated methods used to determine quality of evidence such as GRADE. Further, the paper does not report inter-rater reliability and fails to reach out to a diverse group of experts on their interpretation and understanding of the literature. These steps are an essential part of reaching consensus when bringing forth new guidelines for patient care.

Other studies reporting a small association between prenatal acetaminophen use and ASD have suffered from several forms of potential bias and confounding factors[5–9]. These include recall bias and confounding by indication, where the reason for using acetaminophen cannot be separated from the use of acetaminophen. For instance, maternal fever is associated with ASD, but also may prompt maternal acetaminophen use. Other potential confounders are maternal factors including pain during pregnancy, maternal psychiatric illness, chronic pain, and genetic differences resulting in increased rates of both ASD and acetaminophen use during pregnancy.

Additionally, other studies have illuminated the possibility that, when underlying genetic or unmeasured environmental variables are taken into account, the association between maternal acetaminophen use and ASD disappears[10–12]. In 2024, a sophisticated study of over 2 million children utilized sibling pairs and found that when these unmeasured differences were taken into account that acetaminophen had no impact on the rates of ASD [6]. For unclear reasons, Prada, et al. rated this sibling cohort as having the highest level of bias, despite its robust study design and very large sample size.

Association does not prove causation, but it is a precondition for causation. If two factors are associated, it is possible that one causes the other, that a third factor causes both, or that the relationship is a coincidence. While an association between maternal acetaminophen use and autism has not been convincingly demonstrated, a causal link is even less substantiated. Medical toxicologists and other public health experts use principles introduced by Bradford-Hill criteria as a blueprint to determine if an association is causative[13]. When applied to the relationship between maternal acetaminophen use and ASD, more than half of these criteria are not met, and several have fallen decidedly short or have been directly violated (See Table). As elusive as a proven association appears to be, a causative relationship is even further away.

Table
Bradford-Hill Principles

Bradford-Hill Principle	Definition	Present in Evaluation of APAP-Autism Link
Strength	Large association more likely to be causal	No, proposed association is small
Consistency	Multiple epidemiological studies show consistent association	No, multiple studies do not show association
Specificity	Exposure only causes one disease	No
Temporality	Exposure precedes the disease	Yes (but not in all cases)
Biological gradient	Dose-response relationship	No
Plausibility	Relationship is consistent with current body of knowledge	No
Coherence	Coherence between epidemiological and laboratory findings	No
Experiment	Experimental evidence	No, evidence is observational

The largest studies reporting an association between acetaminophen and autism have shown a weak association [6,7,9], and the evidence is conflicting [6-9], demonstrating a lack of consistency. A dose-response relationship has not been identified and a very large study suggested negative dose-response [7]. Biological plausibility is threatened by the absence of a causative mechanism, and specificity is not shown, given the numbers of children exposed to acetaminophen without autism, and the number of autistic children who were not exposed to acetaminophen. Specificity of the effect is also lacking as acetaminophen use is postulated to cause ASD, ADHD, and other neurodevelopmental disorders[3].

Unintended Consequences:

Pregnant patients may be discouraged from treating maternal fever, which has been linked to significant fetal risks including neural tube defects, birth defects and is itself correlated with ASD

and other neurodevelopmental disorders[14–16]. Pregnant patients may also suffer from untreated pain, or turn to alternative medications which have known consequences for the fetus and the mother such as nonsteroidal antiinflammatory drugs (NSAIDS)[17] and opioid analgesics[18], or untested dietary supplements. Mothers whose children develop ASD may also experience unfounded guilt or receive blame from their community.
These changes also impact the medical community. Now many medical professionals may hesitate to prescribe or counsel pregnant patients on the proper use of acetaminophen due to fears of medicolegal consequences. Proposed acetaminophen label changes by FDA- which bypassed their usual robust process- will contribute to this hesitation. In addition, Texas has recently filed a lawsuit against Johnson & Johnson and Kenvue (the manufacturer of Tylenol) stating that acetaminophen is responsible for harm against young children and unborn children. The announcement, FDA labeling changes and the Texas lawsuit opens the door to frivolous litigation against physicians and other healthcare providers who recommend acetaminophen to pregnant patients and contributes to undue distress of pregnant patients.

Families affected by ASD have long been vulnerable to pseudo-scientific theories surrounding the causes of and treatments for ASD. ASD is a broad, complex syndrome for which the medical field has failed to produce a definite cause or treatment. From discredited links of ASD to the MMR vaccine[19], or to the preservative thimerosal[20], publicized causes of ASD have not been proven in rigorous well controlled studies. Such fears have resulted in vaccine hesitancy, and subsequent outbreaks of preventable diseases and associated morbidity and mortality.

Additionally, pseudoscientific theories and fears have led to the popularity of unproven, dangerous interventions , which medical toxicologists are often called upon to remedy. Popular treatments without evidence supporting their effectiveness that have harmed these patients include chelation[21], “miracle mineral solution”[22], and hyperbaric oxygen therapy[23]. Unproven treatments pose real harm and incur significant healthcare costs. Furthermore, reliance on untested therapies may prevent families from accessing established, effective treatments. Finally, assigning unfounded blame to acetaminophen as a cause of ASD could truncate investigation into other more plausible etiologies of the disease.

Recommendations

Premature conclusions about the evidence linking maternal acetaminophen use and ASD are at odds with our understanding of the current science around acetaminophen and pregnancy. We stand in agreement with the following professional societies: American College of Obstetrics and Gynecologists, the Society for Maternal-Fetal Medicine, the American Academy of Pediatrics, and the Society for Developmental and Behavioral Pediatrics in asserting that we cannot ascribe any causal relationship between acetaminophen and autism at this time. Acetaminophen remains the preferred drug for treating fever and pain in pregnancy. ACMT strongly encourages the scientific community and government agencies to continue to conduct and support research for these patients, to find definitive conclusions to move beyond speculation.

ACMT | American College of Medical Toxicology

Disclaimer

While individual practices may differ, this is the position of the American College of Medical Toxicology at the time written, after a review of the issue and pertinent literature.

References

1. Bandoli G, Palmsten K, Chambers C. Acetaminophen use in pregnancy: examining prevalence, timing and indication of use in a prospective birth cohort. Paediatr Perinat Epidemiol. 2020;34:237–46. https://doi.org/10.1111/ppe.12595

2. Hodges H, Fealko C, Soares N. Autism spectrum disorder: definition, epidemiology, causes, and clinical evaluation. Transl Pediatr. 2020;9:S55–65. https://doi.org/10.21037/tp.2019.09.09

3. Prada D, Ritz B, Bauer AZ, Baccarelli AA. Evaluation of the evidence on acetaminophen use and neurodevelopmental disorders using the Navigation Guide methodology. Environ Health. 2025;24:56. https://doi.org/10.1186/s12940-025-01208-0

4. Woodruff TJ, Sutton P. The Navigation Guide Systematic Review Methodology: A Rigorous and Transparent Method for Translating Environmental Health Science into Better Health Outcomes. Environ Health Perspect. 2014;122:1007–14. https://doi.org/10.1289/ehp.1307175

5. Alemany S, Avella-García C, Liew Z, García-Esteban R, Inoue K, Cadman T, et al. Prenatal and postnatal exposure to acetaminophen in relation to autism spectrum and attention-deficit and hyperactivity symptoms in childhood: Meta-analysis in six European population-based cohorts. Eur J Epidemiol. 2021;36:993–1004. https://doi.org/10.1007/s10654-021-00754-4

6. Ahlqvist VH, Sjöqvist H, Dalman C, Karlsson H, Stephansson O, Johansson S, et al. Acetaminophen Use During Pregnancy and Children's Risk of Autism, ADHD, and Intellectual Disability. JAMA. 2024;331:1205–14. https://doi.org/10.1001/jama.2024.3172

7. Ji Y, Azuine RE, Zhang Y, Hou W, Hong X, Wang G, et al. Association of Cord Plasma Biomarkers of In Utero Acetaminophen Exposure With Risk of Attention-Deficit/Hyperactivity Disorder and Autism Spectrum Disorder in Childhood. JAMA Psychiatry. 2020;77:180–9. https://doi.org/10.1001/jamapsychiatry.2019.3259

8. Liew Z, Ritz B, Virk J, Olsen J. Maternal use of acetaminophen during pregnancy and risk of autism spectrum disorders in childhood: A Danish national birth cohort study. Autism Res Off J Int Soc Autism Res. 2016;9:951–8. https://doi.org/10.1002/aur.1591

9. Avella-Garcia CB, Julvez J, Fortuny J, Rebordosa C, García-Esteban R, Galán IR, et al. Acetaminophen use in pregnancy and neurodevelopment: attention function and autism spectrum symptoms. Int J Epidemiol. 2016;45:1987–96. https://doi.org/10.1093/ije/dyw115

10. Saunders A, Woodland J, Gander S. A Comparison of Prenatal Exposures in Children with and without a Diagnosis of Autism Spectrum Disorder. Cureus. 2019;11:e5223. https://doi.org/10.7759/cureus.5223

11. Leppert B, Havdahl A, Riglin L, Jones HJ, Zheng J, Davey Smith G, et al. Association of Maternal Neurodevelopmental Risk Alleles With Early-Life Exposures. JAMA Psychiatry. 2019;76:834–42. https://doi.org/10.1001/jamapsychiatry.2019.0774

12. Kougias DG, Atillasoy E, Southall MD, Scialli AR, Ejaz S, Chu C, et al. A quantitative weight-of-evidence review of preclinical studies examining the potential developmental

neurotoxicity of acetaminophen. Crit Rev Toxicol. 2025;55:124–78. https://doi.org/10.1080/10408444.2024.2442344

13. Hill AB. THE ENVIRONMENT AND DISEASE: ASSOCIATION OR CAUSATION? Proc R Soc Med. 1965;58:295–300. https://doi.org/10.1177/003591576505800503

14. Hornig M, Bresnahan MA, Che X, Schultz AF, Ukaigwe JE, Eddy ML, et al. Prenatal fever and autism risk. Mol Psychiatry. 2018;23:759–66. https://doi.org/10.1038/mp.2017.119

15. Tioleco N, Silberman AE, Stratigos K, Banerjee-Basu S, Spann MN, Whitaker AH, et al. Prenatal maternal infection and risk for autism in offspring: A meta-analysis. Autism Res Off J Int Soc Autism Res. 2021;14:1296–316. https://doi.org/10.1002/aur.2499

16. Dreier JW, Andersen A-MN, Berg-Beckhoff G. Systematic review and meta-analyses: fever in pregnancy and health impacts in the offspring. Pediatrics. 2014;133:e674-688. https://doi.org/10.1542/peds.2013-3205

17. Antonucci R, Zaffanello M, Puxeddu E, Porcella A, Cuzzolin L, Pilloni MD, et al. Use of non-steroidal anti-inflammatory drugs in pregnancy: impact on the fetus and newborn. Curr Drug Metab. 2012;13:474–90. https://doi.org/10.2174/138920012800166607

18. Graeve R, Balalian AA, Richter M, Kielstein H, Fink A, Martins SS, et al. Infants' prenatal exposure to opioids and the association with birth outcomes: A systematic review and meta-analysis. Paediatr Perinat Epidemiol. 2022;36:125–43. https://doi.org/10.1111/ppe.12805

19. Flaherty DK. The Vaccine-Autism Connection: A Public Health Crisis Caused by Unethical Medical Practices and Fraudulent Science. Ann Pharmacother. SAGE Publications Inc; 2011;45:1302–4. https://doi.org/10.1345/aph.1Q318

20. Parker SK, Schwartz B, Todd J, Pickering LK. Thimerosal-containing vaccines and autistic spectrum disorder: a critical review of published original data. Pediatrics. 2004;114:793–804. https://doi.org/10.1542/peds.2004-0434

21. James S, Stevenson SW, Silove N, Williams K. Chelation for autism spectrum disorder (ASD). Cochrane Database Syst Rev. 2015;2015:CD010766. https://doi.org/10.1002/14651858.CD010766.pub2

22. Lardieri A, Cheng C, Jones SC, McCulley L. Harmful effects of chlorine dioxide exposure. Clin Toxicol Phila Pa. 2021;59:448–9. https://doi.org/10.1080/15563650.2020.1818767

23. Sakulchit T, Ladish C, Goldman RD. Hyperbaric oxygen therapy for children with autism spectrum disorder. Can Fam Physician. 2017;63:446–8.