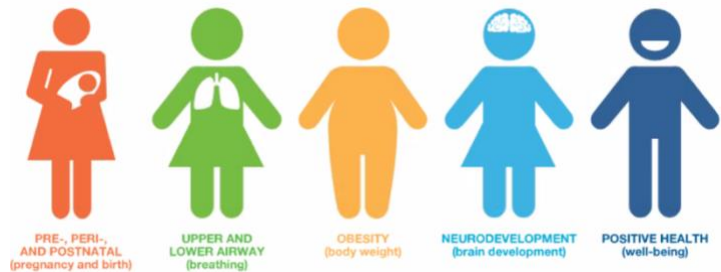


Thank you for your continued participation in TIDES. Our study continues to make important contributions to understanding the impacts of environmental exposures on children's health. We would like to share some recent study findings with you from our parent ECHO program and our TIDES research.

ECHO Research

The Environmental influences on Child Health Outcomes (ECHO) Program is a national research project that includes over 70 cohorts like TIDES. ECHO expects to include nearly **50,000** children and families from **forty-four** states to address five important child health issues: such as asthma, neurodevelopment, obesity, airway health, and birth outcomes. ECHO will become the largest study to follow children from birth to later childhood ever conducted in the United States. See how participants contribute to ECHO science on [this webpage and video summary](#). Below is a summary of one of many ECHO-funded studies. Additional summaries and ECHO-wide publications can be found [here](#).



Which Children Are at Higher Risk of Developing Asthma in the U.S.

[Childhood Asthma Incidence Rate Patterns from the ECHO Consortium: Identifying High-Risk Groups for Primary Prevention](#). Johnson CC, Chandran A, Havstad S, Li X, McEvoy CT, Ownby DR, Litonjua AA, Karagas MR, Camargo CA Jr, Gern JE, Gilliland F, Toggias A; JAMA Pediatr. 2021 Sep 1;175(9):919-927.

Childhood asthma is a major cause of suffering, missed school for children, and missed work for parents. The study used information from children from diverse backgrounds in the United States taking part in 31 studies within the ECHO program to understand who is more likely to get asthma.

The research shows that young Black children and young children with asthmatic parents developed asthma more often than other groups. Children with at least one parent with a history of asthma had two to three times higher rates of asthma. This higher risk with family history of asthma mostly affected younger children, through four years old. The rates for boys went down with age, but rates for girls stayed about the same, so by the teenage years girls developed asthma more often than boys. Black children were diagnosed with asthma more often than white children during preschool years, but less often than white children after age 9-10 years. Researchers will be working to develop new programs to help keep children at highest risk from getting asthma. The research is also featured in [this article](#).

TIDES Research

We are excited to share some recently published research from the TIDES cohort that includes our four study centers: [Seattle Children's Research Institute](#) (Seattle, WA), [University of California, San Francisco](#) (San Francisco, CA), [University of Minnesota](#) (Minneapolis, MN), and [University of Rochester Medical Center](#) (Rochester, NY).

Please contact Stacey Moe, MPH, TIDES UMN Study Coordinator at moe@umn.edu with any questions.

[Maternal urinary levels of glyphosate during pregnancy and anogenital distance in newborns in a US multicenter pregnancy cohort.](#) Lesseur C, Pirrotte P, Pathak KV, Manservisi F, Mandrioli D, Belpoggi F, Panzacchi S, Li Q, Barrett ES, Nguyen RHN, Sathyanarayana S, Swan SH, Chen J. Environ Pollut. 2021 Jul 1;280:117002. Epub 2021 Mar 22.

Glyphosate is a weed-killing chemical widely used in agriculture in the United States and worldwide. In this study, we measured glyphosate levels in urine samples from 94 pregnant TIDES moms and then examined whether these levels were related to newborn anogenital distance (AGD, distance between the anus and the genitals). AGD is important because it is a marker of the fetus' exposure to testosterone in the womb and influences the development of the reproductive system. Glyphosate was detected in 95% of the urine samples, and newborn daughters of moms who had higher levels of glyphosate during pregnancy, had a longer AGD at their birth exam, reflecting higher exposures to testosterone in the womb compared to those with a shorter anogenital distance. The findings are discussed further in [this article](#).



[Associations between urinary biomarkers of oxidative stress in the third trimester of pregnancy and behavioral outcomes in the child at 4 years of age.](#) Rommel AS, Milne GL, Barrett ES, Bush NR, Nguyen R, Sathyanarayana S, Swan SH, Ferguson KK. Brain Behav Immun. 2020 Nov;90:272-278. Epub 2020 Sep 6.

Oxidative stress refers to an imbalance between molecules that can promote well-being and those that can harm health (technically, more reactive oxygen species than healthy antioxidants). Oxidative stress during pregnancy has been linked to preterm birth. We studied the relationship between oxidative stress and child development within TIDES. We focused on behavioral problems in children at age 4 years, including social skills, hyperactivity, aggression, anxiety, depression, and attention problems. We found that in women who had at least some college education, higher levels of oxidative stress during pregnancy were linked to increased behavior problems in the child at age 4 years. In less educated women, oxidative stress during pregnancy did not appear to be related to child behavior at age 4. It may be that structural (e.g. poverty, pollution) and individual-level (e.g. health behaviors, genetics) stressors are more important for behavioral outcomes in families with less-educated moms.

[Associations between prenatal phthalate exposure and sex-typed play behavior in preschool age boys and girls.](#) Evans SF, Raymond S, Sethuram S, Barrett ES, Bush NR, Nguyen R, Sathyanarayana S, Swan SH. Environ Res. 2021 Jan;192:110264. Epub 2020 Sep 28.



In this study, we examined exposure to phthalates in pregnancy in relation to how TIDES children played when they were 4-5 years old. Phthalates have been shown to interfere with testosterone, the male sex hormone that helps to pattern the brain during early prenatal development. We found moms who had higher levels of exposure to some phthalates early in their pregnancy reported that their sons were less likely to engage in types of play that are considered more male-typical, such as playing with cars, climbing, and playing sports and ball games. This makes sense given what we know about phthalates and about how the brain develops. The connection between phthalates and play behavior persisted even when we accounted for other factors like how parents would feel if their child engaged in play that is stereotypical of the opposite gender or whether the child had an older same sex sibling. Dr. Evans discusses her research and findings in this [video](#).

Upcoming Research of Interest

We recognize that child mental health is important and has been affected during the pandemic. TIDES researchers are currently working to publish two papers describing social factors that predict child mental and behavioral health. We look forward to sharing these results with you in the future.

Please contact Stacey Moe, MPH, TIDES UMN Study Coordinator at moe@umn.edu with any questions.