

### Update from the Data Coordinating Center at Mount Sinai



Icahn School of Medicine at Mount Sinai  
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We are now in the middle of conducting TIDES II, the follow on study to TIDES. As you know in TIDES II we are conducting two follow-up visits; Visit I when the children are 4-5 years of age and Visit II at 6-7 years. These visits are being held at the study centers when possible and moms who have moved too far from the center are completing study questionnaires. At the Data Coordinating Center we are continuing to track the progress of all TIDES Centers and to assemble new study data collected in Visit II. As of August 22, 2016 (almost 8 months after the first TIDES II visit), our centers have re-contacted 410 TIDES II participants and 191 moms have completed a TIDES II questionnaire. Visit I is going well, and most moms and their children seem quite comfortable with it. Next spring we will begin inviting TIDES II moms and their children back for Visit II. This will include several of the same items as Visit I (height, weight, blood pressure and a urine sample), some new questionnaires for the mom, and some behavioral testing of the children. With these results we will be able to look at possible links between exposures to the mom during pregnancy or the child after birth and the children's behavior. Included in this newsletter are updates from our four study centers, the growing list of our TIDES publications, and summaries of some of our exciting findings.

I hope you will continue to participate in TIDES II, as your participation is integral to our success in carrying out this important work.

Shanna Swan

## Update from University of Rochester Medical Center



URMC Study Coordinator  
Sarah Caveglia

TIDES Visits are well underway in Rochester. We have been enjoying reconnecting with our participants and seeing how the children have grown. Most children coming in for Visit 1 are in pre-K and are on their way to Kindergarten – it's an exciting time! Our long-time Study Coordinator, Heather Fiore, is moving out-of-state, so she has been busy training Sarah Caveglia to take her place. Sarah has a long history in Ob/Gyn Research, and is excited to be joining the TIDES study. Preschool is one of her favorite ages, and she has really enjoyed getting to know the study families during her training. Heather will miss her colleagues and being a part of TIDES, but she is looking forward to starting a new life with her family in Kansas.

We are looking forward to the TIDES Annual Meeting in Minnesota next spring where we will start to prepare for our next set of TIDES visits. We hope to start scheduling these visits with our first participants in the summer of 2017 when they are 6. It's right around the corner!

### Contact URM:

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## Update from University of Minnesota

Our new TIDES team has really enjoyed getting to know the TIDES families! We are really happy with how well the clinic visits have been going since we started in April, and are thankful to all of the moms and children for their continued participation.

As you may know, we are asking moms to complete a questionnaire online at home (taking about 20-25 minutes) before coming to the clinic with their TIDES child for the approximately one hour visit. The clinic visit includes time for a urine sample from the child, growth measurements, playtime, and a couple more surveys for mom. It concludes with a participant incentive and a token gift for the child. This is a wonderful age for the children to participate; they are very proud of what they are doing to help us learn more about children's health. In fact, at the end of the visit we ask if they will come back to see us for the next scheduled visit at 6 years old, and all of the children thus far have readily agreed!



The fun stickers and chart the kids at UMN get to take home from their office visit!

We have also received great feedback from the moms who have already come in for their first visit (e.g., ease of navigation of the online questionnaire, offering of flexible times for the visits, ease of getting to (and parking) at the Epidemiology Clinical Research Center, and the fact that it is a non-invasive clinic visit).

It is hard to believe we are already planning for the second follow-up visit when the child is 6 years old! You'll see elsewhere in this newsletter how this future visit may be a little different; additional details will be forthcoming when the children get a little older. We look forward to seeing you at the clinic, but as always, if you have any questions, please contact us!

**Contact UMN:**  
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## Update from UC San Francisco



UCSF Center Director Nicole Bush, PhD (L) and Study Coordinator Alana Cordeiro, MPH (R).

A native of the Bay area, Alana is also glad she has returned to her original home after years away! She looks forward to getting to know you and your TIDES child!

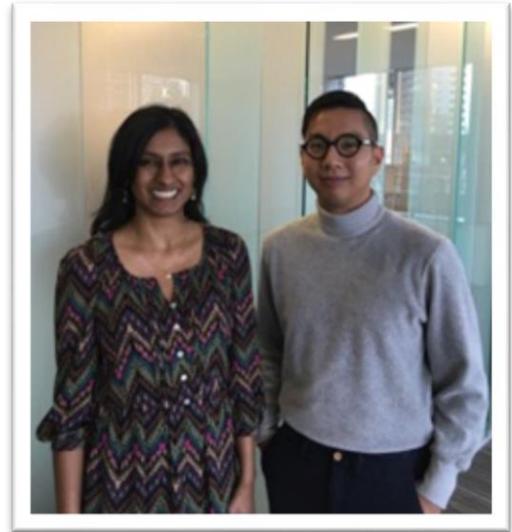
The rest of 2016, we will complete Visit 1 (age 4.5) with the rest of the sample and begin preparing for Visit 2 (age 6) in 2017. We are excited about the way your recent participation can help us learn about an important range of child health and developmental outcomes. You can expect more updates on our study findings in the coming year, as well as follow-up from Alana to schedule a visit. Enjoy the new beginnings that Fall of 2017 will bring for your family!

**Contact UCSF**  
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**(628) 234-4194**  
**<http://bushlab.ucsf.edu/tides-infant-development-and-environment-study>**

## Update from Seattle Children's/ University of Washington

TIDES Visits began in early 2016. Garry Alcedo is our long time study coordinator and has worked on TIDES for three years now. He greets families and performs the study visit along with our new study assistant, Kari Jensen. Kari has worked with young children in several studies here at the Seattle Children's Research Institute and is excited to be participating in TIDES. Both Garry and Kari are enjoying seeing the kids develop and grow as they approach school age! We thank you for your continued participation and look forward to seeing you for the second TIDES study visit, scheduled to start in the spring of 2017.

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Seattle Center Director Sheela Sathyanarayana, MD MPH (L) and Study Coordinator Garry Alcedo (R)

## Highlighted findings from our recent publications

1. Barrett ES, Sathyanarayana S, Janssen S, Redmon JB, Nguyen RH, Kobrosly R, Swan SH, and the TIDES Study Team. **Environmental health attitudes and behaviors: findings from a large pregnancy cohort study.** Eur J Obstet Gynecol Reprod Biol. 2014, 176:119-25.

*During your pregnancy with your TIDES child, we asked you to answer questions about your attitudes and behaviors related to chemicals in your environment. Of the 894 TIDES subjects that completed this questionnaire, 60% of you strongly agreed that environmental chemicals are dangerous. 25% of you felt they were impossible to avoid. Believing that chemicals in your environment are dangerous was linked to healthy behaviors that helped you to limit the chemicals that you and your baby were exposed to. For example, many of you reported choosing organic foods, safer plastics, and personal care products with fewer chemicals. These findings highlight the importance of educating pregnant woman about the dangers of environmental chemicals and strategies to reduce exposures.*

2. Swan SH, Sathyanarayana S, Barrett ES, Janssen S, Liu F, Nguyen RH, Redmon JB; TIDES Study Team. **First trimester phthalate exposure and anogenital distance in newborns.** Hum Reprod. 2015 Apr;30(4):963-72. doi: 10.1093/humrep/deu363. PMID: 25697839

*As you may recall, in TIDES we collected a urine sample from you while you were pregnant. We wanted to know if the amount of phthalates in your urine was related to your child's reproductive development. Specifically, we measured your baby's anogenital distance (AGD) – the distance from the anus to the genitals – to see if reproductive tract development was altered by phthalate exposure. Our results show that exposure to certain phthalates during pregnancy leads to shorter AGD in baby boys. More*

*studies are needed to determine whether phthalate exposure during pregnancy has a lasting effect on reproductive development, and whether girls are also affected.*

3. Barrett ES, Parlett LE, Sathyanarayana S, Redmon JB, Nguyen RH, Swan SH. **Prenatal Stress as a Modifier of Associations between Phthalate Exposure and Reproductive Development: results from a Multicentre Pregnancy Cohort Study.** Paediatr Perinat Epidemiol. 2015 Nov 17. doi: 10.1111/ppe.12264. PMID: 26576028

*In addition to measuring phthalates in your urine, we asked you questions about stressful events that may have occurred in your life while you were pregnant with your TIDES child. When we considered the amount of stress that TIDES moms reported during pregnancy together with the level of phthalates in their urine, we found that stressful events negated the effects of phthalates on boy's AGD. In other words, phthalate effects on AGD were only observed in baby boys of moms who reported no stress during pregnancy. No effects of phthalates on AGD were seen in babies of moms who reported stressful events during pregnancy. This finding suggests an interaction between stress and chemical exposures on reproductive development that has not been previously reported. Our team is continuing to study how both stress and chemical exposures can affect reproductive development and behavior.*

4. Andrade, AJ, Liu, F, Sathyanarayana, S, Barrett, ES, Redmon, JB, Nguyen, RHN, Levine, H, Swan, SH. **Timing of prenatal phthalate exposure in relation to genital endpoints in male newborns,** Andrology, 2016. Apr 7. doi: 10.1111/andr.12180.

*One very important question that we would like to answer is when during pregnancy does phthalate exposure have the greatest effect on reproductive development. To answer this question we obtained urine samples from you during each trimester of pregnancy. So far we have been able to measure phthalates from all three trimesters in 168 TIDES moms of boys. We found that phthalate exposure during the first trimester was associated with shorter AGD in the boys. Interestingly, exposure during the second and third trimester showed no effect. When we looked at another measure of male reproductive tract development, penile width (PW), we saw stronger associations with exposure during the second trimester. These observations are consistent with what we know about the timing of male reproductive development and what has been reported in laboratory animal studies and provide further evidence that phthalates interfere with male reproductive development. We hope to extend this study to include more TIDES subjects who provided urine during all three trimesters.*

## Additional TIDES Published Papers

Adibi JJ, Lee MK, Naimi AI, Barrett E, Nguyen RH, Sathyanarayana S, Zhao Y, Thiet MP, Redmon JB, Swan SH. **Human Chorionic Gonadotropin Partially Mediates Phthalate Association With Male and Female Anogenital Distance.** J Clin Endocrinol Metab. 2015 Sep;100(9):E1216-24. doi: 10.1210/jc.2015-2370. PMID: 26200238

Alur S, Wang H, Hoeger K, Swan SH, Sathyanarayana S, Redmon BJ, Nguyen R, Barrett ES. **Urinary phthalate metabolite concentrations in relation to history of infertility and use of assisted reproductive technology.** Fertil Steril. 2015 Nov;104(5):1227-35. doi: 10.1016/j.fertnstert.2015.07.1150. PMID: 26275821

Sathyanarayana S, Grady R, Redmon JB, Ivicsek K, Barrett E, Janssen S, Nguyen RHN, and Swan SH and the TIDES Study Team. **Anogenital Distance and Penile Width Measurements in the Infant Development and the Environment Study (TIDES): Methods and Predictors.** JPurol Online publication: 29-MAR-2015 DOI information: 10.1016/j.jpuro.2014.11.018

Serrano SE, Seixas NS, Karr CJ, Swan SH, Sathyanarayana S. **Dietary Phthalate Exposure in Pregnant Women and the Impact of Consumer Practices.** Int J Environ Res Public Health, 2014. 11(6): p. 6193-6215.

Nelson JW, Edhlund BL, Johnson J , Rosebush CE , Holmquist ZS , Swan SH Nguyen RH, **Assessing a New Method for Measuring Fetal Exposure to Mercury: Newborn Bloodspots.** Int. J. Environ. Res. Public Health 2016, 13, 692; doi:10.3390/ijerph13070692

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**If your contact information has changed, please tell your study coordinator. Thank you!**