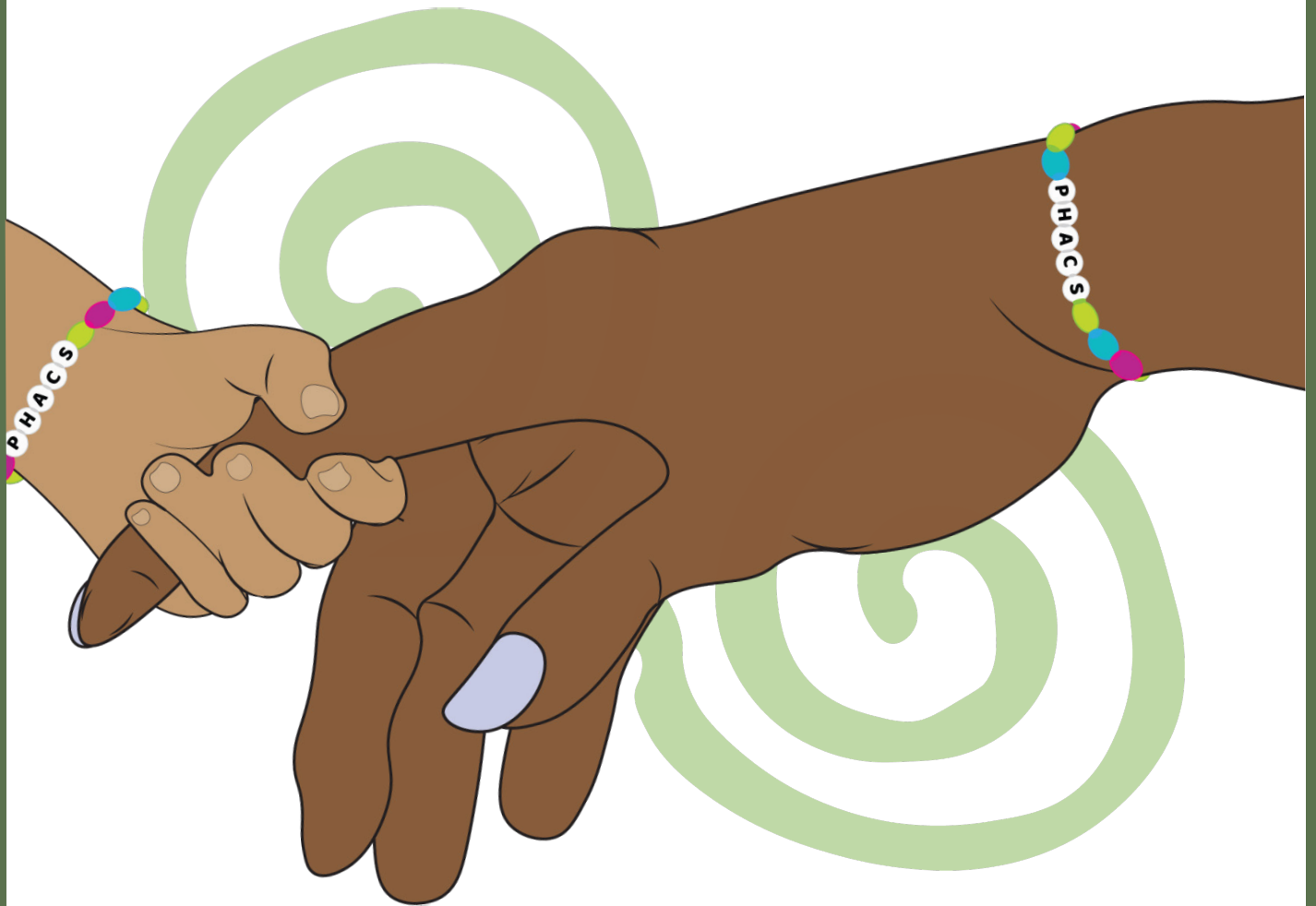


SMARTT Study

Pediatric HIV/AIDS Cohort Study (PHACS) Network

Research Highlights

Milestone: Over 5,000 Children Enrolled



Opened 2007

OVERALL FINDINGS

The SMARTT study **has enrolled over 5,000 children** since 2007 – a major milestone!

Overall, findings from SMARTT have **reassured us that the benefits of taking antiretrovirals** in pregnancy outweigh any smaller risks for the mother or her baby.

Taking antiretrovirals (ARVs) during pregnancy makes it very unlikely that a mother will pass HIV to her baby. But it is also important to **make sure the ARVs are safe for the baby.** In SMARTT, we looked at the type of antiretrovirals that pregnant women took, as well as which trimesters they took them in.

By participating in SMARTT, your family has helped us learn more about children exposed to HIV at birth as they grow up. This has helped improve health care for countless other mothers with HIV and their children around the world!

MATERNAL HEALTH IN PREGNANCY

MAJOR FINDINGS

- We looked to see **which type of HIV medicines pregnant women** took and when they started taking them. Then we looked for **connections** to blood pressure disorders, weight gain, inflammation, anemia, or sexually transmitted infections during pregnancy.
- **Some women** in SMARTT were **more likely to give birth early or to babies with low birth weight** if they had **taken certain types of antiretrovirals**. Women who were born with HIV (versus getting HIV later in life) did not seem to be at any higher risk for giving birth early.
- Many women in SMARTT had suppressed viral loads by the time they gave birth. However, by the beginning of their next pregnancy, many had higher viral loads. **This suggests that they may prioritize caring for their infant over their own health.**
- **Dolutegravir** is a more recently available medicine that is effective at treating HIV. We found that dolutegravir was **both safe and more effective at helping pregnant women stay virally suppressed.**

FUTURE DIRECTIONS

- We want to look at how **newer HIV medicines** might be connected to a higher risk of giving birth early, to smaller babies, or the occurrence of birth defects. We also want to keep looking at which newer medicines are **easiest for pregnant women to take and are safe for their baby.**



HEART HEALTH

MAJOR FINDINGS

- We **didn't find any heart disease** in young children (2-7 years old) whose mothers took ARVs during pregnancy. There was no difference in the heart size or function for children in SMARTT compared to children not exposed to HIV. **Some children in SMARTT had higher levels of biomarkers** (chemical signals) in their blood. This could mean there is some damage, stress, or swelling in their hearts. However, we didn't see strong signs that this was related to the specific type of HIV medicine a mom had taken during pregnancy.
- We also found that children in SMARTT with **high weight for their height** were more at **risk of having higher blood pressure**, but they also had **fewer problems with cholesterol and insulin resistance**.

FUTURE DIRECTIONS

- Researchers should look at whether **testing children's biomarkers** can help us **screen for and prevent future heart disease**.



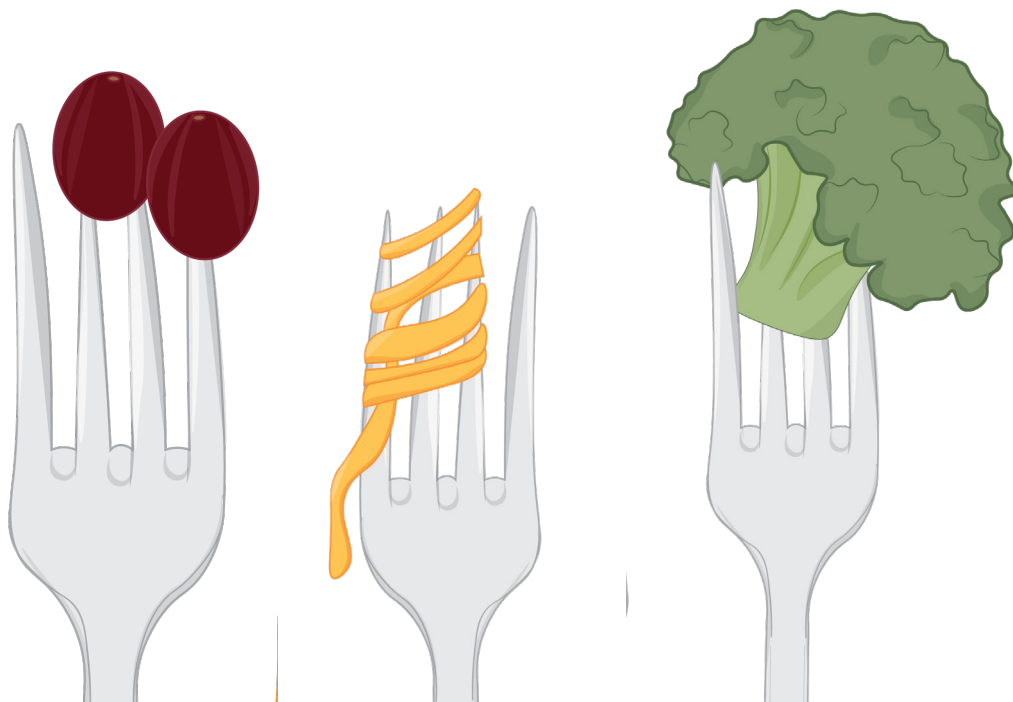
CHILDHOOD GROWTH AND NUTRITION

MAJOR FINDINGS

- We found that about **one-third of pregnant women in SMARTT had low vitamin D levels**. This was **linked to giving birth early and lower birth weight**, and their children were also shorter on average when they turned one. In another study, we **found that the type of antiretroviral** a mother used during pregnancy, as well as when she started taking it, was **connected to babies having higher weight and head circumference**.
- We also found that **in the first week of life, some babies in SMARTT had an imbalance in how their body turns food into energy**. The babies who were affected were more likely to have been **exposed while in the womb** to smoking, alcohol, or a kind of ARV called protease inhibitors. This could affect their growth while in the womb.

FUTURE DIRECTIONS

- We want to follow these children over time to see **whether their differences** in growth or weight gain in **early childhood affects their health as they get older**.



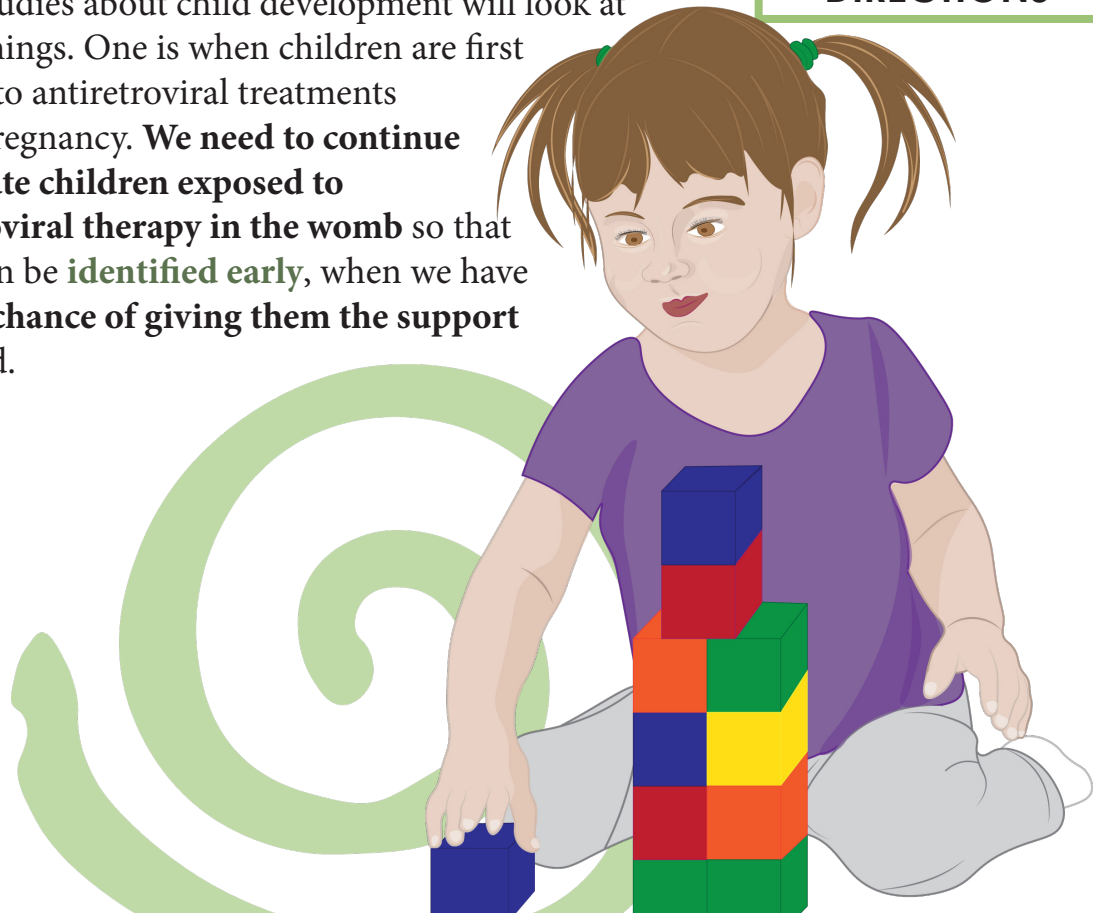
CHILD DEVELOPMENT

MAJOR FINDINGS

- **Neurologic** (brain and nervous system) conditions were not very common for children in SMARTT. For instance, microcephaly (small head size) was rare among children with HEU. However, the **timing of when babies were exposed to ARVs during pregnancy could be important.**
- Five-year-old children **may be at risk for lower performance in certain developmental areas** if their mothers **first started taking ARVs during pregnancy (compared to starting before pregnancy).** These areas were language, emotional-behavioral development, and/or cognition. For people living with HIV who could become pregnant, it is especially **important to take ARVs to help protect the health** of the fetus in case they do become pregnant.

FUTURE DIRECTIONS

- Future studies about child development will look at several things. One is when children are first exposed to antiretroviral treatments during pregnancy. **We need to continue to evaluate children exposed to antiretroviral therapy in the womb** so that delays can be **identified early**, when we have the **best chance of giving them the support** they need.



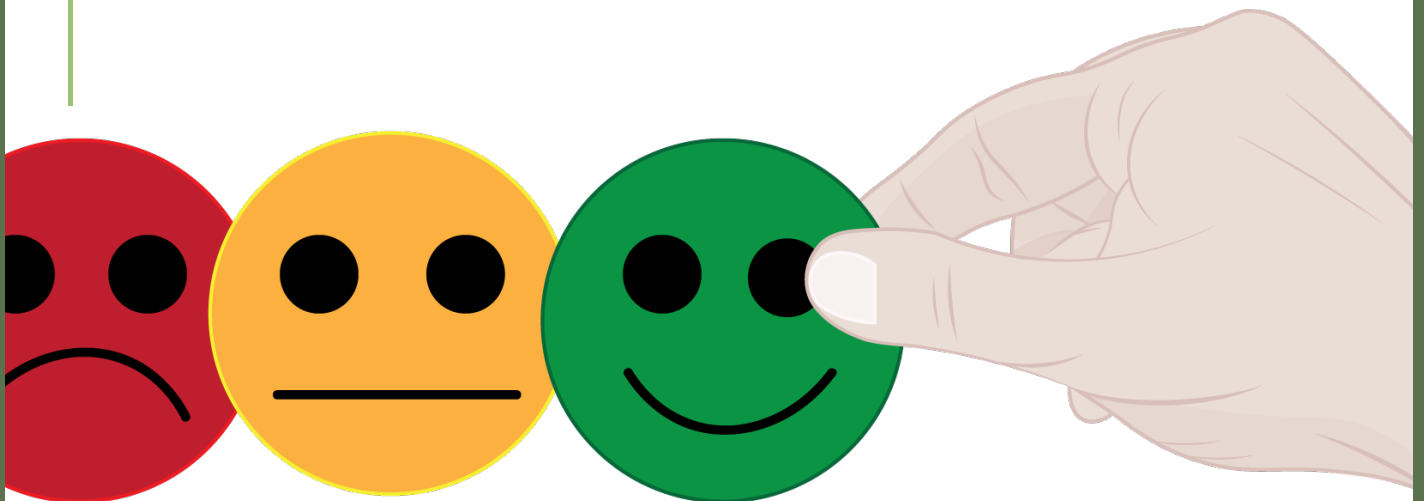
MATERNAL MENTAL HEALTH

MAJOR FINDINGS

- Women living with HIV **may be at high risk for struggling** with their mental health, including during pregnancy and postpartum. Mental health problems were **often related to traumatic** or stressful events in their lives, having **unstable resources, or a lack of support**. Most mothers struggling with their mental health were not receiving mental health care.
- We also found that the amount of **substance use among mothers with HIV decreased quite a bit** from the 1990's. However, in recent years, we've seen that more women in SMARTT are **using cannabis** (marijuana) during pregnancy and after giving birth. Their alcohol use has not changed in the same way, though.

FUTURE DIRECTIONS

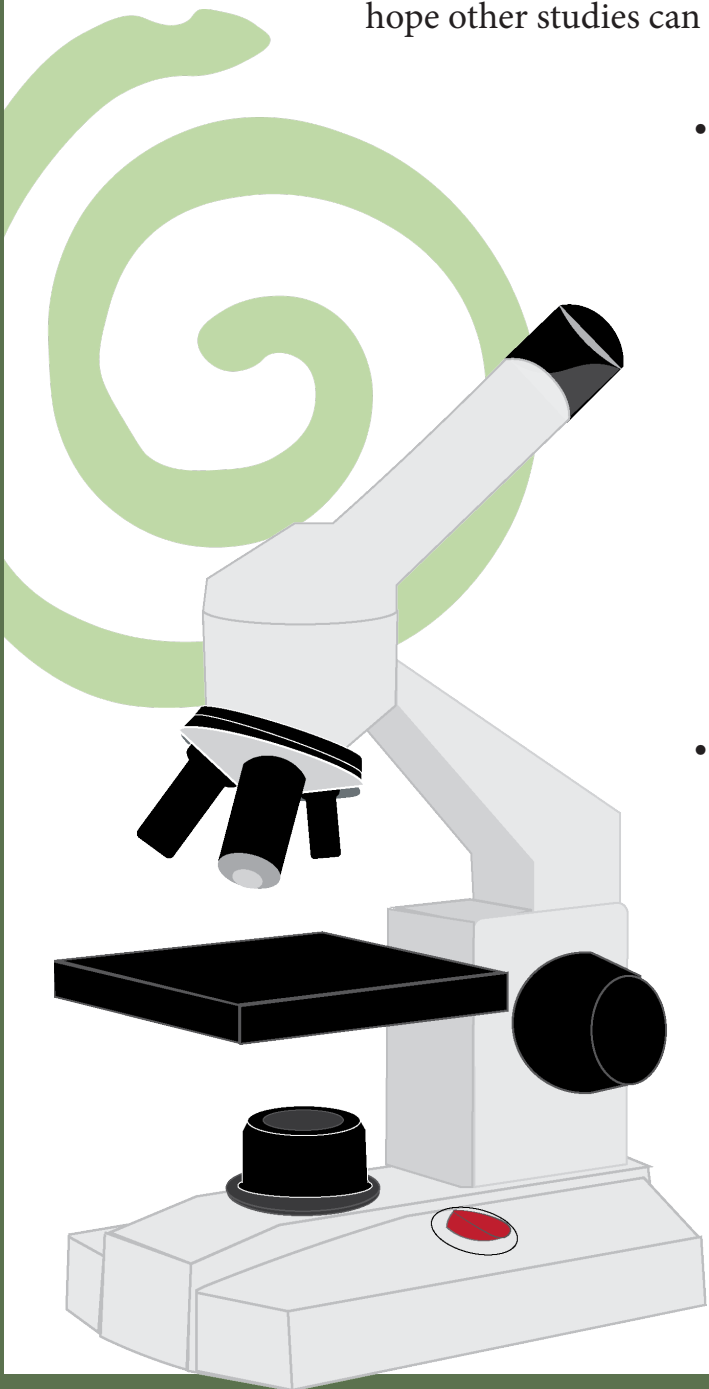
- Mothers living with HIV should receive **individual support in navigating their mental health**, but we should also advocate for more access to resources. Future research should also look at why cannabis use is growing in our population and **how to support mothers who use substances during and after pregnancy**.



CONTRIBUTIONS TO SCIENTIFIC METHODS

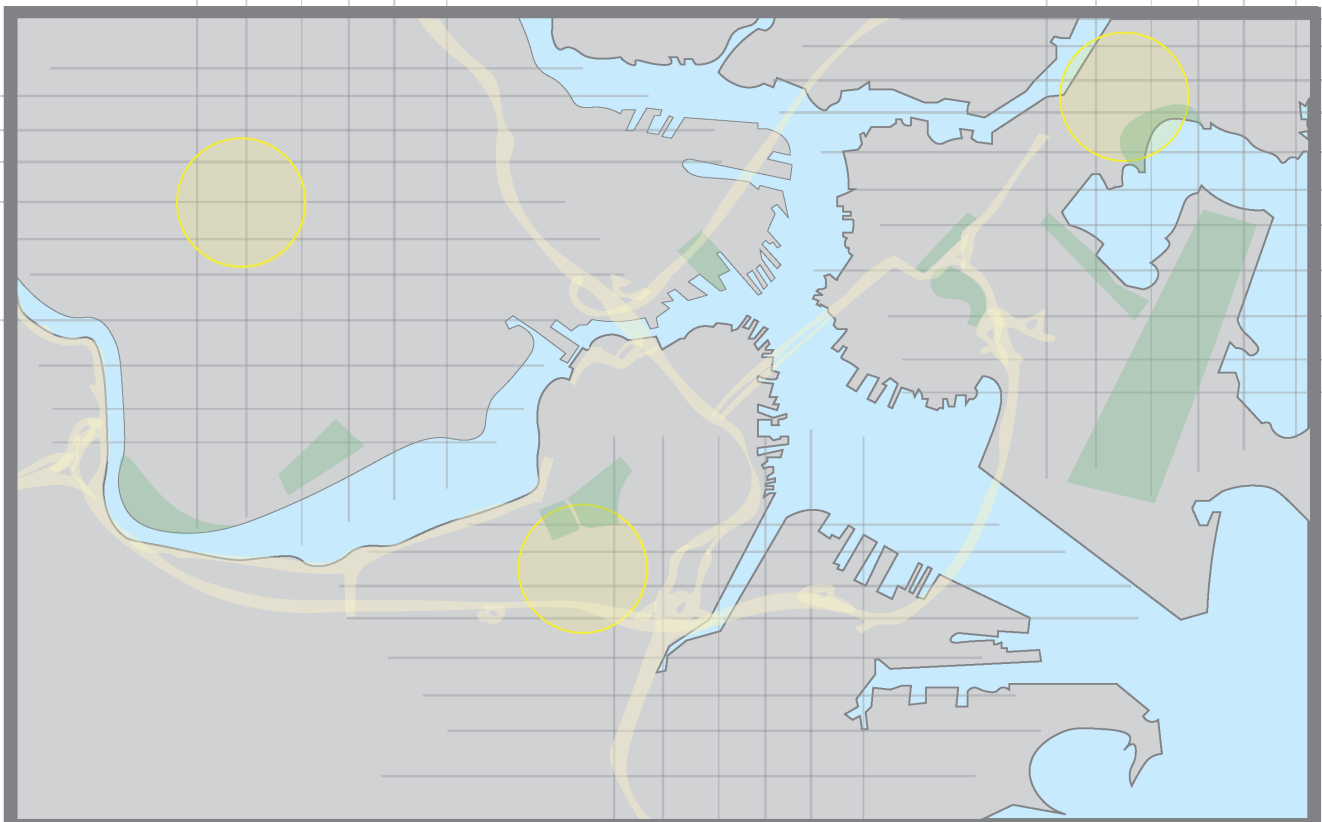
MAJOR FINDINGS

- PHACS was the **first study** that looked at pregnancy specifically in women born with HIV.
- We also **helped develop several research methods**, which we hope other studies can learn from and use in their own work.
- We developed a **“trigger-based design”** in SMARTT. This helps **keep study visits shorter for most children**, and helps researchers find the children who might have more serious health issues. Keeping an eye on “trigger” events (across many health concerns like child development or poor growth) also **helps researchers focus more energy on understanding those health issues** and how they might be related to ARV exposure in the womb.
- We used a **few new ways to check for how much of their mother’s ARV medicine a baby had absorbed by the time they were born**. One test uses a sample of their hair right after birth, and another uses their meconium (first feces). Both of these tests can show us how much exposure the baby has had to the medications their mother took during pregnancy. Using these **tests can help us track if babies with higher ARV drug levels at birth** will have any health problems later in life.



FUTURE DIRECTIONS

- We are looking at **new ways to assess a child's language development** to make sure they are evaluated in the specific dialect they speak. This helps prevent children from being over-diagnosed with language problems, and also helps us find the children who do need support with a language delay.
- We are **looking at issues of maternal stress and sleep quality during pregnancy**, and exploring how these are linked to risk of early delivery and infant growth.
- We are beginning to use a method called geocoding. **Geocoding helps us understand the way a person's neighborhood and environment (especially structural racism) can impact their health** and can help us advocate for more fair distribution of resources.



Keep up to date
on PHACS studies:



<https://phacsstudy.org/>

A huge thank you
to **our participants!**

**Without you, none of
this would be possible.**