Memory Functioning in Children and Adolescents with Perinatal HIV Infection

A PHACS AMP substudy

Study Team

Chair: Sharon Nichols
Vice chairs:
- Kay Malee
- Betsy Kammerer

Team Members:
- Kim Allison
- Julie Davidson
- Patricia Garvie
- Lynnette Harris
- Molly Nozyce
- Doyle Patton
- Patricia Sirois
- Paige Williams

Statistician: Miriam Chernoff
Programmer: Cenk Yildirim
Protocol specialist: Nancy Liu
Data manager: Carol Elgie
Consultants:
- Steven Woods
- Stephen McCauley
- Dean Delis

What do we mean by memory?

- In the study, we are looking at both acquiring information (*learning*), and retaining it over time (*memory*). We test learning and memory of words (verbal memory) and figures (nonverbal memory).
- We are also looking at *prospective memory*, which means remembering to do something.

Why look at memory?

- Adults with HIV are at risk for problems with memory, but few studies of children and adolescents have looked at this. No studies of children with HIV have looked at prospective memory.
- In adults with HIV, problems with memory, especially prospective memory, are linked to problems with medication management and other aspects of everyday life.
- Children through young adults are in a phase of life where learning is one of their most important tasks. They are learning skills for their daily lives, health management, and future jobs. It is important to know if they have problems with learning and memory so we can know more about how to prepare them for adulthood.

What do we mean by executive functions?

- *Executive functions* refers to skills that help us keep our actions in line with the situation we are in and the goals we have. It refers to processes that regulate our behaviors and our thinking.
- It includes several areas such as planning and organizing, problem solving, starting (initiating) and stopping (inhibiting) actions, keeping our mind on what we're doing, mental flexibility and switching from one thing to another.

Why look at executive functions?

- This is another area that can be affected by HIV in adults, and some studies have suggested that may be true for children as well.
- Executive functions are important for many aspects of our daily functioning, such as organizing and focusing on school and job tasks, getting things done in our daily lives, problem solving, handling social situations, avoiding risk behaviors, and health management.
- As children get older and face more challenging tasks, problems with executive functions can become more obvious.

More relevance of memory and EF

- The parts of the brain that are most likely to show effects of HIV are also the ones that are related to executive functions. These areas also keep developing until young adulthood.
- Problems with learning and memory and executive functions happen with other childhood disorders such as learning disability and ADHD.
- For both executive functions and memory, there are interventions already developed that might be helpful if our research shows that young people with HIV have problems in these areas.

Study Questions

- Do youth born with HIV have more problems with learning, memory, prospective memory, or executive functions than children who were exposed to but not infected with HIV? Do these skills develop at the same rate in both groups?
- Do youth with HIV have problems with day-to-day functioning, adherence, or academic achievement that are related to memory or executive function issues?
- How are memory and executive functions affected by severity of HIV? Is this different depending on how old the youth was when HIV was most severe?

Study Design

- Enrolled children and youth at 8 sites age 9-19, with and without HIV, able to speak English, who were in the AMP study around time of 2.5 year visit.
- Enrolled 173 youth with HIV and 85 without.
- Study participants take tests of learning and memory, prospective memory, and executive functions.
- A second study visit after 2 years lets us look at further development of these skills.

Study Measures

- Learning and Memory
  - Verbal Learning – word list presented 4 times and youth recalls it each time, then again later.
  - Visual Memory – youth draws abstract figures from memory, then has to recognize them later.
- Prospective memory
  - Participant has to remember to do various tasks while working on other things. For some, they are given cues; for others, they have to keep track of time.

Study Measures

- Executive Functions
  - Fluency – how fast can participants say words or make different designs? Can they switch back and forth between different tasks easily?
  - Inhibition/interference control – how hard is it for participants to keep themselves from saying something they shouldn't?

Study Measures

- Executive Functions
  - Problem solving – can participant figure out a Twenty Questions task with as few questions as possible?
  - Working memory – can participant hold numbers in his or her head and rearrange them?
  - AMP also has a questionnaire about everyday executive functions.

Other Measures

- Adherence:
  - A pharmacy refill adherence measure was added to the existing AMP adherence measure
- Processing Speed
  - Coding subtest from WISC-IV/WAIS-IV
- AMP measures of demographics, health, other cognitive areas, adaptive skills, academics will be used in analyses

Progress so far

- Enrollment is completed: 173 youth with HIV, 85 without
- Sites have started conducting second visit
- QA of data is just being completed and analysis plan for initial questions is complete
- We hope to present results of baseline visit at the Fall, 2013, PHACS meeting