

*Scientific Program*  
**Call for Papers & Posters**

This abstract is being submitted for consideration as a:

- Poster only  
 Paper (oral presentation) only  
 Poster or Paper

Abstract type:

- |  |                                      |
|--|--------------------------------------|
| <input checked="" type="checkbox"/> Research Study | <input type="checkbox"/> Case Report |
| <b>INCLUDE:</b>                                    | <b>INCLUDE:</b>                      |
| - Background                                       | - Background                         |
| - Methodology                                      | - Case Summary                       |
| - Results  | - Discussion                         |
| - Conclusions                                      |                                      |

**TITLE: Results of the Vision In Preschoolers - Hyperopia In Preschoolers (VIP - HIP) Study: Uncorrected Hyperopia and Early Literacy**

**ABSTRACT: (following applicable outline above and limited to 300 words)**

**Background:** The impact of uncorrected, moderate hyperopia on early literacy and visual functions in 4- and 5-year-old preschool and kindergarten children is controversial. **Methodology:** Eligibility criteria included hyperopia ( $\geq 3D$  to  $\leq 6D$  sphere in at least one eye, astigmatism  $\leq 1.5D$ , anisometropia  $\leq 1D$ ) or emmetropia (hyperopia  $\leq 1D$ ; astigmatism, anisometropia, and myopia each  $< 1D$ ) on cycloplegic refraction and no amblyopia or strabismus. Visual functions of near visual acuity (VA), stereoacuity, and accommodative response were assessed. Masked examiners performed the Test of Preschool Early Literacy (TOPEL) which assesses Print Knowledge, Definitional Vocabulary, and Phonological Awareness. **Results:** 244 hyperopes [ $+3.8D \pm 0.8$ ] and 248 emmetropes [ $+0.5D \pm 0.5$ ] participated. After adjusting for age, race/ethnicity and parent education, hyperopes scored lower than emmetropes for TOPEL total by  $-4.3$  ( $p=0.01$ ); for Print Knowledge by  $-2.4$  ( $p=0.007$ ); for Definitional Vocabulary by  $-1.6$  ( $p=0.07$ ) and for Phonological Awareness by  $-0.3$  ( $p=0.39$ ). Greater deficits in TOPEL score were observed in hyperopes with  $\geq 4D$  as compared to emmetropes ( $-6.8$ ,  $p=0.01$  TOPEL total;  $-4.0$ ,  $p=0.003$  Print Knowledge). Hyperopes with increased accommodative lag ( $> 1.35D$ ) scored lower on the TOPEL than emmetropes ( $-5.7$ ,  $p=0.09$  TOPEL total;  $-3.4$ ,  $p=0.05$  Print Knowledge). Relative to emmetropes, the largest deficits were found in hyperopes with near VA of 20/40 or worse ( $-8.5$ ,  $p=0.002$  TOPEL total;  $-4.5$ ,  $p=0.001$  Print Knowledge;  $-3.1$ ,  $p=0.04$  Definitional Vocabulary) or stereoacuity 240" or worse ( $-8.6$ ,  $p<0.001$  TOPEL total;  $-5.3$ ,  $p<0.001$  Print Knowledge). Furthermore, more hyperopes (65%) than emmetropes (17%,  $p<0.001$ ) had  $\geq 1$  reduced visual skills, increasing to 82% among the  $\geq 4D$  hyperopes. **Conclusions:** Moderately hyperopic preschool children have more reduced visual functions than emmetropes. Uncorrected hyperopia accompanied by reduced near VA or stereoacuity in 4- and 5-year-old children is associated with worse performance on a measure of early literacy. In addition to educational intervention, hyperopic correction may be beneficial for improving early literacy, but has not been assessed.

**Supported by NIH/NEI R01EY021141**