

## How providing glasses to students with poor vision helps them perform better in school

The Children's Discovery & Innovation Institute (CDI) at Mattel Children's Hospital UCLA brings together child health researchers throughout the campus with the mission of creating a healthy future for children through transformative cross-disciplinary research. In keeping with that mission, the CDI recognized Vision To Learn's model as a potentially innovative and cost-effective solution to the challenge of reducing disparities in educational outcomes by improving access to and use of corrective lenses for children with poor vision. To better understand how providing corrective lenses impacts their ability to succeed in school, three CDI researchers (Drs. Dudovitz, Slusser and Chung) conducted an independent evaluation of the Vision To Learn program. Given the importance of academic achievement to a child's overall health trajectory, this information is critical in calculating the societal return on investment of basic pediatric vision correction.

First, we conducted separate focus groups with kindergarten through 8<sup>th</sup> grade students, their parents and their teachers, 3-12 months after they received corrective lenses. Participants described how:

- Before they got glasses, students with poor vision had difficulty focusing and participating in class and struggled to complete their work, often to the point of giving up.
- After receiving glasses, they were able to pay better attention in class, were more engaged, and were more willing to complete their schoolwork, all of which contributed to better overall school performance.
- Serving students in school rather than referring them to an outside optometrist increased both access to and use of glasses by both making it easier for families to obtain glasses and changing the school culture to decrease the stigma associated with wearing glasses.

We then looked at the school records of 887 largely low income Latino/Hispanic and African-American 2<sup>nd</sup>-6<sup>th</sup> grade students attending 30 different public schools in Los Angeles who received glasses to correct their poor vision. The schools included serve a student population that is, on average over 90% African American and Latino/Hispanic and 90% economically disadvantaged. We conducted piecewise regressions to compare their grades from each grading period in math and reading for the 2 years before they got glasses to 1 year after they got glasses.

- Preliminary results demonstrate that before they got glasses, students on average had a downward trajectory in their math grades—i.e., their grades were steadily dropping over time. After they received their glasses, however, that trend reversed and their math grades began to improve.
- The improvement in their math grade trajectory was statistically significant—the estimated difference in these trajectories was 0.1 GPA points per year (Figure 1), which amounts to an estimated difference of 4% over 1 year.

Figure 1. Math GPA over time for all students

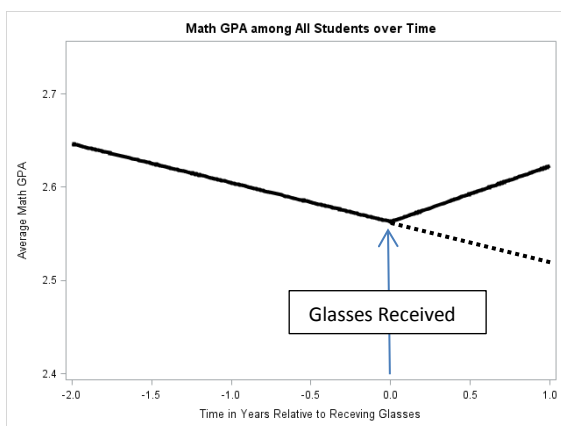
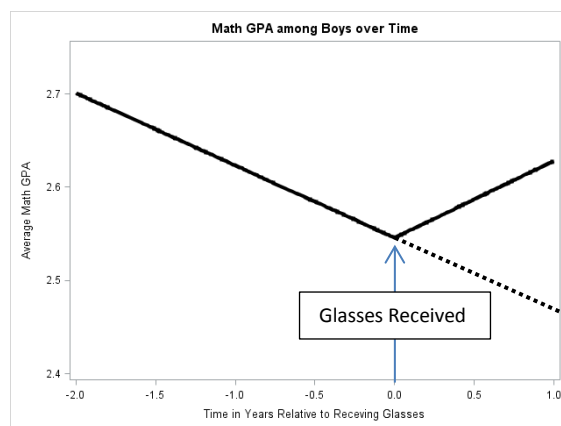


Figure 2. Math GPA over time for boys



- Compared to girls, boys showed a more dramatic improvement in their math grade trajectory. For boys, the estimated difference in their trajectory was 0.2 GPA points per year (Figure 2), which amounts to an estimated difference of almost 8% over 1 year.
- For grades in reading, students also had an improved trajectory in their grades after receiving glasses, though this was not statistically significant. Prior to receiving glasses, students' grades in reading increased by an average of 0.03 GPA points/year during the 2 years prior to being served by Vision To Learn. After receiving glasses, the average annual GPA change increased to 0.05 GPA point over 1 year.



The true impact of corrective lenses on school performance may actually be larger than what is estimated here, since these analyses do not account for the likelihood that some proportion of glasses were lost, broken, or never used. In addition, academic gains were only monitored for 1 year, leaving open the possibility of continued gains over time.

While these initial results are exciting, there are still many important questions that remain. We hope to conduct future studies to understand whether these results also hold true in other core subjects (e.g., science), why glasses appear to have a stronger impact on boys with poor vision than on girls, whether grades continue to improve over longer periods of time, whether these findings hold for students from other racial/ethnic, sociodemographic and regional backgrounds, whether access to and use of corrective lenses is associated with other academic outcomes, like improved attendance and test scores, how the trajectories of students with vision problems compare to their peers with normal vision. Larger, more in-depth studies are needed to determine the most effective and efficient policy solutions for vision correction in public schools. Nevertheless, Vision To Learn is to our knowledge the first such program to be rigorously evaluated and shows excellent early promise as a state and national model.

This work was supported by the University of California Los Angeles Center for Translational Science Institute Biostatistics Program (Grant Number UL1TR000124).

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