

11th Annual



**Prevent
Blindness**

Focus on Eye Health
National Summit

Eye-conic Approaches to Eye Health

July 13–14, 2022

A Virtual Interactive Event



Leveraging Data Sources to Tell the Children's Vision Story

Megan E. Collins, MD, MPH
Allan and Claire Jensen
Professor of Ophthalmology
Wilmer Eye Institute
Director, Johns Hopkins
Center for School Health

Disclosure



- Board of Directors, Warby Parker Impact Foundation
- Scientific Advisory Committee, Versant Health



**Eye-conic
Approaches
to Eye Health**

**How do we leverage
data to tell the
children's vision
story?**



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Baltimore Reading and Eye Disease Study (BREDS)



- School-based research program to study the impact of eyeglasses on reading achievement
- 12 Baltimore City Public Schools, 2014-2016
- Second and third grade students
- Vision and reading assessments at baseline, one year, and two years

Data on Pediatric Vision Care

- What are the data about how pediatric vision care, including vision screening, is being delivered in the United States? Where do the gaps exist?
 - Age groups (pre-school and school-age)
 - Professional society position statements (e.g. AAP, AAO, AAPOS)
 - Federal and state guidelines
 - Existing databases (federal/state/local/school district)
 - School-based vision programs (how many are there, where do they operate)

Individual vs Population Health

THE MUTUAL DEPENDENCE OF PERSONAL AND POPULATION HEALTH DATA



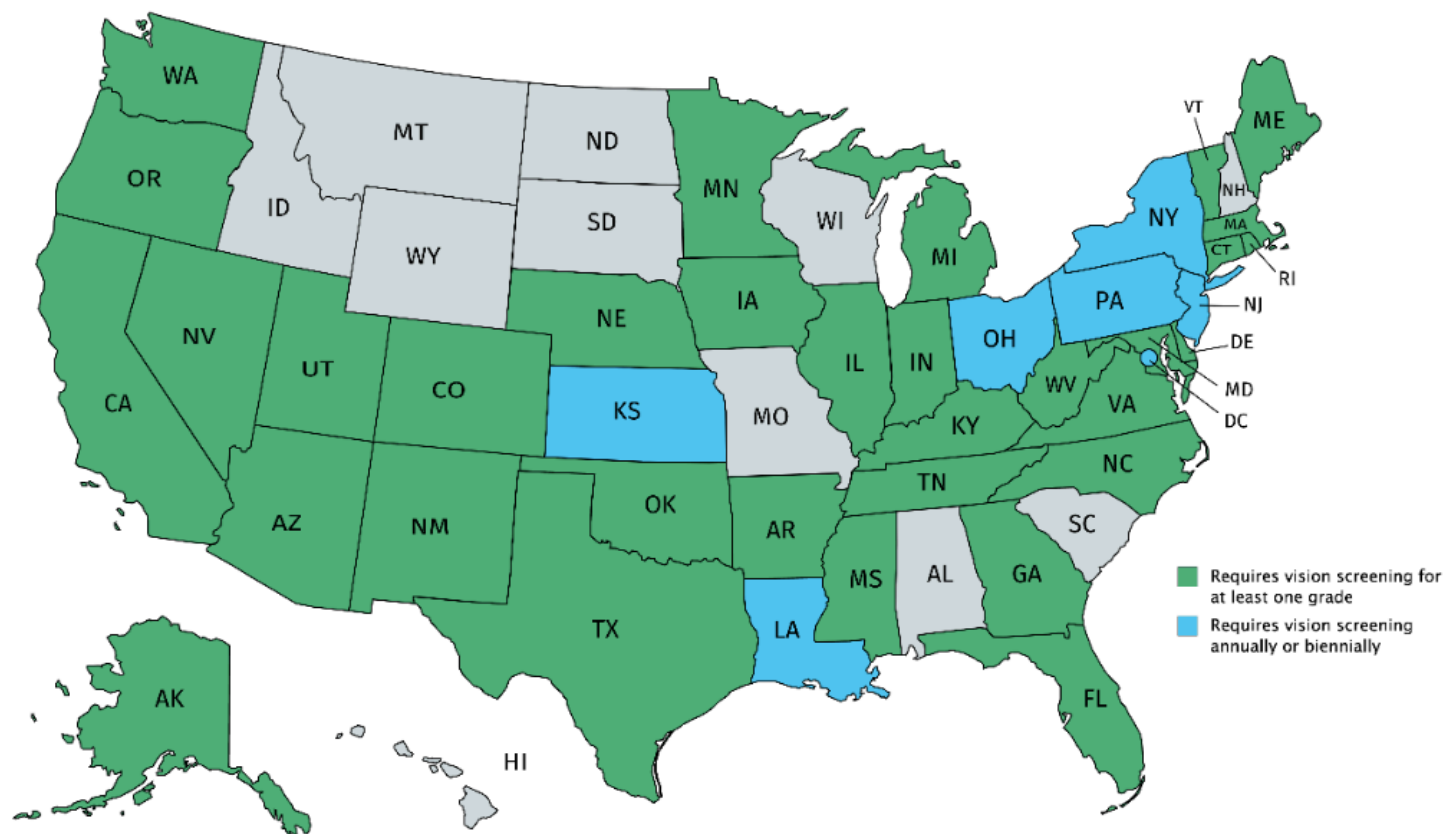
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<https://www.wikimedia.org/>

Questions to Consider

- What data do we have about pediatric vision screening?
 - **How many states require pre-school and school-age vision screening?**
 - **How many children do not pass vision screenings?**
 - **How many children successfully connect with care?**
- Why does vision matter to pediatric health and life outcomes?
 - **What is the impact of vision on learning in childhood?**
 - **What is the impact of vision on mental health?**
- What data do we have about eye doctors and insurance coverage?
 - **How many pediatric eye care providers are there in the United States?**
 - **What, if any, pediatric eye care is covered in private and public insurance plans?**
- What do we know about the impact of social determinants of health (SDoH) on pediatric eye care?
- What lessons can we learn from data reporting in other pediatric health conditions?

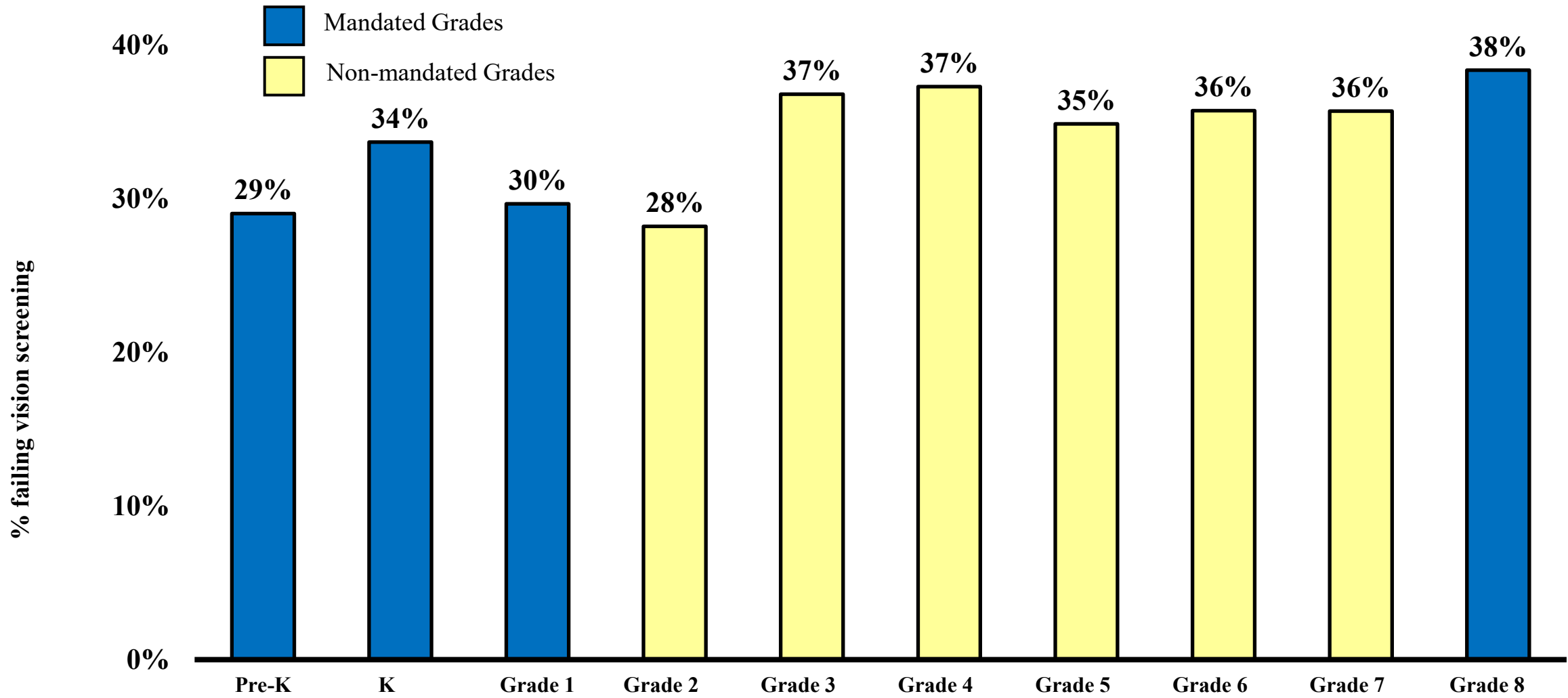
Vision Screening Requirements by State



Wahl, Optom Vis Sci 2021;98:490–499

School or community vision screening in school-age children, as stated in the legal code or government document. States with no vision screening requirements for school-age children are left uncolored.

Vision Screening Failure Rate by Grade Levels



Pre-K = pre-kindergarten; K = kindergarten; Percentage showing proportion of students who failed among those enrolled per grade level



School-Based Vision Programs





Eye-conic Approaches to Eye Health

Why does vision matter to pediatric health and life outcomes?

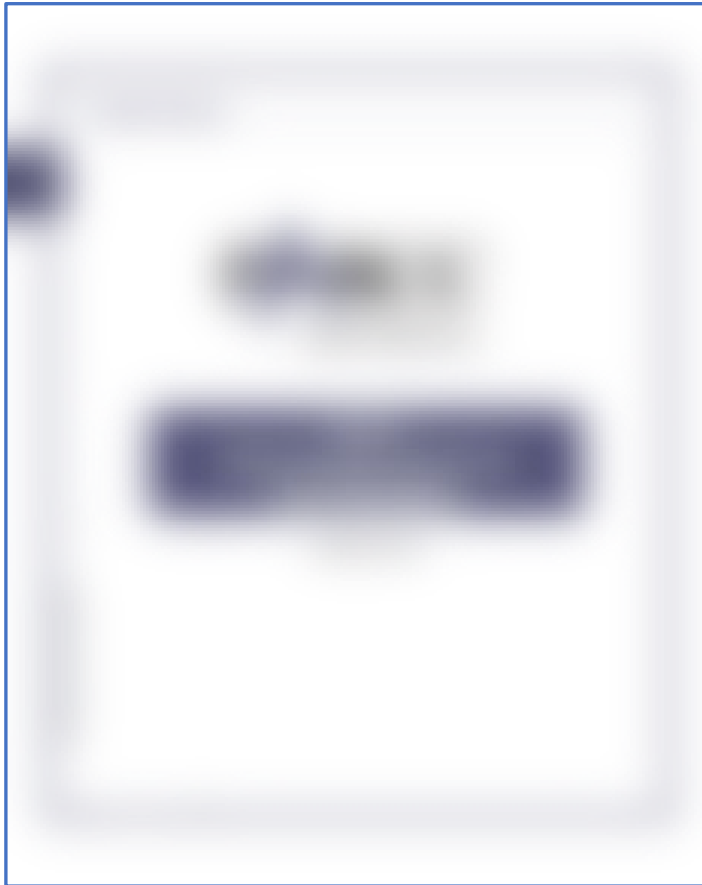
- Amblyopia and non-refractive eye problems
- Refractive error
- Mental health
- Academic outcomes
- Sports
- Employment
- Driving
- Overall quality of life



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Academic Consequences of Vision Impairment



In Plain Sight: Reading Outcomes of Providing Eyeglasses to Disadvantaged Children

Robert E. Slavin, PhD^a, Megan E. Collins, MD^b, Michael X. Repka, MD, MBA^c,
David S. Friedman, MD, PhD, MPH^c, Lucy I. Mudie, MBBS, MPH^c,
Josephine O. Owoeye, O.D., MPH, FAAO^{b,1}, and Nancy A. Madden, PhD^a

^aSchool of Education, Center for Research and Reform in Education, Johns Hopkins University, Baltimore, MD; ^bKrieger Children's Eye Center, Wilmer Eye Institute, Baltimore MD; ^cWilmer Eye Institute, Johns Hopkins School of Medicine, Baltimore MD

JESPAR, 2018

Impact of eyeglasses on academic performance in primary school children

Lisa A. Hark, PhD, RD,^{*,†} Avrey Thau, BS,[‡] Alexandra Nutaitis, BS,[§] Eileen L. Mayro, BA,^{*,†}
Tingting Zhan, PhD,^{||} Nooreen Dabbish, PhD,^{||} Judie Tran, BS,^{*} Linda Siam, BS,^{*} Michael Pond, BA,^{*}
Angela R. Rice, MBA,[¶] Alex V. Levin, MD, MHSc^{‡,**,†}

Canadian Journal of Ophthalmology, 2019

Research

JAMA Ophthalmology | **Original Investigation**

Effect of a Randomized Interventional School-Based Vision Program on Academic Performance of Students in Grades 3 to 7 A Cluster Randomized Clinical Trial

Amanda J. Neitzel, PhD; Betsy Wolf, PhD; Xinxing Guo, MD, PhD; Ahmed F. Shakarchi, MBBS, MPH;
Nancy A. Madden, PhD; Michael X. Repka, MD, MBA; David S. Friedman, MD, PhD, MPH;
Megan E. Collins, MD, MPH

July 14, 2022

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- Study results show positive impact of eyeglasses on academic achievement
 - Improved test scores on i-Ready English Language Arts
 - Particularly large gains for girls, students in special education, students performing in the lowest quartile at baseline
- All students
 - **Two to four months** of additional education
 - Students performing in the lowest quartile and students in special education
 - **Four to six months** of additional learning

- **Impact of vision impairment and ocular morbidity and their treatment on depression and anxiety in children: A systematic review (Ophthalmology, 2022)**
- Vision-impaired children experienced significantly higher scores of depression and anxiety than normally-sighted children.
 - In particular, myopic children experienced higher scores of depression
- Strabismus surgery significantly improved symptoms of depression (SMD: 0.59 95% CI 0.12-1.06, three studies) and anxiety (SMD: 0.69 95% CI 0.24-1.14, four studies) in children.

Li D, et al. Ophthalmology. 2022 May 31.

Pediatric Eye Care in the United States



- Who provides vision care to children in the US?
- How many pediatric optometrists/ophthalmologists practice?
 - Geographic variations
 - Insurance
 - Public
 - Private
 - Uninsured

- **The American Association for Pediatric Ophthalmology and Strabismus workforce distribution project (2007)**
- 749 pediatric ophthalmologists who were members of AAPOS practiced in 154 of 280 metropolitan statistical areas (MSA)
- 227 additional pediatric ophthalmologists in the AAO member database that did not belong to AAPOS
- 2.7 AAPOS members/million persons for the entire United States
- The AAPOS member/million persons ratio ranged from 1.3 (Las Vegas, NV) to 27 (Iowa City, IA)

Shortage of Pediatric Ophthalmologists



Comparison of fellowship match opportunities and results across pediatric surgical subspecialties

Isdin Oke, MD, Gena Heidary, MD, PhD,
Jason S. Mantagos, MD, PhD,
Ankoor S. Shah, MD, PhD,
and David G. Hunter, MD, PhD

There is a nationwide shortage of pediatric ophthalmologists, with trends in fellowship applicants foreshadowing a continued reduction in the number of active pediatric ophthalmologists in the years ahead. In this study, we investigated whether similar fellowship

Oke et al, J AAPOS, 2022

- How do social determinants of health impact pediatric eye care?

Social Determinants of Health



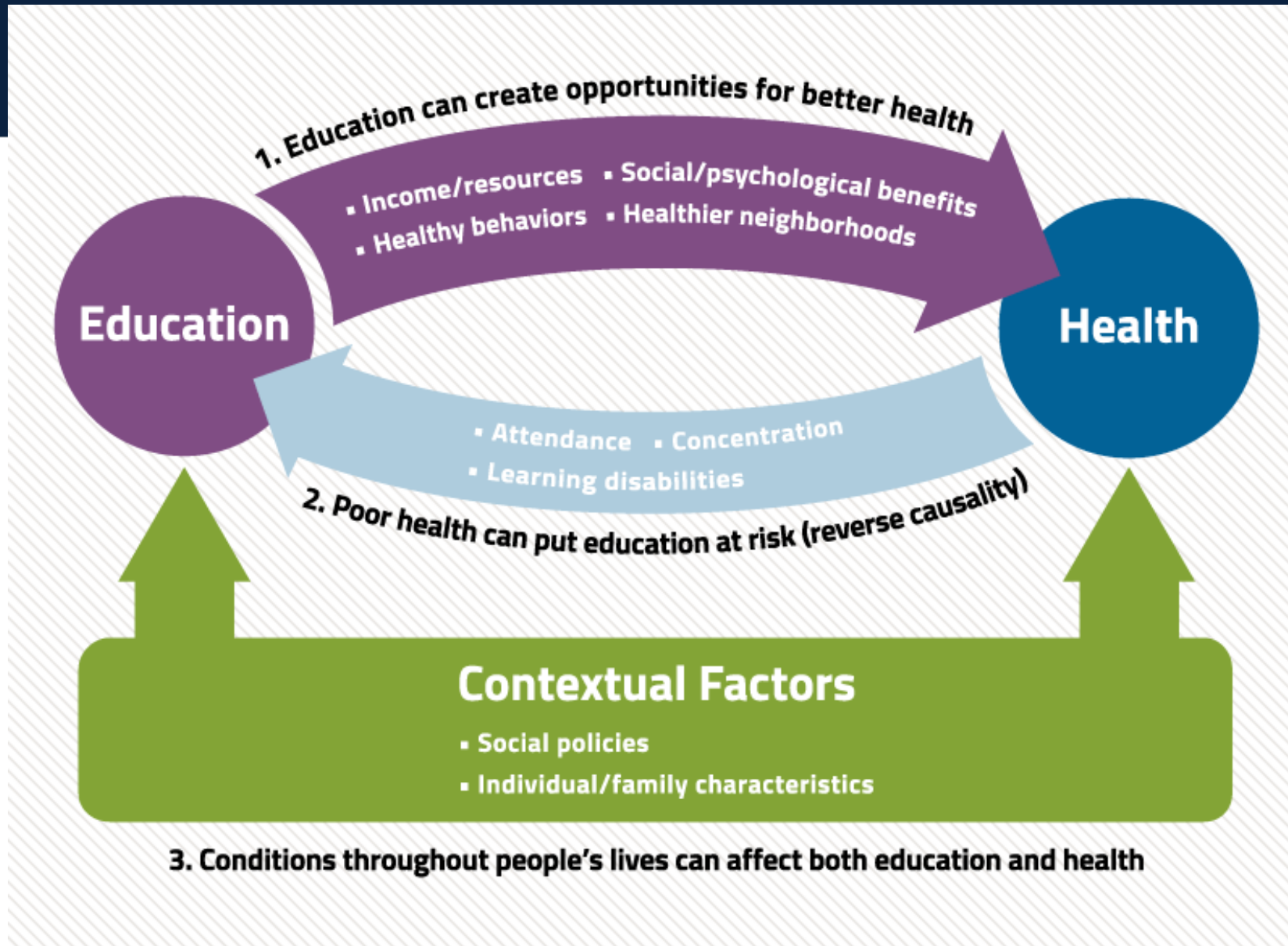
<https://www.cdc.gov/visionhealth/determinants/index.html>

SDoH and Amblyopia Outcomes



- IRIS Registry identified 1,760,066 individuals with amblyopia for a prevalence of 2.47%
 - Refractive error alone accounted for 68.9% of childhood cases of amblyopia
- Overall amblyopia treatment success rate was **77.3%** for children aged 3-7 and **55.5%** for children aged 8-12
- Mean amblyopic eye visual acuity improved 1.8 lines for younger children and 0.8 lines for older children, but mean residual amblyopia was still more than 2 lines.
- The odds ratios for success were **significantly lower** for African-American (0.67; 95% confidence interval [CI] = 0.58 to 0.78) and Hispanic or Latino (0.84; 95% CI = 0.75 to 0.94) children compared with white children.

Repka, AJO, 2020



<https://societyhealth.vcu.edu/work/the-projects/why-education-matters-to-health-exploring-the-causes.htm>

VISION FOR BALTIMORE



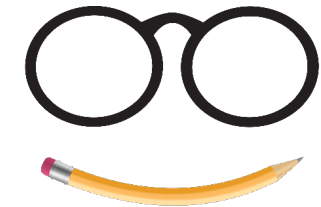
**BALTIMORE
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WARBY PARKER

**JOHNS HOPKINS
UNIVERSITY & MEDICINE**



Vision To Learn
Focus on the Future

Lessons from General Pediatric Care

- What can we learn from other pediatric health conditions?
 - Immunizations
 - Hearing
 - Dental health
- What data is collected?
- How is it being used to inform policy?

🏠 Hearing Loss Homepage

What is Hearing Loss? +

Screening & Diagnosis

Types of Hearing Loss

Treatment & Intervention +
Services

Data & Statistics -

EHDI Annual Data -

2019

2018

2017

2016

2015

2014

2013

Annual Data: Early Hearing Detection and Intervention (EHDI) Program

If you have any questions about these data please email the CDC EHDI program at: ehdi@cdc.gov.

More and more babies who are born deaf or hard of hearing are being **identified early** in the United States



2005



2,634
babies

2019



5,934
babies

Using vision data to advance health equity



- To inform evidence-based practices in pediatric eye care delivery
- To advocate for equitable access to all pediatric eye care services
- To lobby for standardized screening requirements and data collection on vision referral outcomes
- To better elucidate gaps in service delivery
- To explore alternate approaches to care delivery (e.g. school-based vision care and other community-based partnerships)

Limitations & Opportunities

- What are the limitations to getting and maintaining the data we need?
 - Standardization of what data is collected
 - Electronic-format of data collection
 - Systems-based approach
 - Integration with other data collection measures

Questions

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