

The cost-effectiveness of school and clinic-based vision testing programs to detect amblyopia in young children in an urban north American city

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Purpose: The cost-effectiveness of vision testing programs for the detection of amblyopia is unknown. We conducted a cost-effectiveness analysis to compare the costs and outcomes of school and community-based vision testing strategies designed to detect amblyopia in children from a societal perspective.

Methods: We built a probabilistic health-state microsimulation conducted for a hypothetical cohort of 25,000 children living in Toronto, Canada. Three strategies were compared: (1) current standard i.e., vision testing annually from age 3 to 18 years by pediatricians as part of well-child visits; (2) current standard plus optometric exam once between 2 to 5 years of age, and annually thereafter until 18 years, as recommended by national professional associations and the provincial health ministry ("current standard plus optometric exams"); and (3) current standard plus vision screening by a public health unit in kindergartens of elementary schools at age 5 years ("current standard plus in-school screening"). The cost perspective was that of the society. Outcomes were measured as *amblyopia cases mitigated*. Model parameters were estimated from the published literature, the Ontario Schedule of Benefits and Fees, and an ongoing provincial vision screening trial in Ontario. The time horizon was 16 years.

Results: The total average population cost of vision testing was C\$23.06 million in the current standard (C\$22.93 – C\$23.18 million), C\$39.64 million (C\$39.51 – C\$39.80 million) in current standard plus optometric exams, and C\$24.21 million (C\$24.09 – C\$24.34 million) in current standard plus in-school screening. The amblyopia cases mitigated were 664 (613-708) for the current standard, 1586 (1583-1589) as a result of current standard plus optometric exams and 747 (693-796) for current standard plus in-school screening. Compared to the current standard, the additional cost per case mitigated for current standard plus optometric exams was C\$17,988 and C\$13,901 for current standard plus in-school screening.

Conclusion: Based on our analysis, school-screening was the most cost-effective strategy for amblyopia testing compared to the current standard. This information could be used to inform the allocation of resources for health programs by governments.

Layman Abstract (50-200 words)

Amblyopia is one of the most common vision conditions in childhood which affects about 3 out of 100 children in north America. If not detected and treated at an early age, amblyopia may cause permanent impaired vision which may impact the ability to read and have long-term implications, including the choice of future occupation. In order to prevent permanent vision impairment, eye exams are recommended for children routinely from an early age. In north America, vision screening should be conducted as part of well-child visits, but reports indicate this is not happening routinely. Other vision testing strategies that could be more effective in detecting children with vision impairment at an early age include, routine eye exams for all by an optometrist, or school-screening in kindergarten with referrals to optometrists (for those that need it). It is important to know if these programs are effective and beneficial, and if the benefits outweigh the price, especially in comparison to current screening modalities. This type of evidence is most important to inform decisions by governments in choosing health programs to fund.