

Table 4: Recommended Elements in Assessing Visual Readiness for Early Elementary.

Examination Component	Purpose
Visual Health	Ensure health and good function of the eyes and the visual nervous system.
Refraction >Retinoscopy or Autorefraction (more recent technology w/ trained personnel)	Determination of the degree of nearsightedness, farsightedness, and astigmatism.
Cycloplegia – borderline or clinically significant cases.	Pharmacologic agents are administered as drops to silence the accommodative response in order to determine more accurately the eye's refractive error. Detects latent hyperopes and cases of accommodative spasm.
Visual acuity at distance (min 3m)	Distance acuity reveals myopes who will struggle to see the board. These children will fare better in class compared to hyperopes who will often pass this test. Near visual acuity testing will reveal some degree of facial muscular strain in hyperopes, if not observable decreases in acuity.
Ocular Motility >Ocular range of motion and comitancy >Binocular alignment and posture (including cover testing) >Pursuit movements and fixations >Saccades	>Ocular range of motion: Looking for neurological concerns, disease, strabismus, diplopia. >Binocular alignment and posture: Determination of restrictions on targeting and target maintenance. >Pursuit movements and fixations: Insight into neurodevelopmental status. >Saccades: Looking for potential impediments to rapid automated sequential targeted movements required for reading.
Color	Not critically important in visual function, though color vision deficiencies will require some activity modifications. There are some limitations in career options depending upon color deficiencies.
Stereopsis	Provides measure of depth perception, but a better indicator of relative visual development and alignment status. Measured as seconds of arc of image disparity detectable between the two eyes. May not be required if refractive error and alignment are known.

reports,¹³⁹ such as visual acuity screening or photo screening, are no more than 27% and 37% sensitive, respectively, revealing a strong need for more robust standards.^{15,140} The Modified Clinical Technique, by comparison, is 96% sensitive and 98% specific for common VIL.¹³⁴

In order to ensure that children are properly assessed for potential significant visual impediments to learning, it is proposed that all children be assessed for early learning readiness and adequate visual health following specific guidelines (Table 4), beginning shortly before grade 1, then occasionally afterwards following more abbreviated protocols.^{121,125,133,141,142} The elements of the comprehensive examination are practical for on-site assessments of large groups, and sufficiently detailed

data regarding refractive error, visuomotor skills, and visual neurosensory and neuromuscular function can be obtained in a relatively brief time. It is reasonable, then, that such a protocol should be considered compulsory. Refraction using more recent autorefractor technology is an effective means of increasing reliability of referrals to tertiary care and of reducing overall long-term costs.^{135,143} Occupational therapists and nurses are ideally suited for training for the purpose of meeting the assessment needs of larger groups, such as schools, with instructions for referral to trained vision professionals when children are borderline or do not meet standards.^{144,145} This approach significantly increases rates of detection of affected children and reduces costs of unchecked vision for health and education authorities. School-based solutions where the examiner attends the school to assess students are agreeable for parents with work and home scheduling needs.

Comprehensive assessment programs, as compared to current screening methods, are prudent fiscally and with respect to health and education outcomes.^{120,146} The appearance of an initial cost might dissuade some from supporting policy for compulsory examination, but data does not support cost as a sufficient reason to deter school authorities or state or provincial governments from implementing mandated comprehensive visual assessments.¹⁴⁶⁻¹⁴⁹ Research does support the efficacy of early visual assessment and management as a means of improving outcomes and reducing future costs for treatment of conditions such as amblyopia,⁷⁴ all of which offset the initial cost of detection. Furthermore, it has been shown that regimented visual assessment and intervention leads to greater academic standings overall.¹⁴⁶ Still, tightening school and health budgets encroach upon school nursing and monitoring programs, and more effort is now spent on making vision screening faster and more efficient, but with decreased accuracy.^{140,150,151} This reduction in service level leads to increased false negatives, and, it would seem, higher costs for intervention for academic, behavioral, and health concerns resulting from unchecked VIL over the child's lifetime. Abbreviated screening protocols may well represent false economy while providing little to no benefit to those who need it most.¹⁵

Summary

Because robust visual input is critical in the development of perception and in reading acquisition, VIL present a threat to learning processes and behavior in the visually demanding neo-traditional classroom. Many children struggle against vision difficulties, and yet most VIL are ignored in pediatric visual screenings. Current models of visual screening allow most significant problems to pass through as false negatives. The lifetime cost of these is significant to the individual and to society.

Moderate and severe visual functional impairments spur a variety of behavioral adaptations and responses, depending on the nature and depth of the impediments and on the