

Vision Care for Connecticut Children

EXECUTIVE SUMMARY

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INTRODUCTION

Vision and eye problems are among the most common conditions of childhood. Vision disorders range from temporary conditions such as conjunctivitis to extremely serious eye diseases and conditions that can cause blindness. At the request of the Children's Fund of Connecticut, the Children's Health Council conducted a comprehensive review of current literature and policy on vision screening for detection of ophthalmologic problems and formulated options for improving vision care for children in Connecticut.

VISUAL DEVELOPMENT

Normal visual development occurs rapidly during infancy and continues in early childhood until at least 8 to 9 years of age (Table 1). Soon after birth, anatomic changes in the eye, the neural pathways, and the brain set the stage for dramatic improvement in visual acuity during the first three to four months of life, the critical period of visual development.

Normal visual development is dependent on ocular structure and function as well as ongoing visual stimulation. In the eye, good vision is achieved with clear retinal images, equal retinal clarity, proper eye alignment, and functioning neural pathways. In the brain, clear and equal visual input is necessary for proper cell growth and development in the visual cortex.

PEDIATRIC VISION PROBLEMS

In general, the earlier the onset of abnormal visual stimulation, the greater the degree to which vision is affected and the greater the risk that vision problems will be irreversible. Infants and children who are diagnosed and treated as soon as possible have the best chance of avoiding irreversible visual problems and preserving or regaining near normal visual acuity (Table 2).

VISION EXAMS AND VISION SCREENING

Recommendations of Professional Organizations

The long-term negative impact of strabismus and other eye disorders in young children and the ability to successfully intervene to prevent the consequences of these conditions establishes the importance of discovering these problems at the earliest possible age. Pediatricians, ophthalmologists and optometrists play

major roles in the detection, diagnosis and treatment of vision disorders in children; however, they do not agree entirely on who should screen and when.

In April 2003, the American Academy of Pediatrics (AAP), the American Association of Certified Orthoptists, the American Association for Pediatric Ophthalmology and Strabismus, and the American Academy of Ophthalmology issued a joint policy statement recommending assessment for eye problems at all routine health supervision visits; visual acuity measurement for children 3 and older; and referral of children with ocular or visual abnormalities to pediatric ophthalmologists or an eye care specialists who are trained to treat pediatric patients. None of these physician organizations recommends routine comprehensive eye examinations by ophthalmologists or optometrists for asymptomatic children. In contrast, the American Optometric Association cautions against “undue reliance on vision screening by pediatricians or other primary care physicians” and recommends routine comprehensive eye examinations at 6 months after birth, age 3, age 6 and every two years thereafter.

Vision Screening Requirements in Connecticut

Children enrolled in Connecticut’s publicly funded and administered health and education programs, such as Medicaid, Head Start, school readiness programs and public schools, are subject to vision screening requirements for participation. When taken together, these requirements apply to most Connecticut children 3 and over at some point in their development (Table 3). However, young children who do not participate in these programs are not subject to these requirements and may not be screened for serious vision disorders.

DO CHILDREN RECEIVE APPROPRIATE VISION CARE?

Vision screening is part of a comprehensive well-child exam for children 3 and over; however, the evidence suggests that very young children are less likely than older children to receive vision screenings - an objective measurement of visual acuity. Results of surveys show that many pediatricians do not routinely perform visual acuity testing for children under 4 for whom the screening is time-consuming and requires cooperation from the child. Preschool children who are not enrolled in programs with vision screening requirements are also less likely than older children to receive age-appropriate visual acuity screening in other settings.

Vision Screening for Children in HUSKY A

Children in HUSKY A should have well-child care with subjective vision screening at each well-baby visit through age 2, then objective vision screening at ages 3, 4, and 5, and at 9 to 10 years of age. However, one of every four children age 3 and 4 does not have well-child care in the course of a year and the proportion without well-child care increases with age.

Vision screening performed at a well-child visit (CPT code 99173) can be reported or billed separately by providers who see children in HUSKY A. A

search of encounter data for records corresponding to screening tests for visual acuity revealed that providers submitted claims to all four participating health plans and that all the health plans processed claims for this service even though it does not appear on the Medicaid fee-for-service fee schedule.

Ophthalmologic Conditions and Care for Children in Husky A

In the absence of Connecticut-wide data on children's eye health and vision care, the prevalence of ophthalmologic conditions and care for children in HUSKY A was determined, based on diagnoses associated with care received in a one-year period (Figures 1 and 2). Vision problems due to refractive errors are among the most common chronic conditions of childhood, a fact born out by the high prevalence of disorders of refraction and accommodation (29%), especially among adolescents (47% of children 11-17). The prevalence of strabismus was 3 percent among children less than 6 and 2% among children 6 to 10. Just over 10% of children were seen for an initial examination by an ophthalmologist or optometrist. Most encounter records for vision care corresponded to frames and spectacle lenses.

Provider Participation in HUSKY A

Access to vision care for children in Connecticut's HUSKY program is dependent on the availability of ophthalmologists. Fifteen pediatric ophthalmologists practice in Connecticut. Thirteen provide care for members of BlueCare Family Plan and 8 pediatric ophthalmologists participate in Community Health Network. HealthNet and First Choice/Preferred One do not list any of the 15 pediatric ophthalmologists in their provider panels. The proportion of all ophthalmologists in Connecticut who participate in HUSKY A health plans ranges from 7 percent in Health Net to 61 percent in BlueCare Family Plan. No information is available to indicate which providers are accepting new patients. Calls to the HUSKY Infoline suggest that obtaining vision care is a problem for some families.

IMPROVING VISION SCREENING FOR CHILDREN

Increasing The Number Of Children Who Receive Vision Screening Exams

Efforts to increase the number of children who receive vision screening exams are mainly centered on preschool children. Prevent Blindness Connecticut has targeted preschool children for vision screening and in 2002, screened 12,600 children (9% of all preschool children), using trained staff of local health departments, Visiting Nurse Associations, Head Start sites and School Readiness programs. Another initiative in New Haven is designed to increase comprehensive hearing and vision screening in school readiness programs operated by the New Haven Board of Education. Published results of studies on increasing vision screening in pediatric practice settings suggest that this

approach is affected by practical considerations of time and reimbursement, as well as lack of practical training in preschool vision screening during pediatric residency.

Improving Vision Screening Methods: The Vision in Preschoolers Study

Regardless of the approach, the success of efforts to improve vision care for preschool children is dependent on the validity and reliability of vision screening methods. In 1998, the National Eye Institute convened a panel of experts to determine “useful screens to efficiently detect amblyopia risk factors and other significant problems” and “to provide and evaluate the practicality and effectiveness of ocular screening services for young children, including photoscreening technology.” The panel found a lack of scientific data to support the validity of screening methodologies, the effectiveness of the programs implementing these methodologies, and the adequacy of follow-up and treatment of children identified through these screening programs. The panel called for large-scale studies to address the reliability and validity of commonly used screening methods.

As a result of the expert panel’s report, the National Eye Institute commissioned the Vision in Preschoolers (VIP) Study. The first phase of the study is intended to establish which screening tests can accurately predict which preschool children will benefit from comprehensive vision examinations administered by optometrists or pediatric ophthalmologists. Results for this phase will be published in late 2003 or early 2004. The next phase of the study will evaluate whether tests with the highest sensitivity and specificity are also accurate when administered by pediatric nurses and lay screeners.

Requiring Eye Examinations for School Entry

In 2000, Kentucky became the first state to adopt a law requiring all children to have an eye examination by an optometrist or ophthalmologist before entering public school, public preschool or Head Start programs. Amblyopia was diagnosed in 2 percent of children age 3, 3 percent of children 4 to 5, and over 4 percent of children 6 and older. About 3 percent of children age 3 and 4 were diagnosed with strabismus. Just under 1 percent had other ocular or visual pathology. As a result of screening, glasses were prescribed for almost 14 percent of the children, including 11 percent of children age 3 and 20 percent of children six and older. The prevalence of eye diseases was similar for children who lived in low-income and high-income counties.

In 2001 and again in 2003, similar legislation was considered by the Connecticut General Assembly but not enacted. These bills were supported by optometrists but not by pediatricians and ophthalmologists.

CONCLUSIONS

Visual development

- Normal visual development occurs rapidly during infancy, especially during the first three to four months of age, and continues in early childhood until at least 8 to 9 years of age. Normal visual development is dependent on clear retinal images, equal retinal clarity, proper eye alignment, and appropriate visual stimulation.

Pediatric vision problems

- Pediatric vision problems range in prevalence from rare to relatively common and in severity from minor temporary or correctable conditions to extremely serious irreversible conditions that result in blindness.
- The most serious vision and eye disorders in infancy and childhood are strabismus, amblyopia, cataracts, pediatric glaucoma, and retinopathy of prematurity. Refraction errors are the most common vision problem but are also the most correctable and least debilitating for most children.
- In general, the earlier the onset of vision problems, the greater the risk of permanent, irreversible loss of vision. The earlier the detection and treatment, the better the chance of preserving or regaining near normal visual acuity.

Vision exams and vision screening

- Children should be assessed for eye problems in the newborn period and at all subsequent routine health supervision visits, with visual acuity measurement beginning at 3 years of age using the most sophisticated test that the child is capable of performing. Barriers to routine visual acuity screening by primary care providers include time considerations and reimbursement issues.
- Primary care and eye care specialists do not agree on how best to screen for vision problems. Pediatricians and pediatric ophthalmologists recommend that eye examination be performed by primary care providers at all well-child visits, with referral to a pediatric ophthalmologist or pediatric eye care specialist for diagnosis and treatment of ocular abnormalities or vision problems. Optometrists, cautioning against reliance on primary care providers, recommend routine comprehensive eye examinations at regular intervals throughout childhood.
- The National Eye Institute is conducting a large-scale study of the validity, reliability and cost-benefit of commonly used vision screening methods when performed by lay screeners, primary care providers, and eye care specialists.

Appropriate care

- Professional guidelines for pediatric practice call for external examination of the eyes and age-appropriate assessment of visual acuity at visits for routine health supervision, with referral of all children with ocular abnormalities or failed vision screening to pediatric ophthalmologists or eye care specialists who are trained to evaluate and treat pediatric patients.
- Vision screening or documentation of screening is required for children covered by Medicaid, for children in some child care settings and pre-school programs (Head Start, School Readiness), and for children in Connecticut's public schools. As a result, school-aged children are likely to be screened, while many preschool children are at risk for not receiving age-appropriate visual acuity screening.

RECOMMENDATIONS

Await results of the National Eye Institute's Vision in Preschoolers Study

- Before developing any new initiatives aimed at increasing vision screening for young children, await results of National Eye Institute's evaluation of the validity and reliability of commonly used vision screening methods when administered by optometrists or pediatric ophthalmologists.

Promote screening in primary care

- In collaboration with CT Chapter of American Academy of Pediatrics and other professional groups, develop and disseminate information for providers about reimbursement, referrals, enabling services, and overcoming other barriers to age-appropriate eye examinations and vision screening during well-child visits.

Support preschool vision screening initiatives

- In collaboration with Prevent Blindness Connecticut and others, support screening initiatives aimed at increasing the percentage of preschool children who receive age-appropriate vision screening.

Promote parents' awareness of the importance of vision screening

- In collaboration with the Department of Public Health, professional organizations and vision advocacy groups, support efforts to increase parents' awareness of the importance of good vision and regular screening during early childhood.

Table 1. Normal Visual Development and Indications for Referral for Ophthalmologic Evaluation

Visual Ability	Normal Development	Refer for Ophthalmologic Evaluation
Binocular vision	Binocular fusion at 2-3 months; dependent on clear visual stimulation from properly aligned eyes	Strabismus after 2-3 months
Stereopsis	Develops between 3 to 6 months	Strabismus after 2-3 months
Visual acuity	20/200 to 20/800 at birth, improving to 20/40 to 20/150 by 6 months, 20/20 to 20/60 by one year and 20/25 to 20/20 by 7-9 years	Child 3-4 years with 20/50 or worse OR 2 or more line difference between eyes Child 5 or older with 20/40 or worse OR 2 or more line difference between eyes Myopia develops most commonly between 6 -12 years of age Hyperopia diminishes after age 6
Eye alignment	Intermittent strabismus at birth: 10% aligned (orthopia), 70% with some degree of exotropia (eyes turned out); 20% with esotropia Proper alignment by 2-3 months	Persistence of esotropia after 2 months or exotropia after 2 months
Eye movement	Jerky, fast to 2 months, becoming precise, smooth between 2-6 months	Onset of nystagmus by 6-8 weeks (congenital) or later in infancy or childhood (acquired)
Fix and follow	Sporadic fixation and smooth pursuit of objects through 2-3 months; by 3-6 months, fixation and vertical and horizontal tracking with alignment is present; uses pursuit eye movements when grabbing for objects at 6 months to 2 years	Poor fixation after 6 months
Pupillary response	Present after 30 weeks gestation; equal bilaterally	Pupils of unequal size; abnormal pupillary response to light and accommodation
Red reflex	Present at birth	Unequal, asymmetric or otherwise abnormal red reflex

Table 2. Pediatric Vision Problems

Condition	Nature of the Problem	Children Affected
Strabismus	<p>Misalignment of the eyes that interferes with normal development of vision because two images rather than one are transmitted to the brain.</p> <p>If left untreated, can result in vision loss due to abnormal visual neurodevelopment (amblyopia).</p>	3 - 4%
Refractive disorders	<p>Inability of cornea and lens to focus light rays on the retina in an elongated or shortened eyeball so that the image can be transmitted to the brain.</p> <p>Types of refractive disorder: myopia (nearsightedness), hyperopia (farsightedness), astigmatism (inability to focus light on just one point due to differential refractive power in the lens or cornea), and anisometropia (refractive difference between the two eyes).</p> <p>If left untreated, persistent severe hyperopia and anisometropia can result in vision loss due to abnormal visual neurodevelopment (amblyopia).</p>	<p>20% with some degree of myopia by the end of adolescence</p> <p>A small degree of hyperopia is normal in infants and young children through age 6</p> <p>1 - 2% with anisometropia</p>
Amblyopia	<p>Loss of vision in one or both eyes due to abnormal visual neurodevelopment that results from abnormal visual stimulation, especially during the critical period of visual development between three and four months and up to <u>at least</u> age 7</p>	<p>2.0 – 2.5%</p> <p>Up to 50% of children with strabismus</p>
Congenital cataracts	<p>Opacity of the lens that causes blurred vision</p> <p>If left untreated, can result in vision loss due to abnormal visual neurodevelopment (amblyopia).</p>	0.010 – 0.025%
Pediatric glaucoma	<p>Loss of vision due to increased intraocular pressure that can cause irreversible damage to the optic nerve and developing visual cortex;</p> <p>If left untreated, can result in vision loss due to abnormal visual neurodevelopment (amblyopia).</p>	Infantile: 0.01%
Retinopathy of prematurity (ROP)	<p>Condition that can result from exposure of the immature retina to high concentrations of oxygen, used to treat prematurity, that leads to disruption of normal vascularization of the retina.</p> <p>If left untreated, can result in vision loss due to abnormal visual neurodevelopment (amblyopia).</p>	<p>Up to 50% of infants 1000-1250 grams at birth; smaller infants are at greater risk</p> <p>Severe ROP almost never develops in infants >1500 grams at birth (98.5% of births)</p>

Table 3. Vision Screening Requirements in Connecticut

Program	Age	Requirement
Medicaid (HUSKY A)	Birth to age 21	Regularly scheduled well-child visits in accord with professional guidelines that include assessment for eye problems and visual acuity screening beginning at age 3. Vision services provided at intervals which meet reasonable standards of medical practice and as medically necessary, to determine the existence of a suspected illness or condition.
Licensed child care settings	Birth through school-age	Yearly physical examination, with health records that report special health problems including visual impairments.
School readiness programs	3 – 4 years	Documented record of health screens in accord with requirements for Connecticut's Medicaid program.
Head Start	3 – 5 years	Up-to-date on schedule of regular well-child care and, within 45 days of entry into the program, linguistically and age- appropriate screening for developmental, sensory (visual and auditory, behavioral, motor, language, social, cognitive, perceptual, and emotional skills....
Public schools	5 – 18 years	Health assessment prior to public school enrollment and in grade six or seven and in grade ten or eleven Vision screening for children in kindergarten, annually for children in grades one to six and for children in grade nine.

Figure 1. Estimated Prevalence of Eye Disease in Children 6 to 10 in HUSKY A: 2001-02

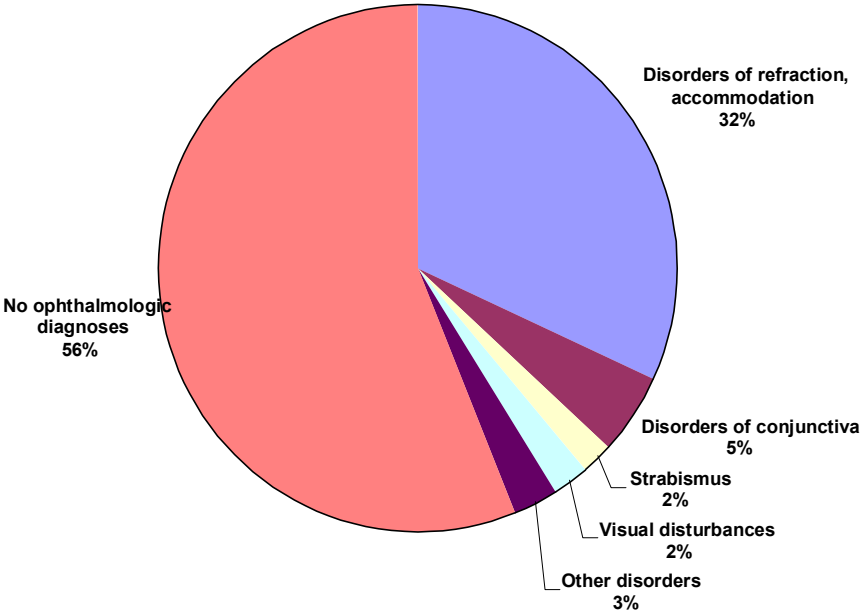
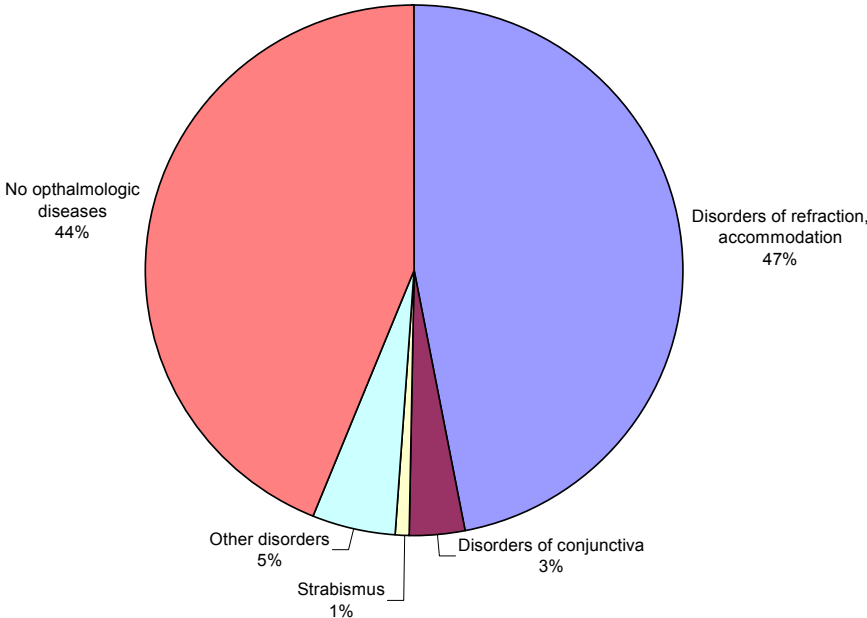


Figure 2. Estimated Prevalence of Eye Disease in Children 11-19 in HUSKY A: 2001-02





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