

# Eye Health Information

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## Glossary of Eye Care Terms

**Amblyopia:** Also called lazy eye. Decreased vision in one eye that leads to the use of the other eye as the dominant eye. A problem most commonly associated with children.

**Anti-Reflective (A/R coating):** A lens treatment for your glasses that helps to reduce distracting glare and eye fatigue by reducing the amount of light reflecting off the lens surface and making the lenses appear clearer. Your eyes will also be more visible behind the lenses.

**Astigmatism:** An eye condition where the eye cannot focus light uniformly in all directions resulting from an irregular curvature of the cornea, the crystalline lens, or the eye itself. Astigmatism results in mild to moderately blurred vision and/or eyestrain.

**Bi-Focal Lenses:** Lenses that use two different distinct powers in each lens, usually for near and distance correction.

**Cataracts:** A cataract is a clouding of the crystalline lens of the eye that makes it hard for light to pass through and be focused properly. In a normal eye, the crystalline lens is almost transparent, however injury, age or disease can cause the lens to eventually lose its clarity. When the lens becomes 'opaque,' it is called a cataract. Treatable by surgery.

**Color deficiency:** A lack of ability to distinguish certain colors. Commonly called "color blindness", the most common form of color deficiency is the inability to distinguish shades of red and green.

**Conjunctivitis (Pinkeye):** An eye condition caused by the inflammation of the conjunctiva, or clear membrane covering the white part of the eye and lining of the eyelids. The eyes will often appear swollen and red while also feeling gritty. It is often viral and may be contagious. There are actually 20 different types of conjunctivitis – from fairly common strains that usually pose no long-term danger to you or your child's vision – to types that are resistant to antibiotics. Call or see your doctor to treat pinkeye.

**Cornea:** The transparent, multi-layered front part of the eye that covers the pupil and iris. It provides most of the eye's optical power.

**Dry Eye Syndrome:** An eye condition that presents itself as itching, burning, and irritation of the eyes, is often called "dry eye syndrome". It is one of the most common problems treated by eye care professionals. It is usually caused by the breakdown (or deficiency) in the tears that lubricate the eyes. As we age, our bodies produce less oil to seal the eyes' watery layer. Hot, arid climates, air conditioning, certain medicines and irritants such as cigarette smoke can all increase dryness of the eye. Your eye care professional might prescribe "artificial tears" or other eye drops to help alleviate the problem.

**Floaters and Spots:** A generalized term used to describe small specks moving subtly but noticeably in your field of vision. A floater or a spot is likely a tiny clump of gel or cells in the vitreous – the clear, jelly-like fluid inside your eye. Aging, eye injury and breakdown of the vitreous are the main causes of floaters and spots. If you notice a sudden increase in the number you see, call your eye care professional.

**Fovea:** A tiny spot in the center of the retina that contains only cone cells. This area is responsible for our sharpness of vision.

**Glaucoma:** A common cause of preventable vision loss when excessive pressure within the eye damages the optic nerve. Treatable by prescription drugs or surgery.

**High(er) Index:** A dense lens material that results in thinner, lightweight lenses than standard plastic. Index refers to index refraction which is the speed that light travels through the lens. Higher index lenses are available from 1.56 to 1.74 (the higher the number, the thinner the lens). They benefit people with stronger prescription eyeglasses.

**Hyperopia:** A condition where distant objects are seen clearly, yet objects close up are seen less clearly. Also commonly referred to as “farsighted.”

**Iris:** The pigmented (colored) membrane that lies between the cornea and the crystalline lens that controls the size of the pupil.

**Crystalline Lens:** The eye's natural lens located directly behind the iris. It has the ability to change shape to focus light rays onto the retina.

**Macula:** The part of the retina responsible for the sharp, central vision needed to read or drive.

**Macular Degeneration:** A group of conditions that include a deterioration of the macula causing a loss of central vision needed for sharp, clear eyesight. It is a leading cause of vision loss and blindness in those 65 years of age and older. Macular Degeneration is also called AMD or ARMD (age-related macular degeneration).

**Minor Eye Irritation:** Slight irritation of the eye caused by a foreign body on the eye's surface such as sand, dirt or eyelashes. Wash your hands, then flush the eye with lukewarm water for up to 15 minutes. If the irritation remains and discomfort continues, seek professional medical help immediately.

**Multi-Focal Lenses:** Multi-focal lenses let you focus on two or more distances through the same lens (usually distance, intermediate, and near). Also known as Bi-focals, Tri-focals, Multi-focals.

**Myopia:** A condition where distant objects appear less clearly and those objects up close are seen clearly. Also commonly referred to as “nearsighted.”

**Nyctalopia:** Commonly called “night blindness,” this is a condition that presents as impaired vision in dim light or darkness.

**Optic Nerve:** A bundle of nerve fibers that carries messages from the eyes to the brain.

**Photochromic lenses:** Refers to lenses that automatically change from clear to dark in the presence of ultraviolet (UV) radiation.

**Photophobia:** Also called “light sensitivity”, this is a condition that can have many underlying causes, and can be prompted by many medications. Protection from bright light is critical for anyone with photophobia.

**Plastic 1.50:** This is a lens material often used for minor prescriptions. Very few lenses are made from glass today, since glass is heavier, thicker, and can shatter. Also referred to as standard index or by the brand name CR-39.

**Polarized lenses:** This type of lens includes an invisible “polarized” filter that helps to cut down on blinding glare from reflective surfaces like water and snow for increased visual acuity (sharpness) in bright light conditions.

**Polycarbonate lenses:** A lens material that is thinner, lighter, and more impact resistant than standard plastic. Polycarbonate lenses are the standard for children’s eyewear.

**Presbyopia:** Condition in which the aging crystalline lens (at around age 40) becomes less able to change shape to focus light at all distances, especially near vision. Presbyopia can be corrected with reading glasses, bi-focal glasses, or progressive lenses. Additional symptoms include eyestrain, headaches, and squinting.

**Progressives:** Bi-focal or multi-focal lenses with no visible lines where the lens power gradually changes from distance to near. Also called PALs (Progressive Addition Lenses).

**Pterygium:** A raised growth on the eye that is most often directly related to over-exposure to the sun. Dry, dusty conditions may also contribute to development of these growths. Protecting your eyes from UV radiation is a critical preventive measure.

**Pupil:** The opening in the center of the iris that changes size to control how much light is entering the eye.

**Pupillometer:** An instrument used to measure the distance between pupils. This measurement is used to position the eyeglass prescription correctly in front of the eye.

**Refraction:** Test to determine an eye’s refractive error and the best corrective lenses to be prescribed.

**Retina:** Part of the rear two-thirds of the eye that converts images from the eye's optical system into impulses that are transferred by the optic nerve to the brain. Consists of layers that include rods and cones.

**Rods and cones:** These are cells inside the eye used by the retina to process light. Rods are used for low light levels (night vision), cones are used for sharp visual acuity and color perception.

**Sclera:** The white part of the eye – composed of fibrous tissue that protects the inner workings of the eye.

**Single-Vision:** Types of lenses that correct one vision problem, like near or far-sightedness.

**Snellen Chart:** This is the commonly seen eye chart often topped by a large letter “E” used in eye examinations. This measures your eye's visual acuity, or the ability to see sharp detail clearly.

**Strabismus:** Sometimes called “crossed eyes” in young children, this condition is the lack of coordination between the eyes, such as one or both eyes turning in, out, up or down.

**Ultraviolet radiation (UVR):** Commonly referred to as “UV Rays”, these are light waves that consist of both UVA and UVB rays from the sun. Without proper protection, chronic exposure to UV rays can lead to various eye conditions and damage.

**UV Protection:** Relates to a lens' ability to filter out harmful rays of the sun. It is recommended that glasses block 100% of both UVA and UVB rays to minimize eye damage from the sun's rays.

**Visual Acuity:** Assessment of the eye's ability to distinguish object details and shape – numerically expressed as 20/20, 20/70, etc.

# Healthy Sight

When we're talking about healthy sight, we're really talking about the immediate, short and long-term care and protection of your vision—the sense that provides you with a unique and personal view of the world. So much of what we learn, what we experience, and what we enjoy comes to us through our eyes.

Healthy Sight isn't a slogan; it's a way of life that enhances your everyday vision while preserving the well being of your eyes. It means getting regular checkups. Eye health means wearing the correct prescription if corrective lenses or contacts are needed. It means knowing how to protect your eyes from glare, from the sun's harmful UV rays, from the hazards of extreme activities. Having healthy eyes understanding how lifestyle, diet and personal habits can affect the way you see—today and tomorrow.

Healthy sight means protecting your children's vision as well.

## **Healthy body. Healthy habits. Healthy eyes. Healthy sight.**

Your eyes are a part of your body. Some of the same healthy habits that protect your general health also promote healthy eyesight:

- Eating a balanced diet rich in fiber, fruits and vegetables
- Drinking water to hydrate your body and your eyes
- Not smoking, and avoiding long-term smoke exposure
- Wearing ultraviolet (UV) protection
- Considering appropriate vitamin supplements

Antioxidants such as vitamins C and E and carotenoids such as Lutein and Zeaxanthin have shown some promise in research studies at reducing the risk and progression of cataracts and age-related macular degeneration (AMD).

## **Additional eye health reminders.**

Research shows a surprising number of healthy sight habits go overlooked, like fully treating diagnosed eye problems with proper medication when prescribed. That means following the directions to the letter until the medicine is gone.

Also remember to share any current medication prescription information with your eye doctor, as there may be unwanted visual side effects when mixing eye medicine with other prescriptions.

You'd be surprised how many of us admit to working in low light or poor lighting situations—be sure to utilize proper, even lighting when reading or doing work that requires concentration. And adjust your computer screen lighting to fit your environment.

Both glare and UV radiation present particular visual hazards and dangers. Take the time to understand how to minimize both, with protective lenses or lens products that have glare reduction and 100% UV blockage built-in.

There's more—much more—to consider if you truly wish to commit to healthy sight. Considerations you'll find completely explained throughout the EyeGlass Guide.

# How the Eye Works

To understand how the human eye works, first imagine a photographic camera—since cameras were developed very much with the human eye in mind.

## How do we see what we see?

Light reflects off of objects and enters the eyeball through a transparent layer of tissue at the front of the eye called the cornea. The cornea accepts widely divergent light rays and bends them through the pupil—the dark opening in the center of the colored portion of the eye.

The pupil appears to expand or contract automatically based on the intensity of the light entering the eye. In truth, this action is controlled by the iris—a ring of muscles within the colored portion of the eye that adjusts the pupil opening based on the intensity of light. (So when a pupil appears to expand or contract, it is actually the iris doing its job.)

The adjusted light passes through the lens of the eye. Located behind the pupil, the lens automatically adjusts the path of the light and brings it into sharp focus onto the receiving area at back of the eye—the retina.

An amazing membrane full of photoreceptors (a.k.a. the “rods and cones”), the retina converts the light rays into electrical impulses. These then travel through the optic nerve at the back of the eye to the brain, where an image is finally perceived.

## A delicate system, subject to flaws.

It's easy to see that a slight alteration in any aspect of how the human eye works—the shape of the eyeball, the cornea's health, lens shape and curvature, retina problems—can cause the eye to produce fuzzy or blurred vision. That is why many people need vision correction. Eyeglasses and contact lenses help the light focus images correctly on the retina and allow people to see clearly.

In effect, a lens is put in front of the eye to make up for any deficiencies in the complex vision process.

## The main parts of the human eye include:

- **Cornea:** transparent tissue covering the front of the eye that lets light travel through
- **Iris:** a ring of muscles in the colored part of the eye that controls the size of the pupil
- **Pupil:** an opening in the center of the iris that changes size to control how much light is entering the eye.

- **Sclera:** the white part of the eye that is composed of fibrous tissue that protects the inner workings of the eye
- **Lens:** located directly behind the pupil, it focuses light rays onto the retina
- **Retina:** membrane at the back of the eye that changes light into nerve signals
- **Rods and cones:** special cells used by the retina to process light
- **Fovea:** a tiny spot in the center of the retina that contains only cone cells. It allows us to see things sharply.
- **Optic Nerve:** a bundle of nerve fibers that carries messages from the eyes to the brain
- **Macula:** a small and highly sensitive part of the retina responsible for central vision, which allows a person to see shapes, colors, and details clearly and sharply.

## Protecting Your Eyes

Did you know...

- Nearly half of traumatic eye injuries relate to ball sports
- 45% of these occur in children under the age of 14
- 90% of these are preventable

Polycarbonate is a lens material that is widely used for shatter-and-impact resistant lenses, and when combined with sturdy frame materials, makes for formidable eye protection.

There are hazards of sunlight and bright light that are harder to understand; namely, ultraviolet rays (UV) and Glare (extreme brightness). Protecting your eyes from these distracting, even dangerous elements is equally important to eye protection.

## Children's Vision

Vision is arguably the most important of the five senses; it plays a crucial role throughout childhood and beyond. Yet many parents don't understand how vision helps their children develop appropriately. The articles below can help.

### Children's Vision – FAQ's

#### **When should children have their eyes examined?**

The American Optometric Association (AOA) issued guidelines for how often children should go to an eye doctor for a comprehensive eye exam. According to these recommendations, infants should have their first ocular evaluation at 6 months of age. Routine eye exams should then follow at 3 years old and at 5-6 years old (prior to entering kindergarten or first grade). If they do not need vision correction, school-aged kids should have a complete eye assessment done every two years. Children who wear eyeglasses or contacts should have yearly examinations.

#### **If my 5-year-old daughter passed a vision screening at school, does she still need an eye exam?**

Yes, she should still have a complete eye exam.

Vision screenings in school are designed to identify gross vision problems. Yet a child can pass this screening and still have an eye condition that affects development, learning and performance in school. Studies have shown that up to 11 percent of kids who pass a school vision test actually have a vision difficulty that requires treatment.

In addition, a comprehensive eye evaluation by a qualified professional checks your child's eye health, which is not included as a part of vision screening done in school.

#### **What is vision therapy?**

Vision therapy or training can be understood as a specialized form of physical therapy for the ocular system. Highly personalized, it involves a customized set of eye exercises that are intended to correct visual problems. Lazy-eye (amblyopia), focusing problems, trouble with eye alignment and movement, and specific visual-perceptual disorders are some of the conditions that may be treated with vision therapy.

Therapy sessions are generally held in an optometrist's office, but most courses of treatment include daily exercises to be done at home.

#### **Can learning disabilities be cured by vision therapy?**

No. Yet children with learning problems often suffer from vision problems too. As the vision therapy corrects underlying ocular conditions, a child's learning difficulty may be improved or resolved.

**How can we get our active one year old son to keep his glasses on? He needs eyeglasses to correct farsightedness and a tendency towards crossed eyes. We've tried everything from elastic bands to tape, but he struggles, cries and pulls them off.**

Most of the time a child's resistance to wearing eyeglasses is settled through time and perseverance. Getting used to the feeling of wearing glasses can take some adaptation. It may help to put his glasses on immediately after he wakes up.

However, sometimes the child's refusal to wear glasses is due to an incorrect prescription or uncomfortable frames. Recheck his prescription and make sure that his glasses fit well. Bring your child into the optometrist for a consultation.

Many frames for children come with an integrated elastic band to help keep the glasses sitting comfortably on your child's head. Be sure to inquire about this option.

**Our 3-year-old daughter was diagnosed with strabismus and amblyopia. What are the chances of a cure at her age?**

The odds of a successful cure are very good if she receives proper treatment. Medical research has demonstrated that the visual system can develop stronger visual acuity at up to 8-10 years of age.

Constant strabismus often requires surgery to straighten and align the eyes, and then therapy for amblyopia ("lazy-eye") follows in order to enhance the success of the surgery. Eye patching and vision therapy are generally implemented as a means to help both eyes team and function together. For more information, discuss treatment options with your Optometrist and a referral to see a pediatric ophthalmologist who specializes in strabismus surgery may be required.

**My 10 year old daughter has been wearing eyeglasses since age 2 in order to correct farsightedness. We think her depth perception is weak. Can she be tested for this, and if there's a problem – can it be treated?**

A very simple, straightforward stereopsis test will determine if your daughter has normal depth perception. During this testing, she will put on 3-D glasses and be asked to look at a chart across the room or at a number of objects in a specialized book. If reduced stereopsis is diagnosed, she will be advised to undergo vision therapy.

**Our 11-year-old son was first diagnosed with nearsightedness when he was 7 years of age. Since then, his vision has deteriorated every year. Is there any way to prevent this?**

Recent studies suggest that myopia progression may be slowed or stopped in childhood. At present, there are four different types of treatment for myopia control: multifocal contact lenses, atropine eye drops, ortho-k and multifocal eyeglasses.

A professional eye doctor will conduct a comprehensive eye exam in order to determine your child's candidacy for any of these potential treatments.

**My son's teacher thinks he has "convergence insufficiency" at 7 years of age. What is this, and what can be done about it?**

When reading or engaging in other close-up tasks, our eyes need to be converged (pointed inwards) slightly. Convergence insufficiency (CI) refers to the eyes' inability to do this easily and comfortably. Headaches, eyestrain, blurred vision, fatigue and reading problems may result.

Convergence insufficiency is a common learning-related vision problem that's typically treated well with vision therapy and/or reading glasses.

**According to the visual screening done at school, my 5 year old son has 20/40 vision in both eyes. Is this a reason for concern, or could his visual condition improve with time?**

In general, 5 year old children can see 20/25 or better. Yet there are a number of possible reasons for his vision diagnosis. Visual acuity testing is highly subjective. Your child is asked to read small letters on a wall chart, and many kids simply give up – even though are able to read some of the smaller lines. Other children may claim that they can't see the letters because they dream of wearing eyeglasses!

Keep in mind that vision screenings conducted at school are often compromised by many distractions. It's wise to schedule a comprehensive eye exam with an eye doctor in order to confirm his prescription and rule out any eye health problems that may be affecting his visual acuity.

**My daughter has severe farsightedness in one eye and was diagnosed with refractive amblyopia. She just received her glasses, and one lens is much thicker than the other. She is complaining that the glasses make her dizzy and she won't wear them. Can anything be done about this?**

When one eye needs much stronger vision correction than the other eye, contact lenses are sometimes preferable to eyeglasses. Unequal lens powers in glasses can cause an unequal magnification effect, so the eyes transmit images to the brain that are not the same size. The

brain may not be able to blend these two images into a single one, which often causes dizziness and nausea. In addition, your child's eyeglasses may be unattractive and causing her to not give them a real chance to adapt.

Contact lenses obviously grant a nicer appearance, and they don't cause as many problematic variations in image magnification. Even young children can handle wearing contact lenses, and one-day disposables or continuous wear lenses (worn consistently for up to 30 days) are possible options.

With amblyopia, one eye doesn't see as clearly as the other eye, even with the best contact lenses in position. Vision in her weak eye may not be drastically improved with contacts, and vision therapy will probably be needed too. Best to discuss all her options with her Eye Doctor.

## Your Infant's Visual Development

Your baby's visual system is not fully developed at birth and continues to develop gradually over the first days and months of life. In fact, from your baby's perspective at birth, the world is black and white, blurry and rather flat. As the days and months go on, they begin to focus, move their eyes and start to see the world around them. While each child will grow and develop on his or her own schedule, knowing an infant's vision milestones will help you ensure that your infant is on track to achieving good vision and eye health and start treatment early if there is a problem.

### **Birth – 3 months**

Because newborn babies' eyes and visual system are underdeveloped, they can not focus their eyes on close objects or perceive depth or color. Babies need to learn to move, focus and coordinate eye movements to team the eyes (have them move together as a team). The brain also needs to learn how to process the visual information from the eyes to understand and interact with the world. In fact, until about 3 months, the optimal distance a baby can focus on is about 8 – 10 inches from their face, about the distance their parents face will be during feeding.

Your baby will start to be able to perceive color within the first 2-3 weeks, however it will take a few months to learn how to focus and use the eyes, to track objects, differentiate between two objects and shift from one object to the other. During this time you may notice that the eyes appear crossed and do not work together or team. This is quite common at the early stages of development, however if one eye appears to be constantly turned in or out, seek a doctor's evaluation.

At around three months, as hand-eye coordination begins to develop, a baby should be able to follow a moving target with their eyes and reach for objects.

#### **4-6 Months**

By 6 months, your baby will begin to move his eyes with more speed and accuracy, seeing at farther distances and focusing well. Color vision should be fully developed and the eyes should be able to work as a team and follow moving objects with relative ease. Hand-eye coordination and depth perception should be greatly improved as your baby will begin to understand the 3-dimensional world around them.

At six months, you should take your baby for his or her first comprehensive eye exam to ensure that the eyes are developing on track and there are no signs of congenital or infant eye disease.

#### **7-12 Months**

At this stage of development babies will be coordinating vision and body movements by crawling, grasping, standing and exploring the surrounding world. They should be able judge distances accurately, throw a ball toward a target and pick up a small object with their fingers. Delays in motor development can sometimes indicate a vision problem.

#### **The First Eye Exam**

While at 6 months, your baby will not be able to read an eye chart, eye doctors can perform an infant eye exam through non-verbal testing to assess visual acuity (for nearsightedness, farsightedness or astigmatism), eye teaming abilities and eye alignment. The eye doctor will also be able to see inside the eye for any signs of disease or problems that could affect eye or vision health.

#### **InfantSEE®**

InfantSEE® is a public health program in which participating optometrists provide a free comprehensive infant eye exam to babies between 6 and 12 months of age. The program was initiated to provide accessible eye and vision care for infants to ensure they have the best chances for normal development and quality of life.

If your child has any unusual symptoms such as excessive tearing, constant eye misalignment, red or crusty eyes or extreme light sensitivity consult an eye doctor as soon as possible.

#### **Are Contact Lenses a Good Choice for Kids?**

Does your child want to wear contact lenses instead of eyeglasses? You are probably wondering if it's a good idea or not. Actually, contact lenses offer specific benefits over other vision correction eyewear for children.

More than age, maturity is the main consideration that goes into deciding whether contact lenses are appropriate for your child. Physically, children's eyes can tolerate lenses from a very young age. Even babies with certain eye conditions present at birth are treated with contact lenses. In addition, a recent study conducted on nearsighted children between the ages of 8 to 11, demonstrated that 90% of the kids had no difficulty inserting or removing one-day disposable lenses – with no help from an adult.

### **Signs of Maturity in Your Child**

How do you know if your child is mature enough for contact lenses? You'll need to assess whether they are able to insert, remove and take care of the lenses independently. One indication of the maturity necessary for these actions is your child's general level of responsibility.

Does this child take on and successfully manage responsibilities at home? If so, that's a good sign. Or does your child need constant reminders to do daily chores? Do they have poor grooming habits? If so, that's an indication that wearing contact lenses may be premature.

Regardless of age, a conscientious child is the best candidate for lenses.

### **Advantages of Contact Lenses for Children**

There are a number of reasons why contacts may be better suited than eyeglasses for your child's visual condition and lifestyle. Some of these benefits include:

- Contact Lenses for Sports

When playing hard, running or engaging in physical contact sports, eyeglasses tend to slip off due to perspiration, get knocked off or fog up. Eyeglasses also limit your child's peripheral vision, which is key for top sports performance. Contact lenses may resolve all of these issues. Specially tinted contacts may even help your child see the ball easier!

Soft contact lenses are generally the ideal choice for sports. Larger and with a more secure fit on the eye than rigid gas permeable (GP) lenses, soft lenses don't carry the same risk of getting dislodged or knocked out during a game.

- A Way to Control Nearsightedness

Hard, rigid gas permeable (GP) contact lenses may be a superior option for children with myopia (nearsightedness). Durable GP lenses typically offer crisper vision than soft lenses.

Orthokeratology, referred to as ortho-k, is a modified technique for fitting GP lenses in order to temporarily reverse myopia. The ortho-k contacts are worn nightly while sleeping and removed in the morning. Nearsighted children should then be able to see clearly with no lenses needed throughout the day.

Multifocal soft lenses, which have various lens powers within different zones of the contact, have also been found to help control myopia.

- **Boost Self-Esteem with Contact Lenses**

Is your child embarrassed to wear eyeglasses? Many children are so uncomfortable with their appearance in glasses that they become very self-conscious about how they look. In this case, contact lenses are an excellent way to enhance your child's self-esteem. Participation in school and social activities often improves when children make the switch from eyeglasses to contact lenses.

### **Hold On to those Eyeglasses!**

An up-to-date pair of eyeglasses is still necessary to keep around even if your child begins to wear contact lenses. Eyes need to breath, and contacts that are worn daily must be removed at least an hour before bedtime. There may also come a time when your child prefers eyeglasses over lenses. In the event of any eye redness or discomfort, contact lenses must be removed immediately.

### **Motivation is the Main Criterion**

Who wants the contact lenses, you or your child? This is the most important factor in determining success with lenses. Just because you may wear contacts and simply love them doesn't mean they're right for your child. Some kids favor eyeglasses and the cool, fashionable look they can create!

Timing is also significant. Your child may decide against contact lenses right now, but become interested in wearing them a few years later. For success, good vision and healthy eyes with contact lenses, it's important to never push children into wearing them.

## **Controlling Nearsightedness in Children**

Myopia (nearsightedness) is a common vision problem affecting children who can see well up close, while distant objects are blurred. Nearsighted children tend to squint to see distant objects such as the board at school. They also tend to sit closer to the television to see it more clearly.

Sometimes, childhood myopia can worsen year after year. This change can be disconcerting to both children and their parents, prompting the question: "Will it ever stop? Or, someday will this get so bad that glasses won't help?"

Myopia that develops in childhood nearly always stabilizes by age 20. But by then, some kids have become very nearsighted. Here are three possible ways to slow down the progression of myopia in children:

### **Gas permeable contact lenses**

Wearing rigid gas permeable contact lenses (also referred to as "RGP" or "GP" lenses) may slow the progression of nearsightedness in children. It's been proposed that the massaging action of the rigid GP lens on the eye during blinking may keep the eye from lengthening, thereby reducing the tendency for advancing nearsightedness.

In 2001 to 2004, the National Eye Institute (NEI) conducted a controlled study to determine whether wearing GP lenses is effective in slowing the progression of myopia in children. The 116 participants in the study were 8 to 11 years old when the research began.

At the end of the three-year study period, the children who wore GP lenses had only 0.63 diopter (D) less nearsightedness than the kids in the control group who wore soft contact lenses.

The study also found that wearing GP lenses does not slow the growth of the eye, which causes most of the myopia in children. The reduced progression of myopia among those children wearing GP lenses was due only to the effect the lenses had on the front surface of the eye (the cornea). Children who wore the GP lenses had less increase in corneal curvature than those who wore soft contact lenses. The NEI researchers believe these GP lens-induced changes in corneal curvature are not likely to be permanent, and therefore the effect of GP lenses on controlling myopia progression may not be permanent.

### **Orthokeratology**

Orthokeratology, or "ortho-k," is the use of specially-designed gas permeable contact lenses to flatten the shape of the cornea and thereby reduce or correct mild to moderate amounts of nearsightedness. The lenses are worn during sleep and removed in the morning. Though temporary eyeglasses may be required during the early stages of ortho-k, many people with low to moderate amounts of myopia can see well without glasses or contact lenses during the day after wearing the corneal reshaping lenses at night.

Recent research suggests ortho-k may also reduce the lengthening of the eye itself, indicating that wearing ortho-k lenses during childhood may actually cause a permanent reduction in myopia, even if the lenses are discontinued in adulthood.

## **Bifocals**

Some evidence suggests wearing eyeglasses with bifocal or progressive multifocal lenses may slow the progression of nearsightedness in some children. The mechanism here appears to be that the added magnifying power in these lenses reduces focusing fatigue during reading and other close work, a problem that may contribute to increasing myopia.

A five-year study published in the February 2007 issue of *Investigative Ophthalmology & Visual Science* produced an interesting result involving nearsighted children whose mother and father were also nearsighted. These children, who wore eyeglasses with progressive multifocal lenses during the course of the study, had less progression of their myopia than similar children who wore eyeglasses with regular, single vision lenses.

### **See us for a consultation**

If you are concerned about your child becoming more nearsighted year-to-year, call us to schedule a comprehensive eye exam and consultation. We can evaluate the progression of their myopia and discuss the best treatment options with you.

# Multifocal Eyeglass Lenses

Multifocal lenses technically refer to any lens that provides more than one zone of corrective power and would therefore include bifocal, trifocal and progressive lenses. Multifocals are designed for the many individuals over 40 who struggle with presbyopia – the age-related near vision loss that requires us to use eyeglasses for reading and focusing on objects in our near vision. The multiple lens powers enable you to correct for near and distance vision with one pair of glasses.

## **Bifocal Lenses**

Bifocal lenses are divided into two powers, one for distance vision and the second for near vision. Bifocals are created in a variety of designs with different sized and shaped viewing segments for near and far vision. While bifocals provide good distance and near vision, they are lacking in corrective power for intermediate areas, which is what has led to the development of trifocal and progressive lenses.

## **Trifocal Lenses**

Trifocal lenses provide an additional lens power zone for intermediate vision (which is typically about an arm's length away).

Some people are bothered by the visible lines where the lenses are divided in bifocal and trifocal lenses. In addition to aesthetics (the lines have become a sign of presbyopia which many associate with growing old), the harsh divisions in the zones can cause a distortion in the object you are viewing (an image jump) when you switch your gaze from one power to the next.

## **Progressive Addition Lenses (PALs)**

Progressive lenses were designed to eliminate the “image jump” that results from the distinct zones in bifocal and trifocal lens design. By providing a smooth progression of many lens powers across the lens, PALs allow for clear vision near, far and every distance in between. Further, similar to natural vision, they just require a slight movement of the eye, rather than the whole head, for you to see through different lens powers. The smooth transition also eliminates the visible lines present on the other lenses which many view as tell-tale signs of age-related vision difficulties.

## **Occupational Bifocal and Trifocals**

A multifocal lens that has a specific purpose, or is created to perform a specific job, is called an occupational lens. What makes these lenses different from other lenses is the fact that the near, intermediate and far zones for vision are placed on specific areas of the lens, which

makes vision for these particular tasks easier. These lenses are found in glasses that are not for everyday wear.

### **Double-D Bifocals**

Double-D Bifocals are special bifocals designed for reading and overhead close work. This type of bifocal is especially helpful for auto workers, who need to see close things, both overhead and when working on a car on a lift, and when looking down. The lens is built with an inner circle for distance sight, and an outer circle for near vision. Office workers who need to file documents overhead might also find this lens very beneficial.

### **E-D Trifocals**

E-D Trifocals are made for people who need to see at arm's length distance most of the time, and near and far some of the time. The E-D trifocal is made for someone who does most of his or her work at arm's distance. For example, someone who needs to be monitoring several screens at once, like someone who works in video. At the same time this job would entail periods of reading, and recognizing people entering a room. The E-D trifocal accomplishes all of these tasks. The lens has a distance correction section in the top of the lens, and an intermediate correction section (for seeing screens) at the bottom. A small portion of the lens, shaped like a D, is embedded in the bottom zone, within the intermediate section.

### **Reading and Computer Glasses**

If you need to read all day for work, or view a computer screen, your eye doctor can create an occupational lens for your needs by moving the position of the intermediate and near sections of the bifocal lens, or change the design of the progressive lens.

If you need glasses for reading most of the day, you may need a pair of glasses that will work better for reading for long periods of time. Glasses that have the bifocal or trifocal portions placed higher on the lens may help. Glasses with a reading sections placed higher will enable you to read comfortably for longer periods of time.

Another option is an "office" progressive lens. This type of lens has a wider and larger intermediate portion of the lens for looking at a computer screen, and a smaller section for distance. An "office" lens gives you a larger lens for office work, such as reading and computer vision, and also provides enough lens space to see distances when needed. These lenses are for office only, and not daily life, because they don't give enough distance vision for many everyday tasks, including driving.

### **Golfing Glasses**

Multifocal lenses can be a problem for golfers when they are on the golf course. Because of the placement of the near zone, it can be hard to see the golf ball without having to tilt your head uncomfortably. It is also difficult to line up a putt with regular multifocals.

A “golfer’s bifocal” is the answer to this problem. A “golfer’s bifocal” lens consists of a distance lens, which a small round near portion placed on the bottom outside corner of one lens. This allows you to read when needed, and gives you a wide view for golfing.

### Glasses for specialized needs

Most adults over 40 can benefit from having more than one pair of glasses. If you wear multifocal lenses, there is a good chance you can benefit from a pair of occupational glasses designed for your specific needs.

## How Progressive Lenses Work

Hands down, progressive lenses are the most popular multifocal lenses in the United States. Also known as progressives or PALS, these multifocal lenses offer a complete vision solution in one pair of eyeglasses – with no lines bisecting the lenses. In contrast to bifocals, which have two lens powers (one for distance and one for close viewing), progressives present a gradual change in power that occurs from the top to bottom of the lens. A range of powers are thereby offered, giving clear vision up close, far away and at every point in between.

Presbyopia is a common condition that generally occurs after age 40 and causes reduced vision up close. To treat this condition, progressive lenses are ideal for mimicking your natural vision. The gradual change in power in the lenses allows you to look upwards to see faraway and look forwards directly to see any object at arm’s length. When you drop your gaze downward, you’ll have a sharp view for reading comfortably or doing fine work.

Most people who wear progressive lenses are middle-aged or older. However, recent studies indicate that some children may benefit from progressives as a way to slow the progression of myopia (nearsightedness).

### Best Frames for Progressive Lenses

Progressives require eyeglass frames with proportions that offer enough vertical space for the lens power to change from top to bottom. Keep in mind that there must be enough room for all lens powers to be included in the eyeglasses. Small frames may leave only a tiny zone of the lens for viewing distance or near.

However, in order to ensure that a wide range of eyeglass styles are available to fit progressive lenses, many manufacturers now offer lens designs called “short corridor”. These

progressives are made to fit in smaller frames. An experienced optician should be able to pinpoint a progressive lens that will function well in almost frame you prefer.

### **Different Progressives for Different Needs**

With many unique characteristics, a selection of progressive lenses is available to suit different purposes. Progressive lenses are now specialized for specific activities. Computer users may appreciate “occupational” progressive lenses, which boast an extra-wide intermediate zone to maximize your visual comfort when at your computer desk. Super-size reading portions of the lens are an alternative design that’s perfect for book-lovers.

### **Adaptation to Progressives**

Getting used to progressive lenses is a highly individual experience that can take anywhere from a few minutes to a few days of wear. Fortunately, the majority of people report that progressives are comfortable almost immediately.

You’ll need to learn how to see through the progressive lenses properly – so that you’re gazing through the most appropriate part of the lens for the distance you want to see.

As you adapt to your new progressives, you may detect slight motions every time you move your eyes or head quickly. With time, this sensation will pass.

### **Reading Glasses**

You have never worn glasses and now after 40 you can’t seem to read your text messages without holding the phone at arm’s length.

The medical term for this normal change in our eyesight is called presbyopia. The ability of the lens inside our eyes changes as we age. The ability to focus on objects up close is greatly diminished. You first notice this change in your eyesight when the small text you are reading suddenly looks blurry.

Reading glasses are usually necessary at this stage in your life. Reading glasses after the age of forty are an optical device that will enhance your reading experience. There are two main styles of reading glasses. The full size frame and the “Ben Franklin” frame. The full size frame is made up of a full size lens and the “Ben Franklin” are half-eye glasses let you see clearly when you look up over the top of the lenses.

People who need to spend a lot of time concentrating on close-up reading material usually pick full frame reading glasses.

Half-eye glasses are preferred by people who use glasses for light reading and want to see things clearly when they look up to see at a further distance.

Bifocal reading glasses are a third option. Bifocals combine 2 sections in 1 lens. The top part of the lens allows for long distance viewing and the lower part of the lens is for reading or close work.

Reading outdoors in the sun with bifocals is more convenient today now that bifocals are available with tinted lenses and 100% UV protection for reading outdoors in the sun.

### **Are Custom-Made Reading Glasses Better than Pre-Fabricated Ones ?**

Reading glasses that are custom-made for your eye care needs are a worthy investment.

Ready-made reading glasses may be less expensive but they are one-size-fits-all concept. This makes it affordable and convenient. It allows you to have multiple pairs and even spares in your car, office, purse and at home.

There is a downside to ready-made reading glasses. One drawback to ready-made readers is that both lenses have the same prescription.

Since most people do not have the same exact prescription in both eyes there can be side effects such as eye strain, headaches and sometimes even nausea. If you experience any of these symptoms with ready-to-wear reading glasses then be sure to get an eye exam so that your eye doctor can prescribe customized reading glasses.

### **Any Change In Vision Requires an Eye Exam**

Even if you do decide to use ready-made reading glasses, make sure you get your eyes checked to determine your eye health status. The health of your vision depends on you.

Any change in vision requires a consultation with your eye doctor. You may just need custom-made reading glasses. But if you developed a serious vision problem immediate care will prevent further damage to your eyesight.

A very common eye disease such as Glaucoma, for example, has no symptoms at first but can cause permanent vision loss, even blindness. When it is detected early and controlled with medication it can be managed and monitored.

Routine eye exams are therefore necessary to avoid future vision problems and to monitor the health of your eyes as you age.

## Dry Eye After Menopause

Dry Eye Disease is a common eye condition – studies show that nearly 20% of North Americans middle aged and older suffer from dry eye disease. The probability of you developing dry eye if you are a woman, and older than 50, increases. Hormonal changes that older women undergo make it much more likely that they will suffer from dry eye as they age, including symptoms such as blurry vision and irritation of the eyes, according to the American Academy of Ophthalmology.

What are the biological changes that happen during menopause which affect your eyes? The tear film in the eyes relies on certain chemical signals to remain stable, and these signals get disrupted during and after menopause. Some doctors believe that androgen, a hormone implicated in menopause, may be the culprit causing dry eye problems for menopausal women. Eyes may become inflamed, which leads to decreased tear production, and possibly dry eye disease. Add in a dry environment and many medications and the risk factors for menopausal women increases exponentially.

### **Treatments for Dry Eye in Menopausal Women**

Estrogen hormone replacement therapy (HRT) is sometimes used to treat menopausal symptoms, as the female hormone estrogen is one of the hormones that decreases during and after menopause. However, studies have shown that this treatment does not relieve symptoms of dry eye.

### **Refractive Eye Surgery**

Refractive eye surgery, such as LASIK and PRK, may not be advised if you are 40 or older, and have dry eye disease. These procedures can affect nerve function in your cornea (the clear surface of your eye), which could worsen your dry eye problem. If you want to have a consultation regarding LASIK or PRK, it's important that your eye doctor know about your dry eye condition. In that case, your eye doctor will know to do the appropriate tests to make sure that there is enough moisture in your eyes for laser vision correction.

There are other health conditions that are associated with dry eye and aging. These conditions include thyroid autoimmune disease, and rheumatoid arthritis. If you suffer from dry eye, make sure your doctor screens you for these diseases.

Allergies may cause eye inflammation, and may be the cause of your dry eye. Prescription and over-the-counter eye drops might relieve your dry eye and allergy problem. Your eye doctor will advise you as to which eye drops would be best for you.

Sometimes commonly prescribed medications can worsen, or even cause, dry eyes. Some of these medications are antidepressants and diuretics, which are often prescribed if you have a heart condition. Make sure to talk about this with your doctor if you suspect that one of the medications you are taking may be causing your dry eye problems. Perhaps changing your medication will be as effective, and won't cause dry eye disease.

## How Your Vision Changes as You Age

We are all well aware of how much physical strength wanes as we age. Not surprisingly, our eyes, similarly, decline with age, perhaps even with accelerating declination from age 60 onward.

Specific age-related eye changes, such as cataracts or farsightedness caused by loss of elasticity of the lens of the eye (presbyopia), are perfectly normal and don't signify a disease process. These are absolutely common along with age and can be readily corrected with treatment.

Millions however, will experience more serious age-related eye diseases with far greater impact on their quality of life during the aging process. Diseases that cause serious vision loss and even sometimes blindness such as glaucoma, macular degeneration and even diabetic retinopathy will affect millions of people globally.

### **When Do The Age-Related Vision Changes Begin?**

Passing age of 40 is typically a first trigger. You may begin to notice more difficulty focusing on close objects. This is normal. The lens inside of your eye is slowly hardening – presbyopia – resulting in related loss of focusing ability.

Many people find that they can compensate for this focusing decline by simply holding their reading materials farther away from their eyes. Hence, the feeling that the older you get the longer your arms need to be. Eventually, proper reading glasses, multifocal contact lenses or multifocal eyeglasses are the correct solution. Corrective surgery options for presbyopia may also be possible; you can discuss CK and LASIK with your caregiver.

Cataracts are quite common among seniors as part of the typically expected age-related changes. A cataract is a clouding of the natural lens located inside the eye. About half of all 65-year-old Americans have some cataract formation. Closing into age 70 and beyond, that number jumps much higher. [National Institute of Health]

Modern cataract surgery is extremely safe and effective so much so that 100% of vision lost due to cataract formation can usually be restored. As you experience vision changes, possibly due to cataracts, do not hesitate to discuss the symptoms with your eye doctor. It is generally better to have cataracts removed before they advance too far. Artificial replacement lens implants, or intraocular lenses (IOLs), may be advised to restore ranges of vision issues. You may even reduce your need for reading glasses and/or distance glasses post cataract surgery with multifocal lens implants.

### **Age-Centric Eye Diseases**

- Diabetic Retinopathy
- Macular Degeneration
- Glaucoma

The NEI counts over 10 million Americans past age 40 as having diabetes. Experts expect that as much as 30% of people with diabetes are undiagnosed. Best estimates show that 40% have diabetic retinopathy at some level and one out of every 12 people with diabetes in this age group has advanced, vision-threatening retinopathy. Controlling the underlying diabetic condition in its early stages is the key to preventing vision loss.

Macular degeneration -age-related macular degeneration- or AMD, is a leading cause of blindness among seniors. According to the NEI (National Eye Institute) macular degeneration affects more than 1.75 million people in the United States. The U.S. population is aging rapidly, and these numbers are expected to rise to 3 million by 2020. There is no known cure for AMD although medical treatment may slow its progression and the hope is to stabilize and eventually cure it.

Individual risk of developing glaucoma increases per each decade after age 40 – from around 1% during the 40s soaring to 12% at age 80. The number of Americans with glaucoma is expected to grow by 50% by 2020. If detected early, glaucoma can be controlled with medical treatment or surgery. Vision loss can be prevented, so get tested early and follow your eye doctor's guidance.

### **Aging Also Affects Overall Eye Structure**

We should not only think of aging as it relates to presbyopia and cataracts. Subtle changes in vision and eye structure as well take place as we age.

#### **Changes include:**

- Color Vision Loss
- Pupil Shrinkage
- Vitreous Detachment
- Dry Eyes
- Peripheral Vision Loss

Retina cells, responsible for proper color vision, decline in sensitivity with aging. This causes color to appear duller with less contrast between colors. Blue color, in particular will fade and wash-out. Since treatment for this age-related loss of color perception is not conclusive you

must be conscious of this loss especially if your profession (artist, fashion, etc.) depends on fine color distinctions.

Muscles which control pupil size and reaction to light weaken with age. This results in smaller and less responsive pupils, to changes in ambient lighting. Due to this, people above age 60 require up to three times the ambient light for comfortable reading vs. age 20s. Seniors are also more likely to be dazzled by bright sunlight and glare when emerging from a dimly lit building. Eyeglasses with photochromic lenses and anti-reflective coating help resolve this issue.

With age, the gel-like vitreous inside of the eye begins to liquefy and pull away from the retina, causing “spots and floaters” and “flashes” of light. This condition, called vitreous detachment, is typically harmless but floaters and flashes of light can signal the beginning of a retinal detachment – a serious problem which can cause blindness unless it is treated immediately. Contact your eye doctor immediately if you do experience flashes and floaters.

Aging bodies produce much fewer tears. This is especially true of women, postmenopausal. Any experience of burning or stinging, or for that matter any other eye discomfort such as dry eyes, should be brought to your eye doctor for immediate help. You may be advised to use artificial tears or prescription dry eye medication to provide increased comfort.

Aging causes a normal narrowing of peripheral field of vision. The size of visual field decreases by approximately one-to-three degrees per each decade of life. Ages 70-80s can expect a peripheral visual field loss of 20-30 degrees.

Because a loss of visual field increases the risk for automobile accidents, increased caution is called for when driving. The decreased range of vision requires more specific head-turning to scan all directions at traffic intersections.

### **What Can Be Done About Age-Related Vision**

Much can, and should be done, to lower risk and increase life quality to age more gracefully. Healthy diet and wiser lifestyle choices begin and end with more regular exercising. Maintain a healthy and steady weight. Reduce stresses to absolutely controlled and low levels. No smoking! Healthy, natural choices are the ideal defense mechanisms against vision loss. Schedule regular eye exams with a caring optometrist or ophthalmologist.

Discuss all concerns about your eyes and vision with your eye doctor. Record and explain any history of eye problems in your family and any related health problems you may have. Be sure to clarify with your eye doctor the specifics of any medications you take, including non-prescription vitamins or supplements.



## Eight Ways to Protect Your Eyesight

One out of every six adults, age 45 and above, have sight-threatening eye problems. The risk of vision loss increases with age. The American Academy of Ophthalmology (AAO) estimates that over 43 million Americans will develop age-related eye diseases by 2020.

### 7 Tips for Protecting Your Precious Eyes

To protect your eyesight and stay eye-healthy as you age, follow these basic guides:

1. Protection from UV rays. Always wear sunglasses with proper UV protection to shield your eyes from the sun's rays. This reduces your risk of cataracts and other eye damage.
2. Eat healthily balanced meals. Many studies prove that antioxidants can reduce cataract risks. Best antioxidants are obtained from a diet rich with fruits, colorful veggies, and dark green leafy lettuces. Studies prove that eating fish, rich in omega-3 fatty acids, help prevent macular degeneration.
3. Exercise more frequently. According to the AAO, studies suggest that regular exercise – such as simple walking – can reduce the risk of macular degeneration by as much as 70%.
4. No smoking! The many dangers of smoking are documented. When it comes to eye health, people who smoke are at significantly greater risk of age-related macular degeneration and cataracts.
5. Schedule regular exams for diabetes and high blood pressure. Left untreated, these diseases can cause eye problems. Diabetes and high blood pressure can lead to diabetic retinopathy, macular degeneration, glaucoma and ocular hypertension.
6. Be aware of your latent risks for eye disease. Explore your family health history. Do any family members suffer from diabetes or blood pressure problems? Are you older than 65? Are you an African-American over the age of 40? These are all traits which may increase your risk of sight-threats. Regular eye exams can detect problems which will be used to help preserve your eyesight.
7. Be Alert for vision changes. As soon as you notice changes in your vision, schedule a visit with your eye doctor. Trouble signs to watch out for: double vision, hazy vision, difficulty seeing in low light conditions, and any other vision alteration. Other signs may include flashes of light, floaters, and eye pain or swelling. All signs or symptoms may indicate potential eye health problem which need immediate attention.

Have your eyes checked at least every two years including a thorough eye exam with pupil dilation to help detect eye diseases such as diabetic retinopathy, macular degeneration or glaucoma which may not have early warning signs or symptoms. A comprehensive eye exam will also ensure that your prescription eyeglasses or lenses are up-to-date.

Following these steps is no forever guarantee of perfect vision. However, maintaining health and a quality lifestyle along with regular eye exams will certainly manage your risk of eye problems to give you the precious eyesight you deserve.

## Tips for Coping With Vision Loss

Age-related vision loss can be addressed with practical solutions. Experiment with adjusting the light settings when reading or working in your home or office. Due to the fact that after 60 your eye's pupil decreases in diameter it is difficult to see in dim light. Images and objects appear hazy as less light reaches your retina. This is why you will need to add extra light to perform certain tasks.

### **Some modification that can help you adjust to age-related vision loss are:**

Illuminate places that have dark corners like garage spaces, above the stove and under kitchen cabinets. Work surfaces should have ample light. Brighten any area that will require you to perform fine motor skill tasks such as sewing or typing. Your workplace may be a place where you will need to add some lighting if possible. Don't forget to schedule regular eye exams as they are essential in monitoring your vision problems. It is important to get your eyes checked to rule out any serious age-related eye diseases.

Another reason for regular eye exams is that your doctor can provide you with options on how to reduce the effects of normal age-related vision degeneration, such as color vision, near vision and contrast sensitivity. A quite common age-related vision problem is Cataracts. It is very common in the over-60 age group. Hazy and cloudy vision are the most common symptoms. Cataract sometimes can be remedied with surgery. The procedure is done to remove the eye's cloudy lens. The natural eye lens is then replaced with an artificial one.

### **Permanent Vision Loss and Your Options**

One of the major symptoms of age-related diseases such as glaucoma, retinopathy and macular degeneration is blind spots and vision loss. Living with low vision is possible with nonprescription devices that make daily tasks more manageable. Some examples include:

- Hand held magnifiers with battery operated lights for reading, these come in different shape and sizes.
- Shields and Lens filters to reduce glare
- Mobile phone with large screen and large fonts settings .
- Large Plasma Television Screens

### **Vision Loss and the Elderly**

Older Adults living in nursing homes often neglect to take care of gradual vision loss caused by glaucoma. When glaucoma goes untreated it can lead to blindness.

Routine eye examinations are necessary for the elderly. Uncorrected vision problems may lead to falls and/or permanent vision loss. Elderly people who live alone need to have someone who can make sure that they schedule routine eye examinations. Losing their vision will undermine their confidence and it puts them at risk of accidents and falls. They will no longer be able to be independent.

Promoting routine eye examinations and eye care education may reduce the risk of further debilitating eye conditions in the aging population.