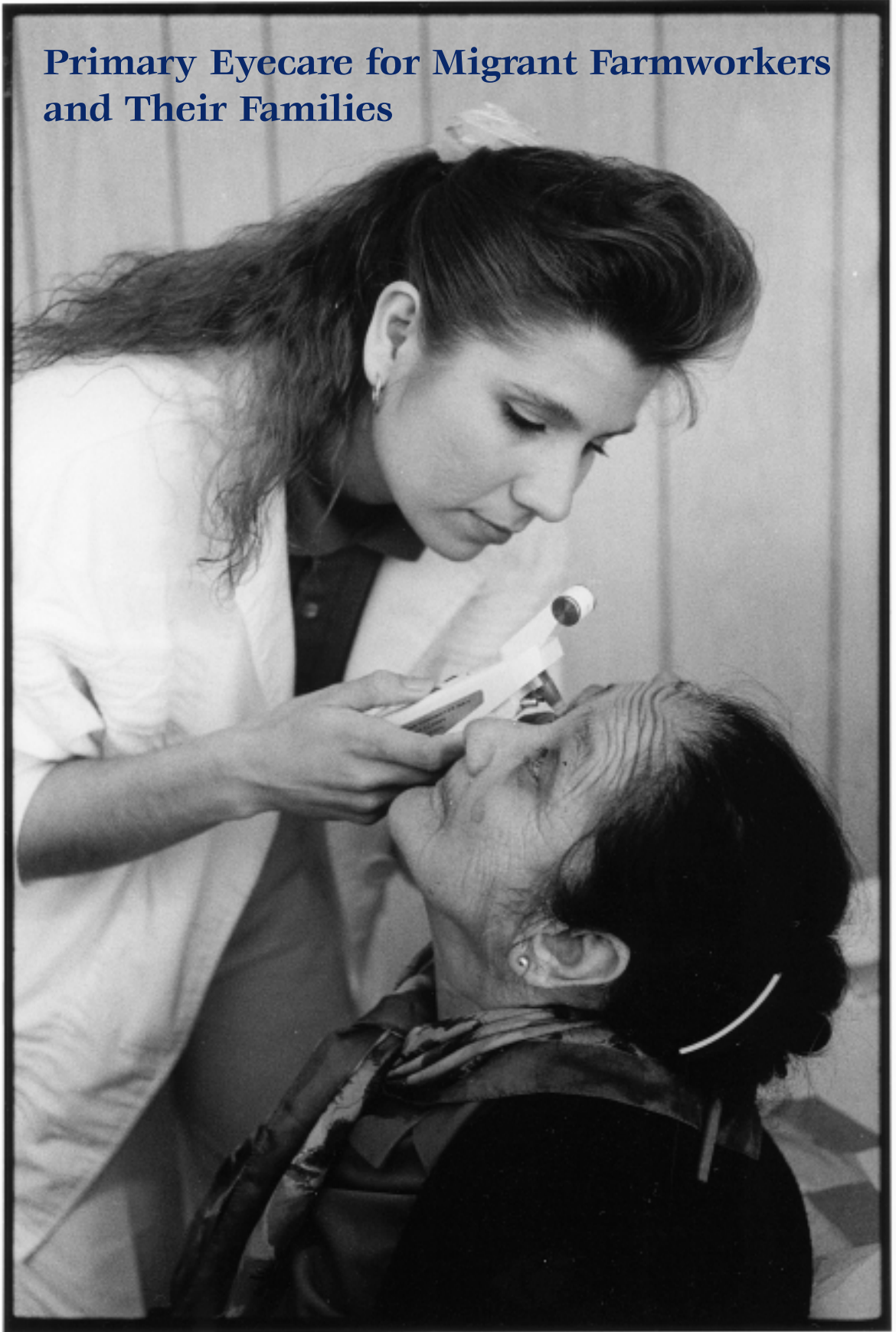


Puntos de Vista

Primary Eyecare for Migrant Farmworkers
and Their Families



Edinburg Tx, Health Fair.

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Puntos de Vista:

*Primary Eye Care
for Migrant Farmworkers
and Their Families*

MCN

(Migrant Clinicians Network),

InFOCUS

*(Interprofessional Fostering of Ophthalmic Care for
Underserved Sectors)*

**The Rural Women's Health Project
and**

C.H.E.C.

(Community Health Education Concepts)

**Migrant Health Branch
Primary Health Care**



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INTRODUCTION:

Primary Eye Care For the Migrant Farmworker?

The principal goal of primary eye care is to decrease the incidence of preventable eye diseases and vision impairment. For example, primary eye exams can reveal systemic disease such as diabetes and other blood vessel, neurologic, and endocrine disorders. Prevention of eye diseases and injuries can be accomplished through community education with a focus on nutrition and eye care safety. An effective primary and preventive eye care program can prepare your community to recognize and prevent problems associated with the eyes.

The goal of primary eyecare is to decrease the incidence of preventable eye disease and vision impairment.

There are three levels of eye care, from simple to complex. This manual focuses on primary eye care tasks that can be performed by community health care workers. Community health care workers include lay health workers, outreach workers, nurses, mid-level practitioners, and general practitioners. This manual will cover vision screening and basic eye care exams which can be conducted in a variety of clinical and non-clinical settings, as well as eye care education, first aid, and primary eye care in the field.

THREE LEVELS OF EYE CARE

- Primary:** This is the simplest form of eye care. At this level, the community health care worker's tasks are to:
- (1) recognize eye problems,
 - (2) screen or refer patients for treatment, and
 - (3) teach the community the prevention of eye disorders.
- Secondary:** All complex or severe eye care problems that cannot be resolved at the primary level should be referred to secondary care centers. This level of care is usually found in hospitals with ophthalmic specialists responsible for diagnosing and treating most eye problems.
- Tertiary:** This level of eye care is found in institutes of ophthalmology or specialized departments of hospitals in large cities. Specialists use operationally complex apparatus and technology. Tertiary-level practitioners perform every kind of eye care, from prevention to surgical intervention.¹

A Note About This Manual

Puntos de Vista: Primary Eye Care for Migrant Farm Workers and their Families provides health workers with tools to implement primary eye care programs. It is most effective when used in conjunction with a Primary Eye Care Training through Migrant Clinicians Network (MCN) or individuals who have been trained by MCN.

Puntos de Vista provides health workers with tools to implement primary eyecare programs.

¹World Health Organization, Primary Eye Care Manual," Scientific Publication No. 490, 1985

This manual begins with an overview of primary eye care services a clinic may choose to implement (Chapter One), and a primer on basic eye anatomy and vision, including the signs and symptoms of common vision problems (Chapter Two).

Chapter Three details training on how to actually perform vision screenings and basic eye exams, including how to recognize eye problems and make accurate referrals. Chapter Four addresses how to use the Focometer™ for measuring refractive and astigmatic errors accurately. For sites that will be dispensing eye glasses, Chapter Five covers reading prescriptions and assembly of eyeglass kits. Chapter Six provides basic first aid as well as prevention education relating to common diseases seen within the migrant population.

Finally, Chapter Seven specifically addresses taking primary eye care “to the field” by performing vision screening, eye exams, first aid, and prevention education in outreach settings such as migrant camps or homes.

The appendices include a list of common optical terms, a glossary of eye problems and conditions, and a useful guide to eye care resources available to migrant health clinicians.

The MCN Primary Eye Care Program

MCN is committed to developing and implementing effective primary eye care programs for clinic sites which serve migrant farmworkers. MCN's primary eye care Needs Assessment Survey of migrant health clinicians showed that while health centers might be interested in primary eye care, many were uncertain about the components of a primary eye care program and how to implement such a program at their site. MCN initiated the trainings and manual to help guide clinics in the implementation of their own programs. Primary eye care can be effectively integrated into existing primary health care programs and can be tailored to local needs and resources. Primary eye care is a service that is not only highly desired by the client population, but one that is both feasible and rewarding to implement.

MCN has been conducting on-site primary eye care trainings since 1995. In addition to this manual, an Eye Care Training Guide and other publications are available from MCN. MCN also fosters cooperative relationships with other agencies involved in primary eye care. Contact information for MCN is included in the Resources section in Appendix C of this manual.

CHAPTER ONE

Primary Eye Care Services: An Overview

The purpose of this chapter is to outline the basic elements essential for the development of a program to provide primary eye care services to a farmworker population.

The profile of primary eye care programs will differ depending on local funding and services. However, there are a number of common elements. Primary eye care activities can take place in an outreach, clinic or referral setting. Activities can include: vision and disease/injury screening, prevention education, referrals for prescriptions or treatment, and/or the provision of low cost glasses.

Primary eye care activities can take place in a clinic, outreach, or referral setting.

Screening

While many clinics provide some eye care screening for people (often only of children) in-house, very few have systems to provide more general screenings of the farmworker population.

Health care workers can screen for vision and other eye problems in a variety of settings including: health fairs, migrant farmworker camps, schools, churches, one-on-one visits, and other arranged group settings. Several tools exist for effective vision screening including the Snellen Chart and the Cometer™. Other eye problems can be treated easily in the field, or when a more serious problem persists, can be referred to an ophthalmic professional.

Prevention Education

Education about the prevention of eye problems goes hand-in-hand with screening activities. The most effective education occurs one-on-one as a person goes through the screening process. However, printed or visual preventive messages left in the community or available at the clinic can also be very effective, provided they are at an appropriate reading level. Primary eye care education messages should stress injury prevention, UV protection, hygiene, and nutrition.

Referrals for Prescriptions or Treatment

Screening efforts are most effective when ophthalmic professionals are available for referrals. A few health centers may have an ophthalmic professional on staff, but most will have to rely on referrals to outside sources. Communities that are reasonably close to a school of optometry can sometimes arrange for services through these institutions. Other communities work with the local ophthalmic community to provide low cost or free services to the farmworker population. [See Appendix C *Eye Care Resources*.]

Provision of Glasses

Once a prescription has been provided by an ophthalmic professional, the trained Migrant Health Clinician or outreach staff can dispense glasses for an individual. Eye Deal Eyewear is a company whose mission is to provide corrective eye wear of a high optical quality at a low price. The company sells an eyeglass collection called Inst Eyeglasses™ which are designed to fit an individual's prescription and can be dispensed in only a few minutes. The eyeglass collection has one hundred different eye glass

frames and a variety of lenses. If an individual is unable to use the lenses they can be returned for a different prescription. The collection also includes a kit to aid in putting the glasses together. See the Resources and Appendix C for their phone number. The glasses are sold at a very low cost and the profits can be put back into the primary eye care project.

Sunglasses can also be provided either free of charge or for a small fee from the Houston Eyeglass Bank (call MCN for more information) or your local Lions Club. The sunglasses can be used as an incentive to bring people in while also serving to prevent UV damage, a serious problem among farmworkers.

First Steps

MCN can provide Primary Eye Care training that is specifically designed to meet your needs.

If your site is interested in developing primary eye care services, first fill out the Clinic Self Evaluation on the following page. This will help identify the services you already provide, as well as the services you may be interested in adding. The form is a tool for self-evaluation only, and does not set criteria for development of an eye care program. Often, the implementation of a program is determined by the amount of staff hours you can commit to it as well as the financial support available.

Depending on the time and resources available, a primary eye care project may consist simply of outreach and clinic staff training on preventive education for eye care problems. A more complex program might incorporate optometric referrals and provision of eyeglasses. MCN is available with technical assistance, trainings and support services to assist sites serving migrant farmworkers to implement some or all of the elements of a primary eye care project.

***Clinic Self Evaluation
for the Provision of Primary Eye Care Services***

SERVICE CATEGORIES	Services currently provided	Services that your clinic would like to implement
<p>Vision screening: Outreach screening Screening in clinic</p>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<p>Screening for disease/injury Outreach screening Screening in clinic</p>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<p>Prevention education: Written materials provided One-on-one in outreach setting One-on-one in clinic setting Group presentations</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>Treatment of disease/injury Outreach workers give basic treatment General health practitioner provides in clinic Ophthalmologist on staff</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<p>Prescriptions for visual correction Ophthalmologist on staff Contacts with local Ophthalmologists for referral</p>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
<p>Provision of glasses Glasses for sale by outreach team or clinic Contacts available in local community for low cost glasses</p>	<input type="checkbox"/>	<input type="checkbox"/>

CHAPTER TWO

Basic Eye Anatomy and Vision

Understanding how the eye works is key to screening clients for vision problems as well as disease or injury. This chapter covers the major parts of the eye and helps to create a general understanding of the mechanism of sight.

The eyes (or eyeballs) are two hollow spherical organs that make it possible to see—that is to receive images and send them to the brain. They are located in two bone cavities called sockets or orbits

They eye is composed of:

- layers
- features
- protective structures

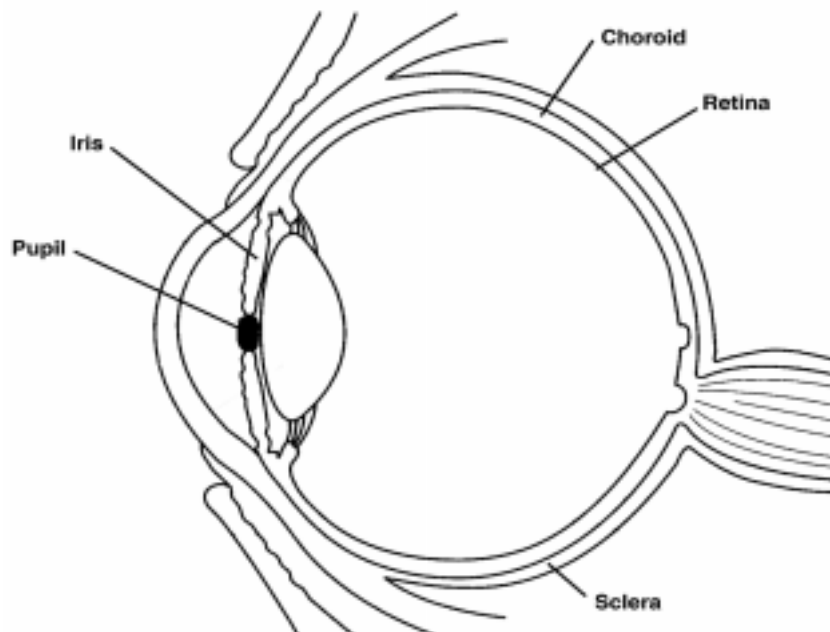
Eye Anatomy: The Three Layers of the Eye

The eyes are composed of three layers, which, from the outside to the inside are: the *sclera*, *choroid*, and *retina*.

The **sclera** is the white part of the eye and makes up its outside layer. It is the toughest of the three layers, and maintains the shape of the eyeball. Toward the front of the eye (anterior portion) it becomes a transparent membrane called the *cornea*.

The **choroid** is a second layer composed mainly of blood vessels that carry nutrients to the eye. In the front of the eye it becomes the **iris** (which gives color to the eye). The iris has a central opening called the **pupil**. The principal function of the iris is to regulate the entry of light into the eye by decreasing or increasing the size of the pupil.

The **retina**, the third layer, is the innermost layer of the eye on which images are formed.



Anatomical Features of the Eye

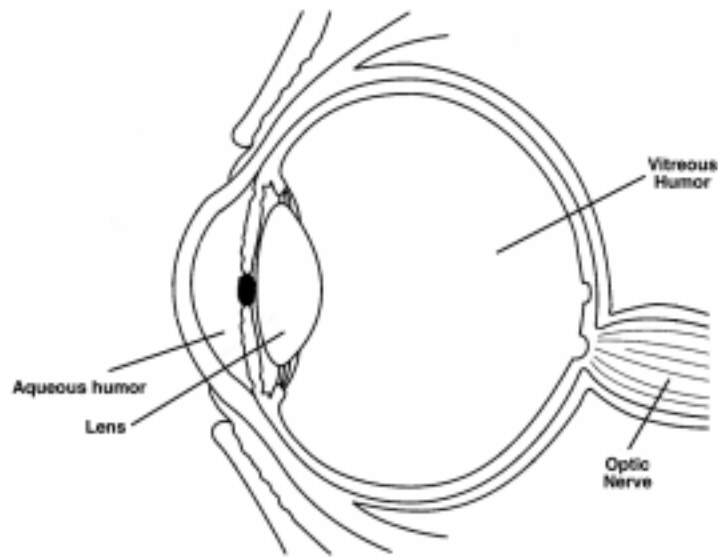
The **aqueous humor** is a transparent liquid that occupies the space between the cornea, iris and lens. The aqueous humor is continually filled, and its principal function is to maintain the normal pressure of the eye.

The **lens** is a transparent structure located behind the iris that focuses light rays entering through the pupil to form an image on the retina.

The **vitreous humor** (also known as vitreous body) is a transparent, jelly-like structure occupying the back (posterior) cavity of the eyeball behind the lens. It also helps to maintain the shape of the eye.

The **optic nerve** is a nerve cord that comes out of the back of the eyeball and transmits to the brain images that are registered by the eyes.

The **extraocular muscles** lie between the sclera and the socket. Their function is to permit the movement of the eyes.



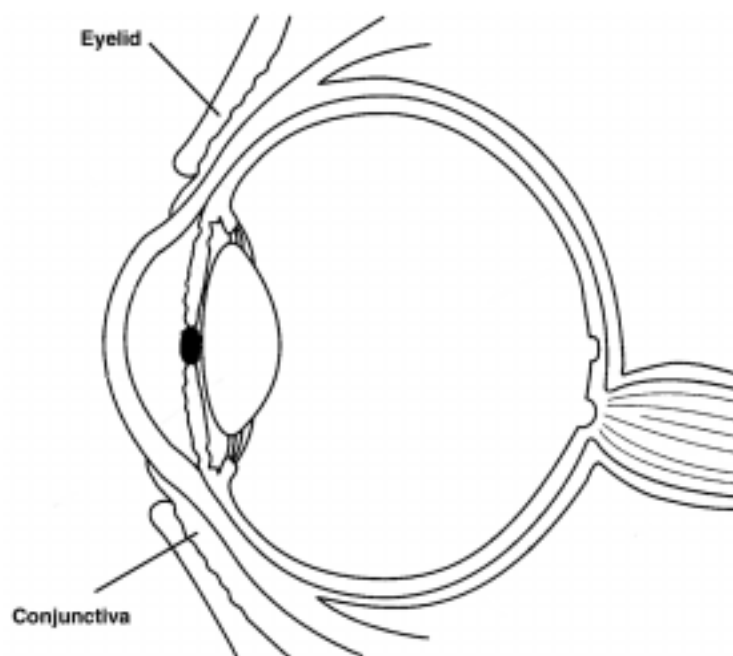
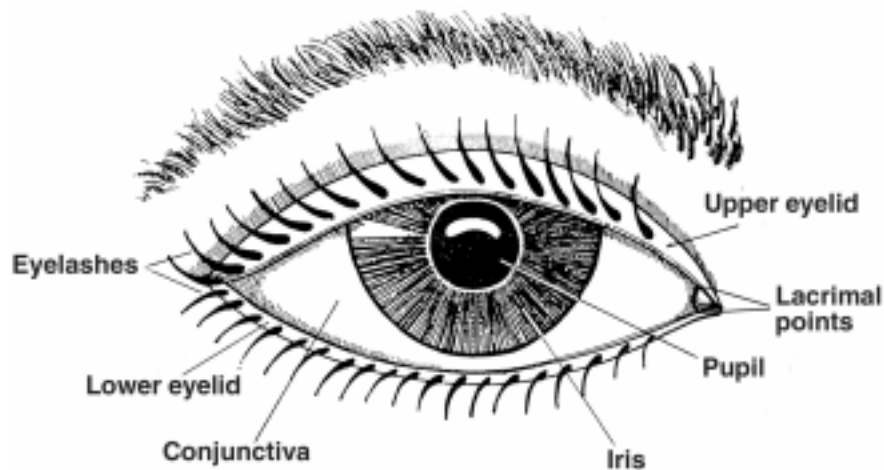
Structures that Protect the Eyes

The **conjunctiva** is a thin, transparent, smooth, moist membrane that covers and protects the anterior part of the sclera and the internal part of the eyelids

The **eyelids** are two mobile structures whose function is to protect the eyes from foreign bodies

The **eyelashes** are implanted on the free edges of the eyelids and help the eyelids carry out their function.

The **lacrimal apparatus** consists of the **lacrimal (tear) gland** and the **lacrimal ducts**. The gland produces the tears, whose function is to maintain the moisture of the cornea and to protect the eye against microbes and foreign bodies. The lacrimal ducts extend from two openings called **lacrimal points**, at the inner corner of the eyelids to the nasal cavities; these ducts eliminate excess tears.



Mechanism of Vision

Your eyes and brain work together to form one three-dimensional image.

Your eyes and brain work together to make it possible for you to see. Light bounces off objects on the front surface of your eye, the cornea. The cornea bends the light, which then passes through the fluid called the aqueous humor, through the pupil, and to the lens. The lens bends the light even more, sending it through the fluid in the back of your eye, the vitreous humor, to the retina. On the retina, the light forms an upside-down image on the cones and rods. The cones and rods send messages to the brain via the optic nerve.

Shortly after leaving the eye, the optic nerves from each eye cross and separate, sending their fibers to both sides of the brain. In effect, each side of the brain receives messages for both eyes. Instead of seeing two of everything, the brain fuses the images together to form one three-dimensional image.

Common Vision Problems

Refractive Errors:

Hyperopia (farsightedness):

A refractive condition in which light focuses behind the retina, resulting in clear distance vision but blurred near vision. Hyperopia is a condition present at birth when the length of the eye is short or the focal length of the lens inside the eye is not long.

Refractive Errors:

- Hyperopia (farsightedness)-Ability to see distant objects clearly.
- Myopia (nearsightedness)-Ability to see close objects clearly.

Young, mildly hyperopic patients are often asymptomatic, that is, they are able to see clearly both at distance and up close. This is due to their ability to accommodate, which causes the lens of the eye to curve and bring the focus of light rays from behind the eye up to the retina. However, as we age, we lose the ability to accommodate and can no longer make this adjustment to achieve clear near vision.

Corrective lenses converge the incoming light rays the appropriate amount so that the image focuses on the retina. Treatment is usually based on patient comfort. Eye doctors may elect not to treat a mildly hyperopic patient who is asymptomatic.

Myopia (nearsightedness):

A refractive condition in which light focuses in front of the retina. This results in clear near vision, but blurry distance vision.

Few people have myopia at birth. However, almost one third of the population in any industrialized society will become myopic after several years of schooling or during the adult years. Myopia is an inherited condition in most cases and may also occur as a result of prolonged tension on the eyes during close work and elongation of the visual axis.

The primary sign of myopia is the inability to view distant objects clearly and distinctly. Myopes may also find themselves squinting when looking at the distance in order to make the fuzzy image clear. After long periods of close-up work, highly myopic patients may complain of eye strain and fatigue.

Corrective lenses spread out the incoming rays of light by an appropriate amount, so they will focus on the retina. There are other treatment procedures, such as orthokeratology, where a hard flat contact lens

is prescribed to flatten the cornea, and radial keratotomy, in which surgeons make incisions in the cornea in order to flatten it.

Conditions:

Astigmatism:

Astigmatism is a refractive condition in which the eye's focusing elements are unable to form a single image for a single object. Usually, astigmatism is caused by an inherited irregularly shaped cornea. Astigmatic corneas are most commonly steeper in the vertical direction than in the horizontal direction. An irregularly shaped lens may also cause small amounts of astigmatism. The use of contact lenses may reduce astigmatism, because of the changes they can produce on the cornea.

The vast majority of astigmatics have very low astigmatism. High astigmatism is present in a very small percentage of young children, but is of major concern to diagnose this before age 2 or 3 to prevent the child from becoming amblyopic (decrease in vision due to lack of neural stimulation).

Small amounts of astigmatism usually do not noticeably impair vision. However, without correction, there is no distance (near or far) at which an uncorrected astigmatic has a completely sharp retinal image. Thus, when looking at an object, portions of it (perhaps vertical components) may appear clearer than other portions.

Astigmatism may be corrected by using cylindrical optical lenses depending on which meridians of the eye are astigmatic. Some patients find that it takes some time to adjust to spectacles with a correction for astigmatism. Without the correction, the brain tends to compensate for visual distortions produced by astigmatism. When a correction is applied, the brain may take a few days to modify its interpretation of the visual scene but will ultimately receive a clearer image.

Presbyopia (accommodation problems):

Presbyopia is a vision condition in which the lens of the eye loses its ability as it matures through life. This results in decreased near vision because of the difficulty of focusing on close objects. Presbyopia is an adult condition and is present in nearly everyone over the age of 40.

The eye stops growing at about the age of ten; however, the lens (which focuses the light entering the eye) continues to grow in layers. As the lens produces more layers throughout life it becomes very dense and compact. The lens eventually loses its youthful elasticity and cannot contract much during accommodation (the process needed to focus), resulting in blurry vision up close.

A common sign of the onset of presbyopia is the tendency to hold reading materials at arm's length to achieve clear vision. At the normal reading distance vision is blurred. Presbyopia can usually be corrected with reading glasses, bifocals, or trifocals.

Once presbyopia occurs, it typically progresses for 10-12 years and then stabilizes. An increase in hyperopia (farsightedness) may also occur with the progression of presbyopia.

Portions of this chapter are adapted from "Primary Eye Care Manual", World Health Organization, Scientific Publication No. 490, 1985. The "Mechanism of Vision" section is adapted from materials produced by InFocus, Dr. Ian Berger, 1995.

Conditions:

- Astigmatism-Causes a blurred image.
- Presbyopia-Gradual loss of the eye's ability to change focus.

CHAPTER THREE

Primary Eye Care: Recognizing and Treating Eye Problems

This chapter provides a systematic approach to setting up a primary eye care screening. After reading this chapter you will know how to 1) take a medical history, 2) ask four basic questions that can indicate disease or injury, and 3) conduct vision testing (including special considerations for screening children). Included in this chapter are screening and referral tools which can be adapted to local sites.

A full eye examination by an outreach or clinic worker will consist of both a vision test and an examination for eye disease or injury. Whether or not problems are found, the examination should be followed by a discussion with the patient on measures to prevent eye disease and injury. If sunglasses are available for distribution, they should be given at the end of the examination. A discussion which highlights sun damage to the eyes should follow.

The screening process includes:

- brief history
- vision test
- eye exam

The next page contains a flow chart which outlines the screening process. Later in the chapter are sample history and assessment forms that can be used for taking an eye history and for referring a patient.

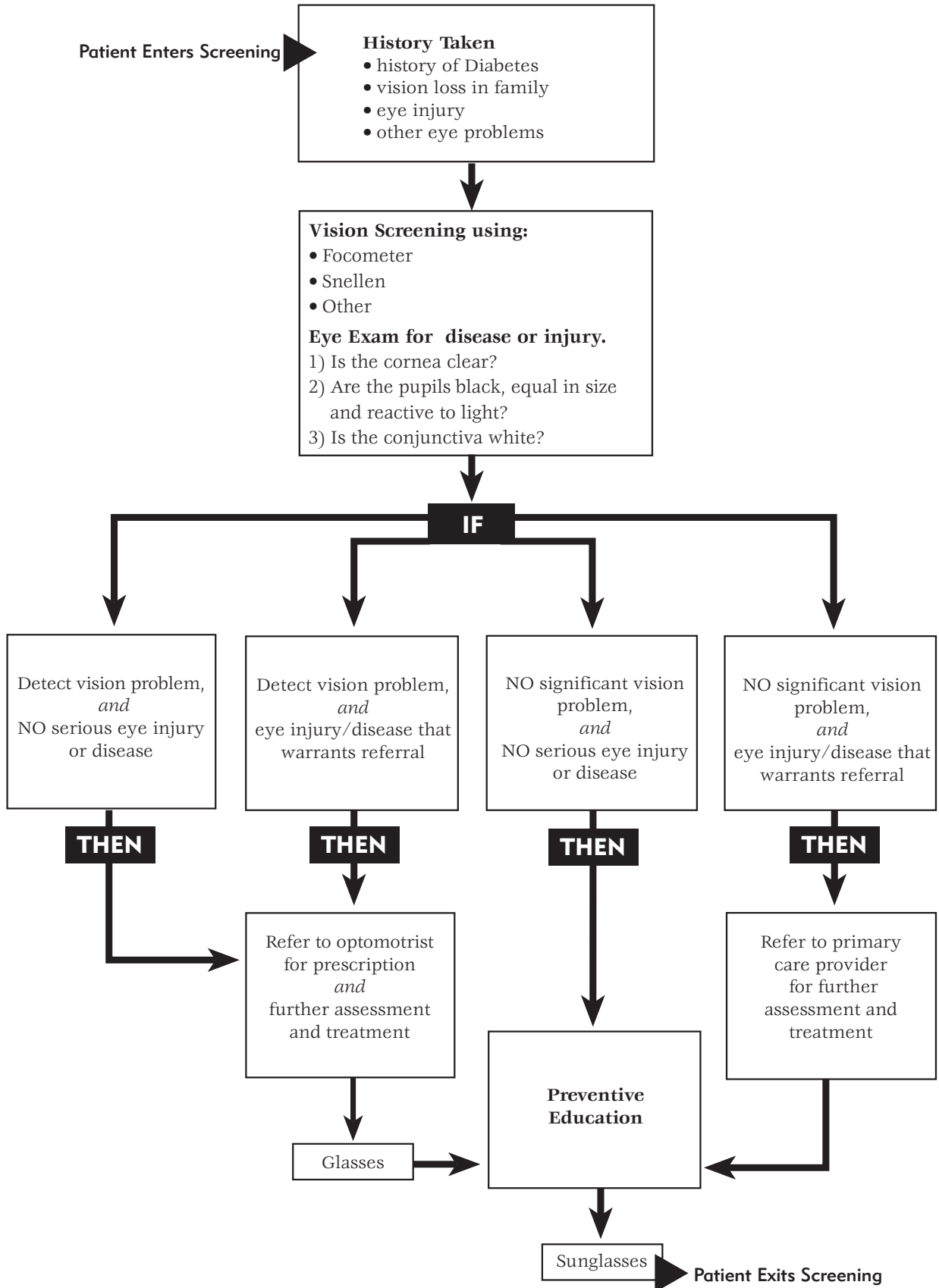
As the flow chart indicates, first, a **history** is taken that identifies symptoms or events that may indicate possible eye problems. Second, the person is given a **vision test** using either a Snellen Chart or the Focometer™. Following the vision test, the outreach/clinic worker examines the person's eyes based on a series of **four basic questions**.

Following the screen, it is the responsibility of the outreach/clinic worker to provide **preventive education**. If the person is found to have a vision problem, eye injury, disease or any combination of these problems, they should be **referred to a medical professional** who either treats or refers to a specialist. If the primary eye care project is dispensing **glasses**, the patient will return after receiving his prescription to purchase the glasses.

Checklist of Materials Needed to Perform the Eye Exams

- | | |
|---|--|
| <input type="checkbox"/> Flashlight and batteries | <input type="checkbox"/> Pencil, clipboard |
| <input type="checkbox"/> Hand cleaner | <input type="checkbox"/> Magnifying glass |
| <input type="checkbox"/> Tape measure | <input type="checkbox"/> Latex gloves |
| <input type="checkbox"/> History and Assessment forms | <input type="checkbox"/> Referral cards |
| <input type="checkbox"/> Occludes or cardboard | <input type="checkbox"/> Activities for children |
| <input type="checkbox"/> Prevention Education Materials | |
| <input type="checkbox"/> Sample safety equipment and glasses for education and display | |
| <input type="checkbox"/> First aid kit (including eye drops, sticks for evertting the eye lid, et...) | |

Primary Eye Care Screening Flow Chart



Completing the Medical History and Assessment Forms

The history and assessment forms allow the outreach or clinical worker to document the status of the patients' eyes. A family medical history can be vital in determining the farmworker's problem, therefore time should be taken in obtaining the medical history. During the screening of the eyes use the assessment form to walk through the process. Create consistency in your methodology (i.e. always start with the right eye then the left), so when interrupted you will know your patterns and where to continue with the screening. Additional comments are important when any abnormalities are seen.

The Medical History

A family medical history can be vital in determining eye conditions and diseases.

History Forms (English and Spanish) are found on pages 14-15. Assessment Forms are on pages 2-22.



*Indianapolis, Indiana health clinic.
Doctor examines a boy whose eye was irritated by pesticides. ©1988 Alan Pogue*

Migrant Health Primary Eye Care History Form

Print Name (Last) _____ (First): _____ Date: _____

Location or Camp where screened _____ Sex: M / F Age: _____

Contact information (address, phone, work location...) _____

_____ Best time to contact: _____

What types of farm work do you do throughout the year _____

	Yes	No	When? /How often?/ Location (worksite, home...)?
--	-----	----	---

Do your eyes...

Burn? Yes No _____

Feel dry? Yes No _____

Itch? Yes No _____

Tire easily? Yes No _____

Water? Yes No _____

Do you have difficulty opening your eye lids? Yes No _____

Is your vision blurred? Yes No _____

Do you have to squint to see clearly? Yes No _____

Does bright light bother your eyes? Yes No _____

Do you have headaches regularly? Yes No _____

Have you ever had an eye injury? Yes No _____

When did it happen? How/ or was it treated? _____

Please describe: _____

Has anyone in your family had eye problems? Yes No _____

If yes what kind? _____

Has anyone ever told you that you _____

have diabetes (sugar in the blood)? Yes No _____

Has anyone ever told you that you _____

have high blood pressure? Yes No _____

Do you wear contact lenses _____

or glasses? (Other than sunglasses?) Yes No _____

If outdoors, do you wear sunglasses _____

including while doing work? Yes No _____

If no, why not? _____

If yes do they offer 100% _____

UV protection? Yes No _____

Patient's Signature: _____ Health Worker's Signature: _____

For more information, contact MCN, PO Box 164285, Austin TX 78716 (512)327-2017

Formulario de la Historia del Cuidado Principal de la Vista

Escriba su Nombre (Apellido) _____ (Nombre): _____ Fecha: _____

Ubicación o Campamento en donde se le registró: _____ Género M / F Edad: _____

Información de contacto (dirección, teléfono, lugar de trabajo....): _____

_____ Mejor hora en cual encontrarlo(a) _____

¿Qué tipo de trabajo agrícola desempeña a lo largo del año? _____

_____ Si No ¿Cuándo? ¿en el trabajo, en la casa...)?

Sus ojos (se) le.

arden? Si No _____

sienten secos? Si No _____

dan comezón? Si No _____

cansan fácilmente? Si No _____

lloran? Si No _____

¿Se le hace difícil abrir los párpados? Si No _____

¿Tiene borrosa la vista? Si No _____

¿Tiene que rasgar los ojos para ver bien? Si No _____

¿Le molesta a sus ojos la luz brillante? Si No _____

¿Le dan dolores de cabeza con regularidad? Si No _____

¿Ha tenido alguna lesión en los ojos? Si No _____

¿Cuándo sucedió? ¿Recibió tratamiento? _____

¿Cómo? Por favor descríbalos: _____

¿Ha habido problemas de la vista en su familia? Si No _____

¿De qué tipo? _____

¿Le han dicho alguna vez que tiene diabetes (azúcar en la sangre)? Si No _____

¿Le han dicho alguna vez que tiene alta presión en la sangre? Si No _____

¿Usa usted lentes de contacto o lentes normales (que no sean lentes oscuros)? Si No _____

Cuando está afuera, ¿utiliza usted lentes oscuros? ¿también al estar trabajando? Si No _____

Si no, ¿por qué no? _____

Si sí, ¿le ofrecen 100% de protección contra los rayos ultravioletas (UV)? Si No _____

Firma del Paciente: _____ Firma del personal de servicio para la salud: _____

Para obtener mayor información, póngase en contacto con MCN, PO Box 164285, Austin TX 78716 (512) 327-2017

Vision Testing

Vision testing is very important because it allows us to measure the extent of a person's visual impairment. It is important to remember that the patient plays a key role in the vision screening process. Time should be taken to clearly explain the vision screen (be it use of the Snellen Chart or the Focometer) and how the patient's interaction is crucial to an accurate reading.

Vision Testing Tools

- Snellen Chart - measures visual acuity
- Focometer - tests for refractive errors

It is important to understand the difference between *vision* and *visual acuity*. *Vision* refers to the ability to see the things that surround us. *Visual acuity* measures the detail or clarity with which we see.

Vision Testing Tools

As a primary level health worker, you should test the vision of all members of the community under your care, especially those with eye symptoms or problems of any kind. It is very important to test vision in children about 3 years of age as early detection can be vital in correction. Vision testing is the *first step* in the eye examination.

Vision Screening Can Help Detect:

- **Eye disease** capable of producing blindness for example, a cataract
- **An alteration in the brain** capable of producing both blindness and death, for example, a tumor
- **Defect of ocular refraction** that does not produce either blindness or death but that reduces the effectiveness of the person's normal functioning, for example, myopia or nearsightedness

What is 20/20 vision?

When an individual can see the 20/20 line on the Snellen Chart clearly at 20 feet.

Eye Chart (Snellen)

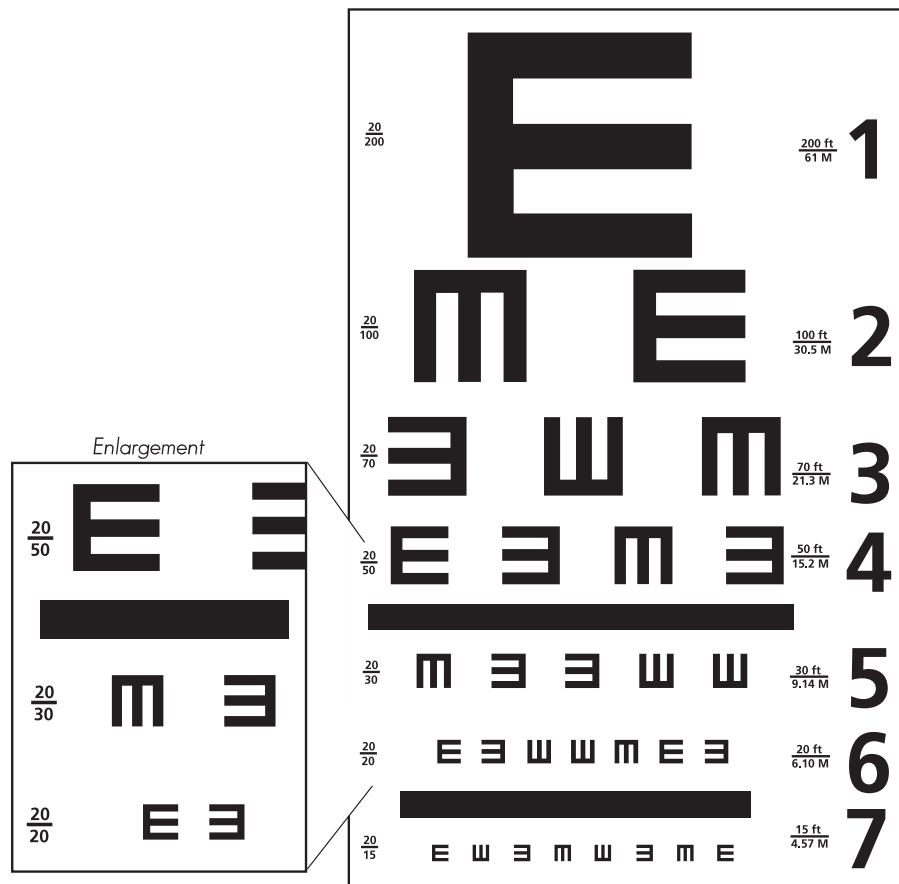
The Snellen chart is an excellent tool for testing because it does not depend on a patient's ability to read or write. The chart either has rows of letters, shapes, or "tumbling E's." The Snellen chart described in this manual consists of a white panel on which the letter E is printed in different positions and on several lines with the size of the letters arranged from larger to smaller from the top to the bottom of the chart. See Optometric Supplies in Appendix C to obtain one.

The Focometer™

The Focometer™ is a hand-held instrument which can measure visual refractive errors accurately without the need for electricity. It can be used by persons with minimal training. The patient looks through the Focometer™ and manually adjusts a focusing device (similar to adjusting a zoom lens on a camera), and brings a target into focus. The glasses prescription is then read on a linear scale on the side of the instrument. Corrections for astigmatism can also be determined with the instrument. The use of the Focometer™ is described in greater detail in Chapter 4.

Using the Snellen Chart

Beside each line of the Snellen Chart is a number consisting of two parts: an upper figure and a lower figure, separated by a horizontal or diagonal line; for example 20/30. **Because the Snellen chart's exact size, color, and contrast are crucial for the accuracy of your eye exams, it is important that you obtain and use only original charts. Do not photocopy or improvise charts. See page 101 (Optometric Supplies) for ordering information.** The top or first number (numerator) specifies the testing distance (usually 20 feet); the bottom or second number (denominator) specifies the letter size in relation to the letters on the 20/20 line. Thus, the 20/100 letters are 5 times larger than the 20/20 letters, and a reading of 20/100 means that the patient can see at 20 feet what a normal eye can see at 100 feet.



Prepare the Snellen Test Site

1. Choose the site where the eye chart will be placed. This may be a wall, a tree, etc.
2. The patient may be standing or seated, provided that the line corresponding to number 20/30 is at eye level, and he should be 20 feet (6 meters) from the chart.
3. Make sure the eye chart is well lit. There should be no windows or objects beside it to distract the patient or produce light reflections to cause discomfort.
4. Stand beside the eye chart in such a way that you can point to the letters with a finger, a pencil, or small stick, without covering them and, at the same time, can observe the patient.
5. Do not allow other people to distract the patient.

6. Have on hand several occluders or pieces of cardboard approximately 2 inches wide x 4 inches tall. These are used by the patient during the test alternately cover each eye (See page 24 at the end of this chapter for instructions on making your own occluder)
7. Have paper and pencil ready to record the results of the examination.

Things to Remember When Performing the Snellen Test

- A reduction in visual acuity is **never** accompanied by pain in the eyes
- Normal visual acuity for a child under 7 is nearly **always** around 20/30.
- When you ask the patient to cover one eye, **make sure** he or she **really** is seeing with the other eye only.
- A long test almost **always** gives false results since the patient becomes **tired**.

Implementing the Snellen Eye Chart Test

1. Explain to the patient that you will point to the letters on the different lines of the chart one at a time. Using their hand, he or she will have to tell you in which direction the parallel lines of the E are pointing.
2. If the patient normally wears eyeglasses to see at a distance (not for reading), tell him or her to keep them on during this examination.
3. To see if the patient has understood how the examination will work, ask him or her to identify the directions in which some of the E letters are pointing, with both eyes uncovered.
4. To test the vision of the person's right eye, have the person gently cover their left eye with the an occluder or cardboard. Begin pointing to the largest letters and proceeding down to the smallest ones that the patient can see. When the patient can no longer distinguish at least half of the letters on a line, that is considered the smallest line that they can see. Record that line on the Primary Eye Chart Assessment Form.
5. When this is done, have him or her cover the right eye and test his or her left eye.

Giving clear instructions is important.

A long test almost always yields misleading or inaccurate results.

Interpretation of the Snellen Chart Test

Normal vision:	Visual acuity ranges from 20/20 to 20/40.
Subnormal vision:	Visual acuity ranges from 20/60 to 20/200.
Blindness:	Visual acuity of 20/400 or less

Further Testing if the Snellen Test is Unsuccessful

- If the patient cannot read the largest letters of the chart, ask him or her to walk toward the chart; the distance at which he or she begins to read the large letters is recorded as the top number. For example, 4/200 means that the patient was 4 feet from the 20/200 letter or that the patient can see at four feet what the normal eye sees at 200 feet.
- If the patient cannot see the largest letters at any distance, hold your fingers in front of his or her eyes and record his or her vision as the farthest distance at which he or she can count your

fingers. For example, if he or she can count the number of fingers you are holding up at 3 feet, record this as "C.F (Counts Fingers) at 3 feet."

- If the patient is unable to count your fingers, wave a hand in front of his or her eyes to find out if he or she can perceive the movement. If he or she perceives it, record this as H.M. (Hand Movements).
- If the patient is unable to detect your hand movement, shine a test light into his or her eyes and ask if he or she perceives it. Record the result. For example, write down "L.P (Light Perceived) or "N.L.P" (No Light Perceived).

How to write up visual acuity in the primary Eye Care Assessment Form

First, write the symbol for visual acuity, which is a large V. Write down the visual acuity of the right of the V, first for the right eye and then below that of the left eye preceded by the letter R and L.

For example:

V R: 20/20

V L: 20/25

The above example shows that, at 20 feet (6 meters), the patient read with his or her right eye the line that can normally be seen at that distance; with the left eye and at the same distance, he or she could read the following line

Use the same notation for recording all measurements of visual acuity.

For example:

V R = 20/200

V L = H.M. 2 inches

This means that at 20 feet, the patient could distinguish with the right eye the sign that normally should be distinguished at 200 feet, while with the left eye he or she could only perceive the hand movements of the examiner 2 inches from that eye

Follow-Up Referrals to a Physician

(Snellen Chart Vision Test Results)

- Any patient with **eye problems**, even if his or her visual acuity is 20/20.
- Any patient with **visual acuity of less than 20/40**, even if he or she does not have eye symptoms
- Any patient whose **visual acuity in one eye differs from that in the other by two lines or more** on the Snellen chart, even if in one or both eyes his or her vision is 20/30 or better. For example, right eye 20/20, left eye 20/40.

Children: Special Considerations for Vision Screening

In order for vision to develop properly, visual stimuli must reach the brain through the eyes. If this does not happen, even though the eyes appear normal, a permanent loss of sight may occur. Consequently, children's vision should be examined from birth in the following manner:

Children from birth to six months of age:

There are no simple eye tests of small children, but it can be assumed that the child sees if his eyes are well aligned (centered), if he makes faces and his pupils contract when a light is shone suddenly in his eyes and, in some cases if the child's eyes follow a light moved in front of him or her at **distance of approximately 13 inches.**

Children from 6 months to 2 years of age:

Again, there are no simple methods of testing vision with precision. In addition to the methods noted above, the following are indications of normal vision:

- The child looks at an object and follows it as it is moved in front of his or her eyes
- The child does not seem upset when one or the other eye is covered

Children from 2 to 4 years of age:

At this age it is already possible to test vision by having the child recognize objects or drawings of objects at various distances from his eyes while one eye and then the other is covered. In some cases, even at this age the Snellen chart with the letter E or the **6-meter™** may be used (see below).

Cases for Referral to a Physician

(Children)

Any child over six months of age:

1. whose eyes are poorly aligned
2. whose eye movements are poorly coordinated

Any child:

1. unable to respond when you shine a light in his or her eyes
 2. whose pupils do not contract in response to light.
 3. whose pupil/pupils look white
 4. who gets severely upset when one of his or her eyes is covered with a bandage
 5. who exhibits significant difference between one eye and the other in the perception of objects or figures.
-

Migrant Health Primary Eye Care Assessment Form

(to be filled out by the health worker)

Name: _____

Vision Testing (Perform ONE type of test, Focometer™ OR Snellen Chart)

Focometer™: **Refractive Error** (i.e -0.75)

Right Eye _____

Left Eye _____

OR

Snellen Chart: **Visual Acuity** (i.e 20/40)

Right Eye _____

Left Eye _____

Disease/Injury

Yes

No

1. Is the cornea clear?

Referred?

If not, how does it appear? _____

2. Are the pupils black, equal in size, reactive to light?

Referred?

If not, how does it appear? _____

3. Can the eye lid open and shut normally?

Referred?

If not, how does it appear? _____

4. Is the conjunctiva white?

Referred?

If not, is it red or yellow?

5. Is the eye injured?

If yes then where? _____

Additional Comments: _____

For more information, contact MCN, PO Box 164285, Austin TX 78716 (512)327-2017

Formulario de Evaluación del Cuidado Principal de la Vista

(to be filled out by the health worker)

Nombre: _____

Pruebas de la Vista (Realice UN tipo de prueba solamente, Focometer™ O Snellen Chart)

Focometer™: **Error de Refracción** (i.e -0.75)

Ojo Derecho _____

Ojo Izquierdo _____

O

Snellen Chart: **Agudeza Visual** (i.e 20/40)

Ojo Derecho _____

Ojo Izquierdo _____

Enfermedad/Lesión	Sí	No
1. ¿Está transparente la córnea?	<input type="checkbox"/>	<input type="checkbox"/>
¿Si no, como se ve? _____		
2. ¿Están negras las pupilas, del mismo tamaño, reactivos a la luz?	<input type="checkbox"/>	<input type="checkbox"/>
¿Si no, como se ve? _____		
3. ¿Se puede abrir y cerrar normalmente el párpado?	<input type="checkbox"/>	<input type="checkbox"/>
¿Si no, como se ve? _____		
4. Está blanca la conjuntiva?	<input type="checkbox"/>	<input type="checkbox"/>
¿Si no, está <input type="checkbox"/> rojo o <input type="checkbox"/> amarillo?		
5. Está herido el ojo?	<input type="checkbox"/>	<input type="checkbox"/>
¿Si sí, que parte del ojo? _____		
Comentarios adicionales: _____		

For more information, contact MCN, PO Box 164285, Austin TX 78716 (512)327-2017

Eye Exam

Encourage the patient to speak freely about experiences at work relating to vision. Talking with the patient may provide important information in diagnosing any abnormalities. For example: a discussion may determine that the individual has extensive exposure to sunlight and chemicals, which may be creating an irritation to the eye and causing redness.

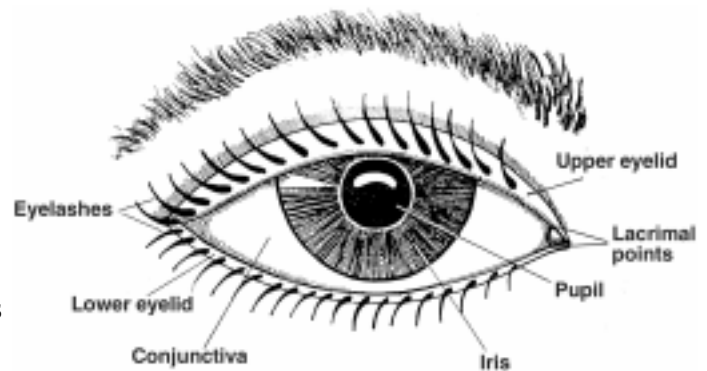
Improve your diagnosis:

Take time to talk with the patient.

The second step in a primary eye care screening visit is the eye examination. When examining the eye there are four questions that the outreach or health worker must ask. In order to interpret observations, use the charts on pages 25-28 to help you to better identify any eye conditions.

The Four Basic Eye Exam Questions:

1. Is the cornea clear?
2. Are the pupils black, equal in size, reactive to light?
3. Is the white part (conjunctiva) white? (The white part is not always completely white, but it should not be red or yellow.)
4. Do the eyelids open and close properly?



Keeping these four questions in mind, carry out the exam according to the following instructions and then use the charts at the end of this chapter to determine what to do when the answer to any of the four basic questions is "no." Any responses that you have to the four basic questions need to be documented on the Assessment Form. Additional observations or concerns need to be documented at the bottom of the form under *Additional Comments*.

How to Carry Out the Eye Examination

Carry out the eye examination in quiet, well-lit surroundings with the patient seated, if possible. Very small children should be placed on their back in a lying position between you and a relative, with the child's head on your lap.

1. Wash your hands before each examination. All you need in the way of equipment is a flashlight and an ordinary magnifying glass.
2. Examine each eye systematically: eyelids, conjunctiva, cornea, iris, pupil, and lens. If necessary, use the flashlight for more light, and the magnifying glass to examine the structures in greater detail.
3. Look at the eyelids to see whether the eyelashes touch the cornea, and whether there is any inflammation or tumor.

4. Evert (turn out) the upper eyelid, especially if you suspect the presence of a foreign body.
5. Check the conjunctiva for reddening (red eye), secretions, other changes of color or other lesions
6. Observe the cornea directly with the help of the magnifying glass; its surface should be smooth, shiny, uniform, and totally transparent; it should be possible to see if the iris is uniformly colored and that it does not have any tumors or any parts missing.
7. Shine the flashlight six inches from the eye on the pupil for several seconds—the size of the pupil should decrease. Normally the pupil is black and the same size in both eyes. If the pupil is black and visual acuity is normal, you may assume that the lens is also normal. PERRLA (pupils equal, round, reactive to light and accommodation) is written when all is OK.
8. Check that the lacrimal apparatus (tear duct) is normal. It is considered normal when the conjunctiva and the cornea are observed as moist and there is no tearing or accumulation of tears.
9. Check the alignment of the eyes by projecting the light from the flashlight toward the person at a distance of 13 inches (33 centimeters) between the flashlight and the eye and ask him/her to look at it; normally the reflection of this light appears in the central part of both pupils. If the reflection of the light does not appear in the center of one of the pupils, the patient should be considered to have a deviation (see Strabismus in Glossary, Appendix B).
10. Check the patient's eye mobility by asking him/her to look up, down, to the right, and to the left; both eyes should make the movements symmetrically.

Making Your Own Occluder

An occluder is needed for carrying out the eye testing (using the Snellen chart or the optometer). For reasons of hygiene it is important to have many disposable occluders. Use the model below to create as many occluders as you need. We suggest using poster board or card stock for this tool.

Check Appendix C "Eye Care Resources" for a listing of vendors. Occluders can be ordered in bulk.



Charts on Abnormal Eye Conditions

The charts on the following pages show what the primary eye care worker can do when abnormal eye conditions are found during an eye exam. For first aid procedures, see Chapter Six, page 5. For detailed information on identified conditions see Appendix B.

ARE THE PUPILS BLACK, EQUAL IN SIZE, REACTIVE TO LIGHT?

NORMALLY: The Pupil should be black and round and reacting to light.

WHEN THE PUPIL IS	IT MAY BE	ACTION TO TAKE	PREVENTIVE MEASURES
White	Cataract (accepted by many people as a usual event of aging)	Refer for surgical appraisal if possible Check visual cavity; tiny pinhole; if improvement, prescribe eyeglasses	UV protection will reduce risk of maturation of cataract.
Brown, green	Tumor (children)	Refer immediately	Good nutrition, antioxidants
Small or big Not reacting to light	Drugs Type: over counter street drugs, alcohol	Refer for investigation if possible	
Irregular, not round	Infection	Refer Check for pain	NO
	Injury	Refer Check for severe pain	

IS THE WHITE PART (CONJUNCTIVA) WHITE?

NORMALLY: The white part is white and smooth and moist.

WHEN THE WHITE PART HAS/IS	IT MAY BE	ACTION TO TAKE	PREVENTIVE MEASURES
Yellow	Jaundice (Hepatitis/Malaria)	Refer to doctor	Cleanliness Boiling drinking water
Red Clear Window	Mild Infection (Conjunctivitis)	Refer if no improvement after 3 days or much pain. Educate on prevention measures.	Cleanliness
Red with white discharge (pus)	Severe infection: Conjunctivitis OR Ophthalmia neonatorum	Refer to eye hospital urgently	Cleanliness
Solid red	Blood (contusion, coughing)	Refer if not better after 3 days	Safety
White foamy spots Bubbles = Bitot's Spots	Night blindness Dry eye (Xerophthalmia)	Refer for Vitamin A or treat with therapeutic dose (200,000 IU), vitamin A, and diet sufficient in protein	Proper nutrition- Vitamin A
Black or Brown spots	Growth (tumor)	Refer to doctor	No delay in treatment Don't allow to become chronic
Red with cut	Wound (injury)	Eye dressing Refer	Safety

DO THE EYE LIDS OPEN AND CLOSE PROPERLY?

- NORMALLY:**
1. The eye lids are regular in shape and color
 2. The eye lids open and close easily
 3. The eye lashes are turned outside

WHEN EYE LIDS ARE/HAVE IT MAY BE ACTION TO TAKE PREVENTIVE MEASURES

Outside Red and Swollen	Stye OR Tear sac infection	Clean with warm water Apply hot, moist compress Refer if no improvement after 5 days	Cleanliness
Bluish or Reddish	Bruise	Reassure the patient	Safety
Inside of the lid is red Irregular (follicles)	Serious Infection (TRACHOMA)	Refer for treatment	Cleanliness (eye and lid washing)
Inside of the lid has white spots (scars)			
1. Not closing properly 2. Eye lashes turned inward	Trichiasis	Refer for treatment	Cleanliness (eye and lid washing)
Skin cut open	Wound, Injury	Bandage Refer if wound is large and cuts edge of lid	Safety

IS THE CORNEA CLEAR?

WHEN THE CORNEA IS/HAS	IT MAY BE	ACTION TO TAKE	PREVENTIVE MEASURES
Flesh growing	Pterygium	Refer for surgery if it covers the pupil unless patient desires removal for cosmetic reasons	UV glasses Protection against dry eye
Cloudy, opaque (partially or totally)	Old scar after infection or injury (corneal opacity)	Explain that no treatment will help.	Cleanliness
Cornea is: <ul style="list-style-type: none"> • Irregular • Not smooth • Not shiny • Blurred • Hazy (partially or totally)	Infection	Refer immediately	Cleanliness
	Glaucoma (painful, hard like a rock)	Aspirin Refer immediately	Understanding that prevention or "early" treatment may greatly reduce risk of blindness
Dry, not shiny with history of night blindness	Dry eye (Xerophthalmia), OR Night blindness with measles diarrhea	Even suspicion of Xerophthalmia (Vitamin A deficiency) can be treated with therapeutic dose of Vitamin A (200,000 IU) along with improved protein sufficient diet	Good nutrition Measles Immunization
Injury	Scratch (Abrasion)	Eye pad with shield if no improvement	Safety
	Wound (Laceration)	Eye pad with shield Refer immediately	
	Blood (Hyphema)	Bedrest Refer immediately	
	Severe Infection (Iritis) from injury	Refer immediately	

CHAPTER FOUR

The Focometer™:

A Tool for Measuring for Refractive and Astigmatic Errors

The Focometer™ was designed to measure refractive and astigmatic errors accurately. It is a hand held instrument which does not require electricity or extensive training to use properly. It was developed by Drs. Ian Berger and Larry Spitzberg at the University of Houston College of Optometry in Houston, Texas to provide a subjective refraction without the need of electricity or a complicated protocol. The patient looks through the FOCOMETER and manually adjusts a focusing device (similar to adjusting a zoom lens on a camera) bringing an unmagnified target into focus. Although corrections for astigmatism can be determined with the instrument, a spherical correction alone will yield an acceptable vision correction in most patients.

For screening purposes, the Focometer can be used to detect both refractive (also called spherical error) and astigmatic errors (also called cylindrical error). The majority of vision problems will be caught by screening for refractive error, however there is a much smaller group of individuals who will have a serious astigmatic error without a refractive error. While it is important to identify this smaller group of people, the trade-off is that it is more complicated to screen for both types of error than just for refractive error. Please read these directions before deciding which screening procedure to employ at your site.

The patient must take an active role in the screening. While a trained person must be present to assist, the Focometer is essentially a self-examiner where the patient holds the focometer and rotates it until the chart comes into focus. It is important for the patient to be clear on what he or she is looking for so you can get an accurate reading.

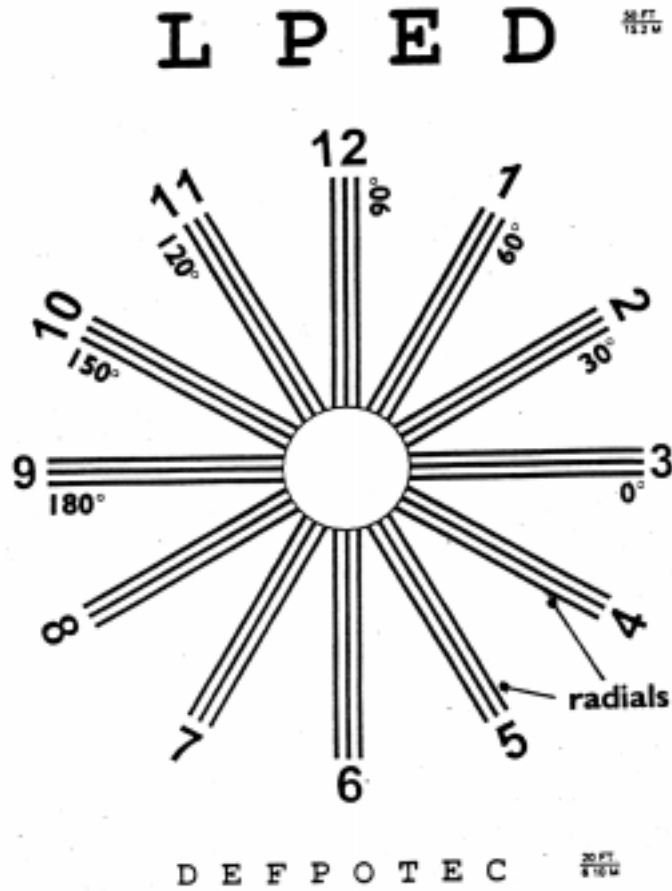
I. Using the Focometer for Refractive Error (Sphere)

Photographs by Alan Bogue

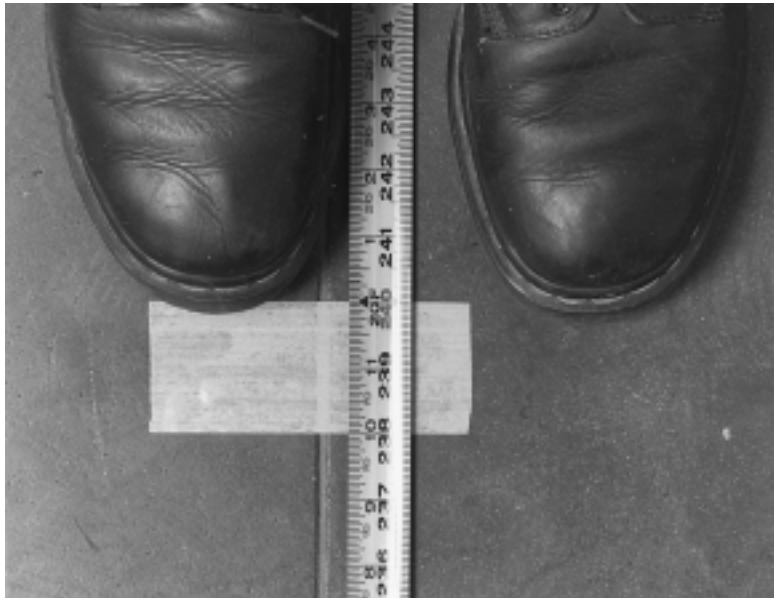
1. Screw the Focometer onto a tripod base or have the patient hold the focometer in the right hand.



- Place the star chart on a well lighted wall at eye level



- Rotate the Focus Collar of the Comometer to +10 Diopters
- Have the person stand exactly 20 feet in front of the eye chart.



- Cover the patient's left eye with a thick piece of paper or a paper cup (not a hand).



6. Have the person rotate Focus Collar of the Focometer clockwise until the star chart first becomes clear. The radials of the star chart may all become clear simultaneously, or one or two may come into focus before the others. **If all radials on the star chart enter focus simultaneously, the patient does NOT have astigmatism. The patient requires only a spherical lens without axis or cylinder.** If one or two radials enter focus before the others, the patient has astigmatism and requires a lens with axis and cylinder. **Please see Section II for astigmatic correction.**
7. The person must **STOP** rotating the collar **AS SOON AS** the star chart comes into focus. At this point, take the Focometer and read the diopter scale.



To read the diopter scale look straight down at the focometer. The point where the focus collar crosses the diopter scale is the nearest whole number value of the refractive error in diopters. The plus or minus sign in front of the number represent plus (for vision) or minus (near vision) correction required. If the focometer reads 0.00 then the individual has NO refractive error.

The correction can be made accurate to the nearest quarter of a diopter by looking at the front edge of the focus collar. When the straight line crosses the middle of the diopter scale the correction is a whole number value. If a white dot crosses the middle of the scale the correction will include a quarter fraction of a diopter.

- After reading the scale write down the correction value in + or - diopters. Obtain a correction for the other eye. The following example shows the reading for one individual who has a refractive error in both eyes. The FOCOMETER reading for the right eye is +2.00. The focometer reading for the left eye is +2.25. The correct notation is: R: +2.00 S L: +2.25. ("S" refers to spherical correction)

RIGHT EYE READING

LEFT EYE READING



- Repeat the evaluation for the right eye. If the correction for the right eye differs the second time, repeat the entire process for both eyes.



II. Astigmatic Error (Cylinder)

1. Repeat Steps 1-5 as described of refractive error.
2. If one or more radials on the star chart come into focus (or become dark) before the other radials, then the person has an astigmatic error.
3. Tell the person to **STOP** rotating the collar **AS SOON AS** one of the radials come into focus. At this point take the Focometer and note the reading. The number indicated on the Focometer scale (as plus or minus) is the **SPHERICAL** correction.
4. Also note the radial which has come into focus. Radials can be recorded in degrees as follows: 9 - 3 o'clock radial = 0 or 180 degrees; 10 - 4 o'clock radial = 30 degrees; 11 - 5 o'clock radial = 60 degrees; 12 - 6 o'clock = 90 degrees; 1 - 7 o'clock radial = 120 degrees; 2 - 8 o'clock radial = 150 degrees; and 3 - 9 o'clock radial = either 0 - 180 degrees (0 and 180 degrees are the same radial). If two radial become clear simultaneously, it is okay to interpolate between them and estimate the radial in degrees.
5. The power of cylinder needed to correct an astigmatism is determined by again looking through the Focometer with the same eye and **CONTINUING** from the **SPHERICAL** correction reading, to turn the collar in an increasingly **MINUS** direction (clockwise with reference to the patient). The patient should continue turning until the radial **PERPENDICULAR** to the **RADIAL FIRST SEEN** comes into focus. For example, if the first radial seen clearly were in the 2 - 8 o'clock position (150 degrees), continue rotating the collar until the 11 - 5 o'clock radial (90 degrees away, at 60 degrees) become clear. Tell the patient to **STOP** rotating the collar **AS SOON AS** the perpendicular radial is clear. The power of the cylinder correction is the amount of minus power dialed from the point where the first radial is seen clearly to the point where the perpendicular radial is seen clearly. The second (or perpendicular) radial seen clearly is

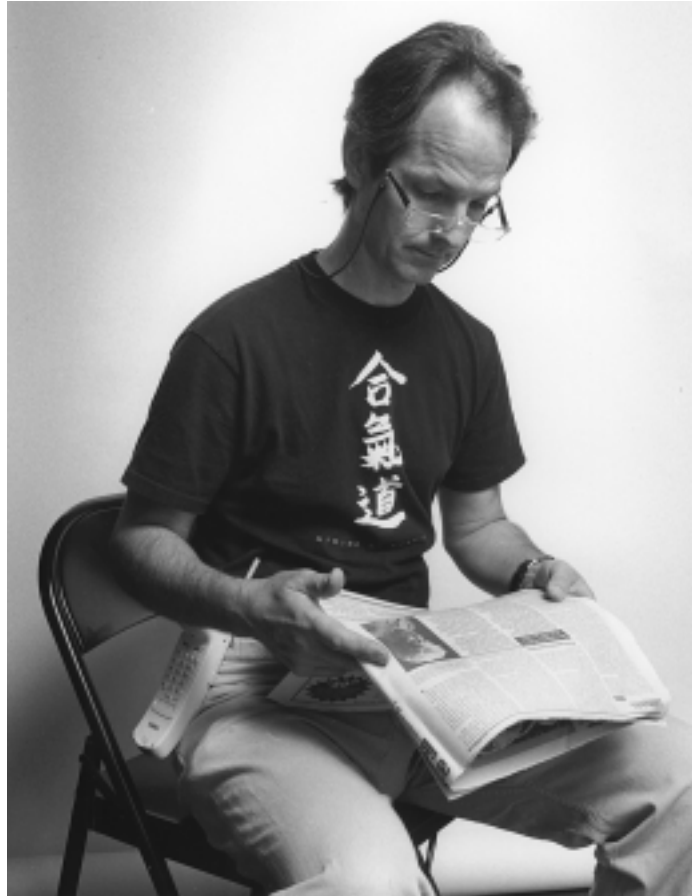
the **CYLINDER AXIS**. A prescription for correction astigmatism **MUST** include the **POWER** and **AXIS** of the **CYLINDER**.

6. The following example shows a prescription for a patient who is hyperopic (farsighted) and astigmatic: **RE** + 2.75 - 2.00 x 120; **LE** + 3.00 - 2.25 x 120. The person has in the right eye spherical correction of plus 2.75 diopters and 2.00 diopters of minus cylinder axis 120 degrees for astigmatism. In the left eye the correction is + 3.00 diopters of sphere and 2.25 minus diopters of cylinder also at axis 120 degrees

The actual number indicated on the Jommeter scale representing the power of **CYLINDER** for this person would have been for both **RE** and **LE**, +0.75 (amount of difference between the first and second reading for each eye moving in the minus direction on the scale), and the **AXIS** at 120 degrees (1 - 7 o'clock position) would be the axis corresponding to the second reading for each eye on the Jommeter (perpendicular to the first radial seen clearly at 0 - 4 o'clock 30 degrees).

III. Presbyopic Correction/Presbyopia (reading glasses)

1. If the person indicates difficulty reading small print items but does not have a refractive error, the focometer can be used to determine the strength of reading glasses required.



2. Set the focus collar to +0 diopters.
3. Rotate the focus collar counter clockwise until a magazine or other small print material held at arm's length can be clearly seen by the person.
4. The correction can be made accurate to the nearest quarter of a diopter by looking at the top edge of the focus collar. When the straight line crosses the middle of the diopter scale the correction is a whole number value. If a white dot crosses the middle of the scale the correction will include some fraction of a diopter.

Focometer Care and Maintenance

For the most part, other than keeping the instrument clean, no focometer maintenance is necessary. As with any optical instrument, cleanliness is important. Lenses can be cleaned with a moistened soft cotton cloth and then wiped dry. The rubber eye piece is purposely removable. It can be washed with soap and water, even between patient use. This is recommended if a patient is examined who has an eye infection.

The Focometer should be stored in a closed container and kept as dry as possible in humid weather. Condensation inside the unit, however, will clear up rapidly if the Focometer is placed near a dry heat source (eg., an electric light bulb).

Repairs or interior maintenance are possible by first removing the three Philips screws found on the rubber eye piece end of the unit. EXTREME CARE IS NECESSARY WHEN OPENING THE FOCOMETER TO AVOID TOUCHING ANY LENS OR PRISM WITH BARE FINGERS, as finger prints will become visible through the optical system. Wear clean, soft cotton gloves. Other screws for fastening prism mounting brackets and an annulus will be visible so that access is possible to all optical components of cleaning. Be careful not to damage the mirrored surface on the large prism.

Lubricating the rotating collar screw mechanism is generally not necessary, but, if the focometer becomes stiff, a drop of petroleum jelly or very light oil can be gently rubbed along the grooves; take care not to touch or smear the lenses.

CHAPTER FIVE

Reading Prescriptions

Reading prescriptions may sound like a difficult task, but it requires an understanding of just a few key concepts. This chapter will be necessary only if your site is providing the Eye Deal Eye Care Instant Eyeglasses.

Sample Prescription Layout

Prescription Form					
Type	Sphere	Cylinder	Axis	Far PD	Near PD
	In .25 D Steps	In .25 D Steps	In Degrees		
Distance	R	-3.25	SPH	61	64
	L	-2.00	-0.50		
Add	R	+1.75	SEG HT	Date of Exam 2/3/00	Print Doctor's Name T. Perk
	L	+1.75	19		
Signature of Examining Doctor <i>T. Perk</i>				Doctor's Telephone	

Most prescriptions are set up in a specific layout (see example above). The prescription (also written as "Rx") includes the right and left sphere, cylinder, axis, prism, and add readings. The Rx should also have the doctor's signature and date the prescription was written. Sometimes the pupillary distances for far vision ("Dist PD" or just "PD") or reading ("Near PD") are also included. Most of the specific measurements needed to create a pair of glasses are found on the prescription card.

Definitions of Common Prescription Terms

Sphere (Refractive Error)- The sphere power is the amount of correction needed to correct near or farsightedness (myopia and hyperopia). There is no limit on what the correction could be. The normal range is +6.00 to -6.00.

Cylinder (Astigmatic Error)- The cylinder power is the amount of correction needed beyond the sphere to correct for astigmatism (a general out-of-roundness of the eye's natural lens). This could be written in two forms, "plus" and "minus" cylinder. It is identified by a + or - in front of the value. A formula that allows you to convert from plus to minus or minus to plus (called transposition) is given on page 39.

Axis - The axis is valid only if a cylinder power is given. The axis is the angle of rotation that the cylinder needs to be turned for optimal correction. The axis is measured in degrees with a value always between 1° and 180°.

Prescriptions Tips

To be valid, a prescription must have a physician's signature and be written within the past six months.

Add - The add power is the amount of correction to be added to the sphere for a reading or near power. The add power assists the weakened eye muscles to view closer objects. It is usually a value between +1.00 and +3.00. We commonly use a bifocal for this. A bifocal is a lens that has the distance correction in the normal viewing area and a smaller segment for reading lower on the lens.

PD - The PD is the distance between the pupils in millimeters. Since the pupils converge (get closer) when you read there could be a distance PD or a near PD. The standard difference between the two is approximately 3mm.

Other Prescription Abbreviations

O.D.	(oculus dexter, Latin) Right eye
O.S.	(oculus sinister, Latin) Left eye
Near PD	Pupillary Distance during reading vision
PD	Pupillary Distance (distance between pupils in mm) during distance vision
O.D.	(after Doctor's name) - Optometrist
MD	(after Doctor's name) - Ophthalmologist
V	Visual Acuity (will not be on a prescription, only on screenings)
Sph	Spherical Power (corrects for refractive error: hyperopia or myopia)
Cyl	Cylinder Power (corrects for astigmatism)
Axis	Axis of Lens Rotation for astigmatic correction
Add	Power of correction to be added to sphere, needed for reading (to correct for problems with accommodation)

Readings Needed for Corrective Lenses

There are three basic types of correction: distance (far vision), reading (near vision), or both, in which case we use a bifocal.

Three Types of Corrective Lenses:

- Distance
- Vision
- Bifocal

Distance – (to correct hyperopia) Farsightedness

For distance vision the only readings needed off the prescription card are:

- Right and Left Sphere
- Right and Left Cylinder
- Right and Left Axis
- PD (Rx assumes this is a distance PD)

The readings are taken exactly as they are written.

Reading – (to correct myopia) Nearsightedness

For reading vision the only readings needed off the prescription card are:

- Right and Left Sphere

Right and Left Cylinder
 Right and Left Axis
 Right and Left Adds
 Near PD

The cylinder and axis are taken exactly like they are written. The sphere power for reading glasses is altered only for a reading prescription. To determine the reading-only sphere power, algebraically add the sphere power and the add power (that is why it is called an "add" power). The near PD, unless specified as a reading, can be estimated as the distance PD value minus 3mm.

Bifocals

You cannot fill bifocal prescriptions on site with the Instant Eye Glasses Bifocals can be mail-ordered from Eye Deal Eyewear

Transposition

Some doctors write their prescriptions in plus cylinder some in minus cylinder (see Cylinder box on example prescription, page 37). Minus cylinder is most commonly used and is the conversion preferred by optometrists (OD). Plus cylinder is often preferred by ophthalmologists (MD). If you are filling a prescription not written by your program, you may need to transpose it to read as a minus (-) cylinder. There is a standard transposition formula that converts between the two. There are three basic steps to transpose:

Transposition
 Prescriptions are written in a minus or plus cylinder. The formula for this conversion is called transposition.

1. Algebraically add the sphere to the cylinder. This becomes your new sphere value.
2. Change the (+ or -) sign on the cylinder, keeping the numerical value the same
3. Add or subtract 90 to the axis. In order to know if you should subtract or add, remember your axis number has to be between 1 and 180.

Transposition Example

	-2.50 S	+1.00 C	140 axis
Step 1.	-2.50 added to +1.00		= new sphere value of -1.50
Step 2.	Change sign of the +1.00 cyl		= new cyl value of -1.00
Step 3.	Add or subtract 90 to the axis of 140 (keeping it between 1 and 180)		= new axis value of 50

The same prescription in minus cylinder is:

-1.50 S -1.00 C 50 axis

Putting Glasses Together

If you are using Eye Deal Eyewear Instant Eyeglasses and you write the prescription you will have written the prescription with a (-) minus cylinder

Plastic Frame Assembly Procedure

(instructions from Eye Deal Eyewear, Inc.)

1. Patient selects frame color
2. Frame should be inspected of any defects
3. Frame size is determined by .D. size.
4. Lenses are selected based upon a prescription for right and left eye
5. Each lens that has a cylindrical power (correction for astigmatism) will have a small dot on the surface near the edge of the lens. This dot will be at the 180 axis point. The lens should be marked at this axis dot with a water-soluble pen (Vis-à-vis).
6. Lay the right eyewire of the frame down on the paper protractor (supplied) being sure to center it carefully. Using a water-soluble pen, mark the desired axis on the eyewire. NOTE: When locating the desired axis on the paper protractor, use the **outer-most circle of numbers** on the protractor to find the desired axis. The lens with the axis mark will be placed in the frame lined with the mark on the frame. The lens is inserted from the back side of the frame by popping it in. Some pressure will be required to snap the lens in.
7. Repeat steps above to assemble left lens and left eyewire
8. To remove any axis marks on the frame and lenses use a cleaning cloth.

Metal Frame Assembly Procedure

(instructions from Eye Deal Eyewear, Inc.)

1. Patient selects frame color
2. Frame should be inspected of any defects
3. Frame size is determined by .D. size.
4. Lenses are selected based upon a prescription for right and left eye
5. Each lens that has a cylindrical power (correction for astigmatism) will have a small dot on the surface near the edge of the lens or a black mark on the edge of the lens. This dot or mark will be at the 180 axis point. Lay the right eyewire of the frame down on the paper protractor (supplied) being sure to center it carefully. Using a water-soluble pen, mark the desired axis on the eyewire. NOTE: When locating the desired axis on the paper protractor, use the outer-most circle of numbers on the protractor to find the desired axis.
6. The endpiece of the right eyewire is placed upon a hard, flat surface or optical anvil, eyewire screwhead facing up. The screwdriver (flat blade) is seated firmly in the slot of the eyewire screw. **Firm, downward pressure** must be applied while turning screw counterclockwise to loosen. Once loosened, right lens is inserted into the right eyewire of the frame. Lens must be seated in the groove of the eyewire and rotated so that the axis mark lines up with the axis mark on the frame.
7. The endpiece of the right eyewire is again placed upon a hard, flat surface or optical anvil, eyewire screwhead facing up. Screwdriver (flat blade) is seated firmly in the slot of the eyewire screw. **Firm, downward pressure** must be applied while turning screwdriver clockwise to tighten.
8. Repeat steps above to assemble left lens and left eyewire
9. To remove any axis marks on the frame and lenses use a cleaning cloth.

CHAPTER SIX

Caring for Your Eyes: Prevention Education and First Aid

Whether you are conducting primary eye care vision screenings or basic eye exams in the clinic at an off-site location, or in an outreach setting, you should always include prevention education as part of your services. Many problems that affect the eyes are preventable by practicing appropriate hygiene, good nutrition, and basic preventative steps. This chapter contains an outline of the basic information you should include in a prevention education session, including common conditions and what should be done if such symptoms are seen, and key prevention messages on safety, nutrition and hygiene.

The glossary in Appendix B of this manual includes less common conditions. Appendix C includes resources for additional educational materials.

Prevention Education

Prevention is directly related to people's behaviors, and the choices they make in how they live their lives. Good health education leads to healthy behavior choices.

In your prevention education session, you should cover the four areas of: hygiene, nutrition, safety measures and UV protection. This section of the manual will give an overview of the most common eye conditions, diseases and symptoms you will find in working with the migrant farmworker population under each of these four areas. The listing of each condition or disease is accompanied by preventive steps and treatments which the farmworker can implement.

Common Conditions:

■ Conjunctivitis (pink eye):

Description

This is a common, contagious infection of the conjunctiva. Causes of Conjunctivitis can include a virus, bacteria, over-exposure to UV light, or allergies.

Symptoms

Often times it is marked by the white part of the eye appearing red. Burning/itching red eyes, excess tearing, possible oozing pus, extreme sensitivity to light, reduced vision.

Preventive Steps and Treatments

Avoid exposure to UV light or wear UV glasses. Apply a cool, wet cloth 3-4 times a day for ten to fifteen minutes, using a clean wash cloth each time. The use of artificial tears will relieve symptoms.

■ Trachoma:

Description

Is caused by a virus-like organism called Chlamydia, which results in swelling in the upper eyelid and eyelashes turned inward, scraping the cornea during blinking. This can lead to such problems as scarring or even blindness.

Symptoms

Swelling of the eyelids produce reddish-gray bumps on the inside of the lids, causes the eyelashes to turn inward, scraping the surface of the cornea with every blink.

■ Hordeolum (sty):

Description

Infection on the inside or outside of the eye.

Symptoms

A reddening of the eye, tenderness and swelling of the eyelid, sometimes accompanied with pus.

Preventive Steps and Treatments

The use of warm soaks can help reduce symptoms. Surgical removal of the sty is sometimes necessary.

■ Neo-natal conjunctivitis:

Description

An eye infection of the newborn, acquired during passage through the birth canal. This is a result of maternal gonorrhea and chlamydia.

Symptoms

Within two days of birth the newborn's eyes become red and swollen with pus

■ **Dacryocystitis:**

Description

Infection of the tear sac

Symptoms

Swelling and redness under the eye near the nose

Hygiene can help prevent many common eye conditions. Remind your clients of the following preventive steps:

Preventive Steps

- Do not share towels, handkerchiefs, cosmetics, bed linens (especially pillows).
- Wash hands prior to and after touching the eye or playing with children.
- Frequent face cleansing is a good method of prevention of Trachoma.
- Wash hands after working with crops, chemicals and pesticides/fungicides
- Take all medications at recommended dosage and of the specified duration, even as symptoms improve.
- Do not wipe sweat from the eye with work-shirts or other work clothing (because of the presence of dust, pesticides and contaminants).

Referrals

All conditions in this section require medical intervention and completion of the prescribed medication. Refer to page 54 for information on applying eye drops/ointment.

Nutrition: The Prevention of Eye Diseases

A well-balanced diet, including a balance of vitamins and minerals, is essential to both the maintenance of good eyesight and the healing or recovery of injuries and infections. Vitamin A is directly linked to vision. Therefore, it is important to include in the diet dairy products, fruits, and red, yellow and green vegetables, all of which are high in Vitamin A.

Diseases and Conditions

■ Diabetes:

Description

A disorder caused by decreased production of insulin, or by decreased ability to use insulin. Insulin is a hormone produced by the pancreas that is necessary for cells to be able to use blood sugar. Type I usually begins before age 20, while Type II begins after age 40.

Symptoms

An early symptom of non-insulin dependent diabetes is acanthosis nigricans or a darkened pigment band on the back of the neck. This is associated with insulin resistance and too much sugar in the diet. There may be some vision problems. The most common symptoms are weakness, excessive urination and exhaustion. Diabetic retinopathy is a serious problem that can lead to loss of sight.

Preventive Steps and Treatments

The best way to control the advancement of Diabetes is through a controlled diet (as prescribed by a physician), which requires monitoring on a daily basis. Special attention is given to reducing sugar intake, but the diet can also include the reduction of fats, and the balancing of the diet. The better your glucose control, the less your chance of serious eye problems.

■ Glaucoma:

Description

Glaucoma is characterized by an increase in intraocular pressure, due to the aqueous fluid being formed faster than it leaves the eye. An early symptom may be a loss of peripheral vision. Glaucoma may be painless, so medical exams are necessary to detect this condition.

Symptoms

Symptoms may include tunnel vision or black spots in the peripheral vision fields. In some cases, symptoms may include pain, redness, halos around light or blurred or clouded vision. 95% of those affected by Glaucoma do not have symptoms and the disease must be detected by an eye exam.

■ Xerophthalmia:

Description

This is caused by a vitamin A deficiency and progresses from night blindness through conjunctival and corneal degeneration, eventually resulting in corneal scarring, ulceration and collapse of the entire eye.

Symptoms

Symptoms may include dry eyes, pain in the eyes, night blindness.

Preventive Steps and Treatments

Maintain a well-balanced diet, high in vitamin A. Foods high in vitamin A include green, yellow and red fruits and vegetables, dairy products, liver, kidney and fish oil.

Preventive Steps and Treatments

People who suffer from high blood pressure, diabetes and high cholesterol are prime candidates for Glaucoma. Aside from following recommended diets, these people are encouraged to have annual eye exams. African-Americans over the age of 40 are more at risk and should have annual eye exams. Also, individuals with a family history of Glaucoma should have eye exams performed annually.

Referrals

These patients must be referred for medical treatment. The treatment may include eye drops, eye exams, laser-therapy, surgery or nutrition counseling.

Safety Education: The Prevention of Eye Injury

The majority of eye injuries are preventable when safety equipment is utilized properly. For example:

- Use of ANSI-approved, impact-resistant safety glasses or work goggles
- Use of 100% Ultra violet blockage sunglasses or goggles
- Use of a strong cap with a wide brim.
- Avoiding the use of audio equipment (i.e. Walkman) that might interfere with hearing of oncoming vehicles or verbal cautions

Common Conditions

■ Burns:

Description

These can occur from either direct exposure or exposure to the fumes of household cleaners, pesticides, fungicides and fertilizers. Burns can cause irreversible damage to the cornea and permanent loss of vision.

Symptoms

A strong or subtle burning sensation that can be accompanied by severe pain and the inability to open the lids

Preventive Steps and Treatments

Burns require immediate medical attention and irrigation of the eye for 15-20 minutes with a soft, continual flow of sterile water or, as a last resort, clean water from a running tap. Do not use an eye cup. Bandage both eyes and then seek medical assistance.

■ Debris in the eye:

Description

Debris may or may not be imbedded. This can include dust, powder residue from a fungicide/pesticide, insect splinters, sand and dirt. Debris can sometimes be a minor problem but without following the appropriate protocol, it can lead to serious complications, infections or loss of vision.

Symptoms

A gritty feeling, possible inability to open the eyelid, possible pain or discomfort and sensitivity to light.

Preventive Steps and Treatments

Certain actions should not be taken. If the debris is embedded, do not rub the eye or try to remove the debris. The patient needs to be seen by a medical professional. If the debris is not embedded, try to let the tears wash out the particle or use a sterile eye wash. (Refer to Irrigation, page 52.) If chemicals are suspected of having entered the eye flush the eye for 15 minutes even after the debris has been removed.

■ Hyphema:

Description

Blood in the anterior chamber of the eye that is caused by trauma to the vessels of the iris

Symptoms

There may be severe pain, subnormal visual acuity, possible lacrimation, and inflammation of outer eye. This may be potentially serious and the patient should be referred to an eye specialist.

Preventive Steps and Treatments

Do not forcibly retract the lids or patch the eye as this may apply damaging pressure. Use an eye-shield to protect the eye. Seek immediate medical attention.

■ Lacerations:

Description

Mild scratches or deep gashes to the eye and surrounding structures. These are most often associated with traumatic blows from vehicular accidents or fights. In fieldwork, scratches and lacerations can also occur from branches.

Preventive Steps and Treatments

Bandage the eye lightly and seek medical attention.

■ Retinal Detachment:

Description

Retinal detachment may occur as the result of a blow to the head or it may be spontaneous. This is a medical emergency!

Symptoms

In some cases flashes or spots of light or floating images may appear.

Preventive Steps and Treatments

If symptoms occur, see a doctor within 24 hours.

■ Traumatic Endophthalmitis:

Description

An inflammation of the entire eyeball in response to injury or physical trauma to the eye. This can be compounded by an infection, usually bacterial, which attacks the weakened, injured eye.

Symptoms

High fever, red and swollen eyes and a quick, dramatic reduction in vision.

Preventive Steps and Treatments

This requires immediate medical assistance.

NOTE:

All conditions listed in this section require medical attention, with the exception of non-embedded debris. If immediate medical attention is not available, apply ophthalmic antibiotic ointment.

All conditions in this section require medical intervention and the completion of medication at the recommended dosage and duration. If injury occurs in the workplace, Workers' Compensation policy requires that an incident report be made within 24 hours, even if medical attention is not immediately sought.

Preventive Steps and Treatments

First aid steps are included under each condition, along with preventive steps firmworkers can self-administer. If you are in the field and need to apply first aid, refer to Chapter 7 of this manual and the chart on page 56.

Referrals

All conditions in this section require medical intervention and the completion of medication at the recommended dosage and duration. If injury occurs in the workplace, Workers' compensation policy requires that an incident report be made within 24 hours, even if medical attention is not immediately sought.

UV Protection: The Prevention of Vision Loss

Farmworkers' eyes may be exposed to tremendous amounts of UV light daily. Wearing adequate eye protection in the fields can prevent serious eye irritations and permanent vision loss.

Common Conditions

■ Macular Degeneration:

Description

Slow loss of vision that is due to a breakdown of the blood supply to the retina. It may also develop due to an infection, ocular trauma or diabetes. In addition, there is evidence that this condition may be related to excessive UV and blue light exposure.

Symptoms

Blurred vision, increased difficulty in seeing details near or far, even with corrective lenses. Bright colors may look dull and blind spots may appear in the center of the visual field. Sometimes this only affects one eye and the other eye may compensate for the visual changes.

■ Pinguecula:

Description

A small yellowish spot on the conjunctiva caused by a deposit of protein and fat. Most often the patch will appear on the side closest to the nose. This condition, unlike pterygium, does not grow onto the cornea and therefore does not threaten sight. May be a response to chronic eye irritation from dust or sunlight exposure.

Symptoms

A noticeable small, yellowish patch or bump on the white part of your eye. Symptoms can include a feeling of dryness or a burning, itching or gritty sensation. No treatment is necessary unless it becomes inflamed.

■ Pterygium:

Description

This is a result of excessive exposure to sunlight, dust or wind. Pterygium can lead to blindness if preventative measures (i.e. use of 100% UV protective lenses) are not taken to slow the growth, which can cover the cornea.

Symptoms

Is a patch of raised tissue on the white part of the eye. It is a winged-shaped fold of tissue that commonly occurs on the inner corner of the eye. There may be a noticeable small, yellowish, raised mark on the white part of the eye. The eyes may feel dry or gritty. People with pterygium often experience the sensation of debris in the eye. If left untreated, it can block the vision by growing onto the cornea.

■ UV Radiation Exposure:

Description

This results from excessive exposure to sunlight and exposure to a welder's arc (welder's flash).

Symptoms

It produces red eyes, a gritty feeling and a high sensitivity to light.

Preventive Steps and Treatments

For all of the above conditions the use of safety glasses or goggles with 100% UV protective lenses as well as wide-brimmed hats can help prevent exposure to UV light.

Surgery may be recommended if the pterygium begins to grow over the cornea.

Ultraviolet radiation may require pressure patching with a topical antibiotic.

In some cases of Macular Degeneration, vitamins and a Zinc supplement may be recommended by an Ophthalmologist.

Referrals

All conditions in this section require medical intervention and the completion of the recommended dosage and duration of medicines. If injury occurs in the workplace, Workers' Compensation requires that an incident report be made within 24 hours, even if medical attention is not immediately obtained.

First Aid For the Eyes

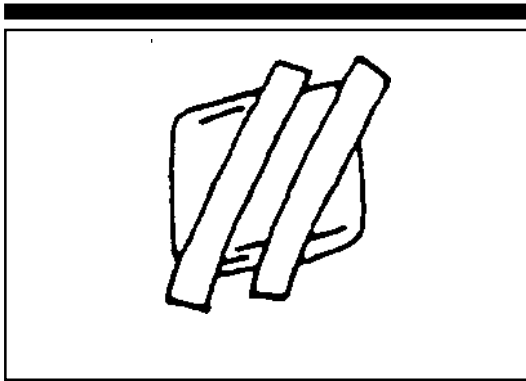
The best way to handle eye injuries is to prevent them from ever happening. When playing sports or working in hazardous conditions wear goggles and protective head gear. When you suffer an eye injury, seek medical help. When medical help is not readily available, apply first aid. First aid is emergency assistance to prevent further injury and should never take the place of medical care.

First aid will differ for each eye injury, depending on the type and seriousness of the injury. This section covers pressure patching, eye shields, irrigation, removal of debris, applying ointment and drops to the eye as well as referral for eye injury and other eye emergencies.

All eye injuries are not treated the same. In fact, severe damage can be caused by inappropriate first aid. Care must be given to use only clean/sterile supplies and take hygiene precautions so that supplies are not contaminated during the administration of first aid. Before administering first aid, always wash your hands to prevent infection, no matter how critical the injury.

Pressure Patching

Apply a pressure patch when there is a corneal scar (scar of the front part of the eye) or a wound that does not penetrate the eye (there is no hole in the eye). Pressure patching aids in the natural healing process by preventing eye movements which cause irritation. It also keeps the patient more comfortable. Note, pressure patching should never be done when there is a penetrating wound (a wound that punctures the eyeball). Never leave a patch on for more than twenty-four hours.



Procedure:

1. You need 1-4 oval pads and 4-5 pieces of tape 5-7 inches long. If you do not have oval eye pads use folded pieces of cloth or gauzes as a substitute.
2. Clean the area of the face with rubbing alcohol so that the tape will stick. Do not put alcohol or any other drugs into the eye.
3. Fold an eye pad in half, and put it over the eye. Place a second pad over the first one facing in the direction of the tape. You may have to use more pads depending on the size of the eye.
4. The tape should go from the point of the least movement of the jaw to a point on the center of the forehead so that the person's movement is not limited and they can talk, yawn and eat freely. Pull the skin of the cheek up or ask the person to smile or raise his or her cheekbones. Apply a second tape parallel along the center of the pad the same way mentioned above.
5. Place additional tape along the side of the patch. Curve the tape around the sides of the eye pad attaching it to the same points on the cheek and forehead as the first piece. The patch should be snug enough to keep the person from blinking.
6. The person should be seen by a doctor within 24 hours.

Irrigation

Irrigation is the flushing of the eye with a liquid wash chemicals or other foreign substances out of the eye. Do not irrigate the eye if there is a penetrating wound.

Chemical Burn

If there is a chemical burn (or if it is suspected that the debris is contaminated with chemicals), flushing of the eye must be maintained for a full fifteen minutes. This is necessary in order to diminish the damage of the chemical burn, prior to seeking emergency medical attention.

Debris

If non-embedded debris is to be removed, it is important to carry out flushing of the eye for five minutes even after the sensation of debris in the eye has passed.

Procedure:

1. Sterile saline solution is the best, but if you don't have, use water. Use only the non-pressurized/non-aerosol saline dispenser because the force from the aerosol can cause more damage to the eye.
2. With the person lying on his back hold the eyelids open, with a slow steady stream irrigate under the upper and lower lids as well as the front surface of the eyeball for at least 15 minutes. Use paper towels or a basin to collect drainage. If one eye is involved, turn the head so that the irritant is not flushed into the unaffected eye.
3. Irrigate for a minimum of thirty minutes for a chemical injury. This length of time of irrigation is very important if chemicals are suspected to have come into contact with the eye. (Or, if available, use litmus paper as a guide to determine when to stop irrigation, to ascertain the non-acidity or alkalinity of fluid remaining on the eye.)
4. For foreign particles irrigate at the edges of the particles to loosen and float them from the eye. If the foreign bodies are embedded, you should not try to remove them: your eye care provider should remove them. For foreign particles do not patch the eye.

NOTE:

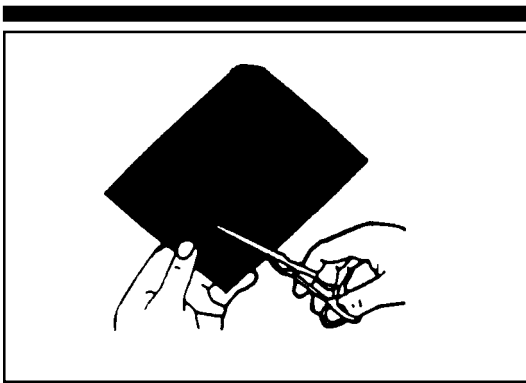
1. Do not irrigate the eye if there is a penetrating wound, puncture, or laceration.
2. Do not irrigate the eye if the debris is embedded.
3. Use only sterile or clean water!

Eye Shield

The eye shield is used to protect the eye while seeking medical attention. It is usually used to protect an eye that has been cut or if there is a hyphema. The eye shield protects the eye from further damage and dryness (especially if there is a problem with blinking) and from wind, dust or light.

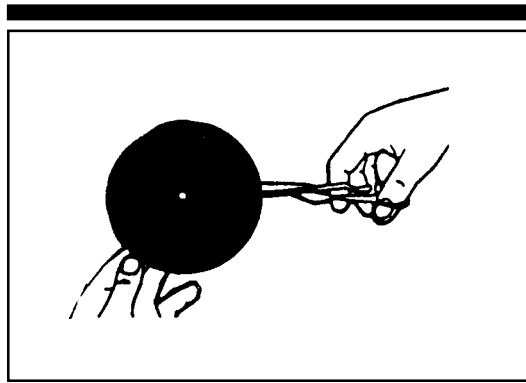
Procedure:

Remember to wash your hands with soap and water.



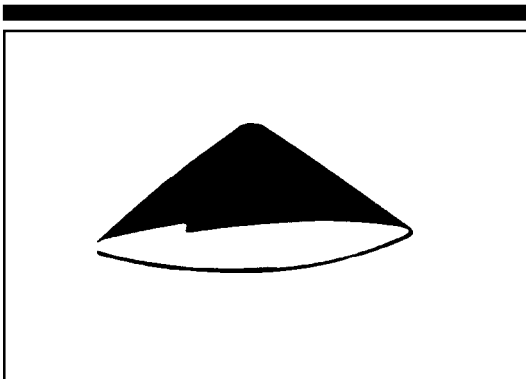
1.

Cut a circle from heavy paper or card stock.
The circle should be approximately
2 1/2" in diameter (the length of your little finger).



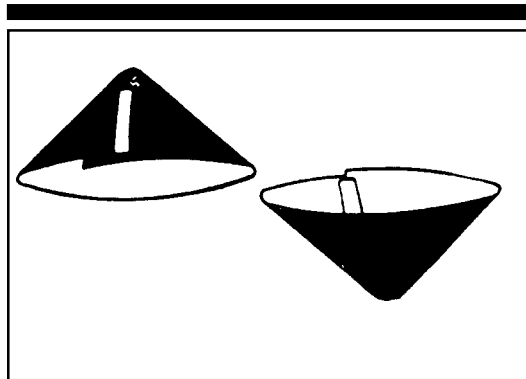
2.

Fold the circle in half and cut out
a tiny hole in the center



3.

Unfold the circle and make a cut from
the outside edge to the hole in the center



4.

Gently slide one edge of the paper
over the other (approximately 1")
to form a cone. Tape the cone on
the inside and outside in order to
maintain the shape. Surgical or sterile
adhesive tape should be used.



5.

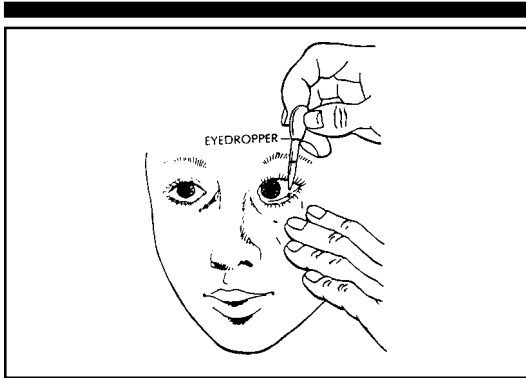
Gently place the cone over the closed eye
and securely apply tape from the cheekbone
to above the eyebrow.
Apply the tape firmly so that the shield stays in place

Ointments/Eyedrops

Ointments and eyedrops are used to apply antibiotics, artificial tears, and contact lens solutions. Eye ointments and eye drops should not be shared. Touching the vial to the eye surface may promote re-infection or contamination in other users.

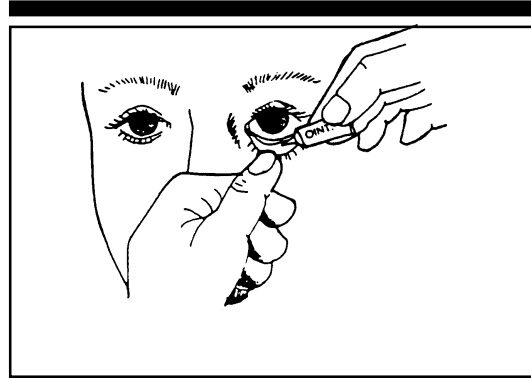
Procedure:

Remember to wash your hands with soap and water.



1.

Have the patient look away from the medicine tube or vial aimed at her/his eye. This will reduce the tendency to blink and close the eye before the ointment or drops can be applied properly.



2.

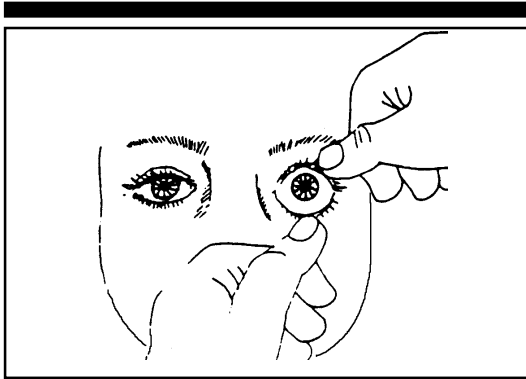
To apply ointment or eye drops, gently pinch the skin under the lower eyelid. This should form a little pocket that ointment or drops can be placed into.

For infants or children: It may be easier to apply the ointment or eye drops by holding the eyelids wide open, pulling the upper lid up and both lid down. After applying the medication, keep the lids extended open for a few seconds so that the medication has time to be absorbed.

Removing Debris

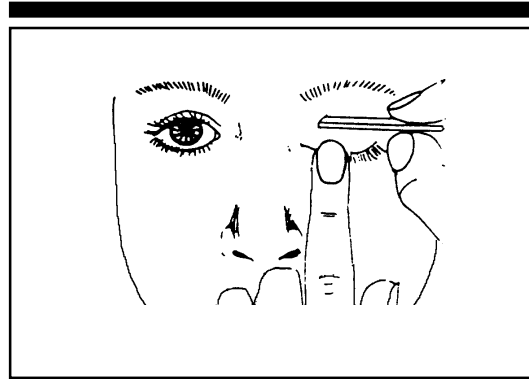
If there is debris in the eye, irrigation method (see page 52) can be attempted, but some particles may stick to the wet surface of the eye (due to surface tension). These particles have to be gently lifted away. You may try using a corner of a clean, damp wash cloth. Other less preferable options include the use of a clean cotton ball, or a "Q-tip." In all cases, take caution to avoid using any substance such as paper edges or wooden sticks which can scratch or even cut the cornea. Most importantly, try to use the cleanest object possible and avoid infection or contamination.

How to evert (turn out) the upper eyelid using a cotton swab or small wooden stick:



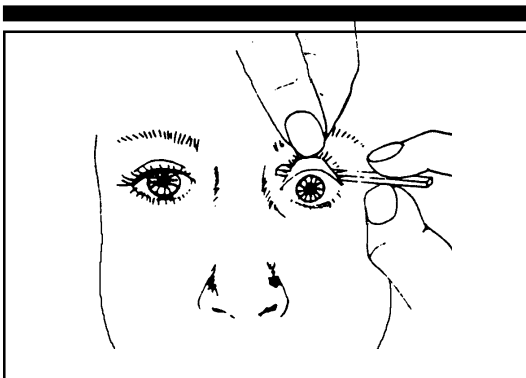
1.

Look for the foreign body on the eyeball without lifting the upper eyelid.



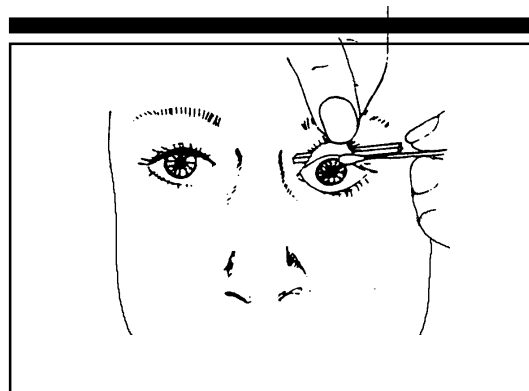
2.

If you cannot find it, take the upper eyelid between the thumb and index finger;



3.

lift it so that it lays on cotton swab, and with the entire conjunctiva exposed to view, look for the foreign body;



4.

when you have found it, remove carefully with a clean cotton swab or the tip of a clean cloth.

First Aid for Eye Injuries

Type of Injury	Possible Cause/ Symptoms	First Aid	Prevention
Wound of the lid (Laceration)	Hit with a hard object Pain in the eye lid	Clean the lid gently Apply a pressure patch Refer	Wearing safety glasses wherever there is more than usual risk of injuries
Blood inside the eye (Hyphema)	Hit in the eye Poor vision Possible eye pain	Lightly apply eye shield Refer Antibiotics needed	Be knowledgeable of what the risks are
Scratch (Abrasion)	Injury from a branch	Apply a pressure patch Refer Antibiotics needed	Be sure vision protection is worn for work, recreation, or anywhere there is a more than usual risk of injury
Perforation of the eye	Hit in the eye Pain in the eye Vision affected	Don't touch the eye Apply shield Refer	Be sure vision protection is worn for work, recreation, or anywhere there is a more than usual risk of injury
Burns with liquid chemical	Liquid splash into eye Cornea appears rough or cloudy	Rinse (irrigate) for 15 minutes Refer	Safety eye glasses
Debris in the eye	Pain or irritation Red and tearing	Apply rinse (irrigation) if non-embedded debris Refer if embedded and/or signs of infection	Safety eye glasses
Bruise around the eye (Hematoma)	Trauma to the eye area	Check vision, reassure patient if vision is OK	Safety eye glasses

Taking Primary Eyecare to the Fields

Many primary eye care services can be provided in the field where farmworkers are. This can include at camps or individual residences. This chapter will prepare you to make vision screening, basic eye exams, and prevention education part of your outreach services. This chapter also covers basic eye-related first aid that you may need if providing primary eye care services in an outreach setting.

The following sections give information on what you will need to research and prepare before you begin primary eye care outreach services. The Toolbox section lists the pages of this manual you should bring with you into the field. A list of "Tool Box" materials to be used in the field follows. The materials listed can be found in this manual on the pages indicated. Produce the forms as needed.

Outreach: Connecting With The Community

The farmworking population is unique due to language barriers, limited economics and legal status, as well as challenges accessing medical services. Announcing a Primary Eye Care campaign, without having first promoted your general services, may prove unproductive. Building trust is an essential part of working with this community. Should your facility or organization choose to implement an eye care program, be sure to announce and promote who you are and the services that you provide in advance of implementing that program.

The lack of familiarity with the process of eye examinations can be frightening. It is important to approach Primary Eye Care as an educational process, taking care to not intimidate a patient with information that is not understood or by making assumptions about their level of eye care knowledge.

Keeping the issue of language aside, how you explain prevention, patient participation in an exam, and the utilization of medicines will be as new to you as to those you serve. For example, though the Ecometer is technologically wonderful, it is a rarity for patients. Asking a patient to hold a Ecometer (which may look like a camera), then to turn a lens and tell you when the lines on the chart are in focus, is a lot for anyone to manage. Therefore, you need to choose concise, non-technical language and explain what procedures you want the patient to follow.

The farmworking population consists of individuals from many different cultures. Each culture has certain customs which will be noticeable during eye exams. For some patients, physical proximity and direct eye contact may be difficult and we should be sensitive to this. In order to carry out the exams or other procedures, you might need to ask permission prior to physical contact and explain the reason for necessary procedures.

In order to succeed in carrying out Primary Eye Care tasks, individual and cultural differences must be considered. In addition, clear and concise communication with the patient will build their trust and confidence in the service you provide.

Resource Development

Listed below are a series of questions. Answering these will enable you to provide a worker with the necessary information to ensure that they will receive the medical treatment they need.

1. Who in your community provides information about eye injury prevention and injury treatment?
2. Where can a worker go if injured? What are the clinic/office hours? What is the protocol? Cost? (This information will be based on the medical arrangements of each harvesting company or crew leader and are greatly affected by the use of HMO or Workman's Compensation.)
3. What transportation options are available to the injured worker?
4. Are translation services available at the medical facilities? If not, what other resources exist, and what is the protocol to receive that service?
5. How does someone make an appointment for medical service? (aside from through crew leader?)
6. Are first aid kits available on work sites? Where are they located? Who has access to the first aid kits? Do they contain eye washes, gauze, Tape, and a flashlight?
7. Is there clean drinking water at the work site? Is it available at all times? Where is it located?
8. Are there enforced, mandatory safety glass usage requirements in your area? Who enforces them and how?
9. Are safety glasses available from the growers or harvesting companies? Which brands? Are they ANSI-Z87.1-1989 approved? Do they offer 100% UV protection? What is the cost to the worker? How do the workers acquire them? Are they comfortable for the worker to use?
10. Are ANSI-Z87.1-1989 approved safety glasses available at the health department, local ophthalmologists or local hardware store? What is the price, quality and availability?

Tool Box

A list of “Tool Box” materials to be used in the field follows. The Field Preparation Tools are found earlier in this manual on the pages indicated. Photocopy or tear out those pages and take them with you. The Outreach Tools are included in the following pages of this chapter as are the education tools.

Field Preparation Tools	
Supply Checklist for Eye Exams	11
Taking a Medical History	
Spanish	14
English	15
Primary Eye Care Assessment	
Spanish	21
English	22
Occluder Model	24
Prevention and First Aid Guide	41-56
Outreach Tools	
Mini-Resource Directory	60-61
Referral Materials	63
Education Materials	
Visual Blockage Replication Activities	64
Eye Anatomy Flip Chart	65-67
Handouts	
Eye Anatomy Coloring Sheet	68
Word Scramble	69

ACCESSING CARE: A MINI-RESOURCES DIRECTORY

Prior research and planning on your part will facilitate a worker's ability to get needed help. It is important that you understand the necessary protocol that a farm worker must follow in order to receive medical attention for their eyes whether it is an injury or a regular appointment. Therefore, it is helpful to know the following local resources:

- 1) organizations and services that provide extended social services for farm workers
- 2) medical facilities and organizations which assist farm workers with eye care
- 3) businesses and organizations which sell ANSI-approved safety equipment

LOCAL HARVESTING COMPANIES:

Harvesting Co.	Safety Officer	Crewleaders	Phone #

HMO OR MEDICAL CONTRACTORS:

Name.	HMO/Clinic	Address	Phone #

LOCAL HOSPITALS OR EMERGENCY CARE CLINICS:

Hospital/Clinic	Hours	Address	Phone #

LOCAL OPHTHALMOLOGISTS/OPTOMETRISTS:

Doctor/Clinic	Hours	Address	Phone

HEALTH DEPARTMENT OR MIGRANT HEALTH CLINICS:

Hospital/Clinic	Hours	Address	Phone

ADDITIONAL RESOURCES:

Organization	Hours	Address	Phone

Outreach Checklists

The following are a series of checklists designed to assist you as you carry out your work. Because there are certain special materials you will need, it will help to make your list in advance of your activity.

Preparing For Eye Exams in the Field:

- Tape
- Clipboards and pens
- Folding chairs (if not available on site)
- Tape measure
- Flashlight and extra batteries
- Occluders (cardboard or paper cups)
- Snellen chart
- Star Chart
- Focometer
- First Aid Kit (shields, patches, gauze, tape, eye cup...)
- Blood Pressure Cuff
- Eye Medications (drops/ointment for conjunctivitis...)
- Sterile Water
- Surgical gloves
- Paper Towels
- Health Education materials
- Posters
- Sample sunglasses and safety glasses
- Refreshments
- Activities for Children (crayons & paper, balls...)
- Incentive Items (sunglasses, safety glasses)
- Referral Forms and Maps
- History Intake Form
- Assessment Form
- Four Basic Question Tables
- Local Resource Directory
- Prevention First-Aid Reference Guide

Preparing for Community Outreach

Locations for Outreach Promotion:

- Camp housing
- Laundromat
- Barber shops
- Grocery/Convenience store
- Day care
- Schools
- Churches
- Pool Halls
- Sport Fields
- Worksite
- Local restaurants
- Post office
- Check Cashing Business
- Gas stations
- Clinics
- Union/Farmworker Offices
- Bus/Transportation Services

Outreach Materials:

- Flyers
- Brochures
- Photonovels
- Incentives
- Samples of sunglasses and Safety glasses

Selecting a Location for Field Exams:**Infrastructure:**

- Building or covered area
- Good lighting
- One flat surface to hang charts
- Chairs or benches
- Bathrooms

Locations:

- Camp housing or trailer parks
- Churches
- Daycare Center
- Employer's Office
- Community Center
- Union/Farmworker Offices

Accessibility:

- Transportation
- Hours
- Weather

Checklist of Referral Materials

- Map of Clinic Location
- Clinic Appointment Cards
- Clinic Referral Forms
- Business Card
- Clinic Appointment Book

Portions of this chapter have been adapted, with permission, from the Rural Women's Health Project's User's Guide, "*!OJO! con tu vista*"

Educational Materials

The educational tools are designed for use in the field. The tools help to familiarize the people with eye anatomy through a coloring sheet and a word puzzle. The three different eye anatomy diagrams can be copied onto overheads and overlaid on one another to demonstrate the layers of the eye. We encourage outreach workers to copy these materials and use in the field as educational resources.

Visual Blockage Replication Activities

You will need the following:

- 3 pairs of non-prescription glasses, clear lenses preferred
- This Visual Blockage Replication Activity page
- One or two sheets of transparent, sticky backed paper for photocopying (available by the sheet from most office supply stores)
- One small container of petroleum jelly

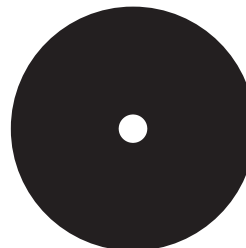
Glaucoma and Macular Degeneration

Step #1

Make a photocopy of the Visual Blockage Replication page onto a transparent, sticky backed sheet of paper. Note: prior to copying, check that the copy resolution will be dark.



Macular Degeneration



Glaucoma

Step #2

Once photocopied, cut around the above images, leaving 1" around the edges. You will attach the cut circles to the center of both lenses of the glasses in order to replicate the visual blockage.

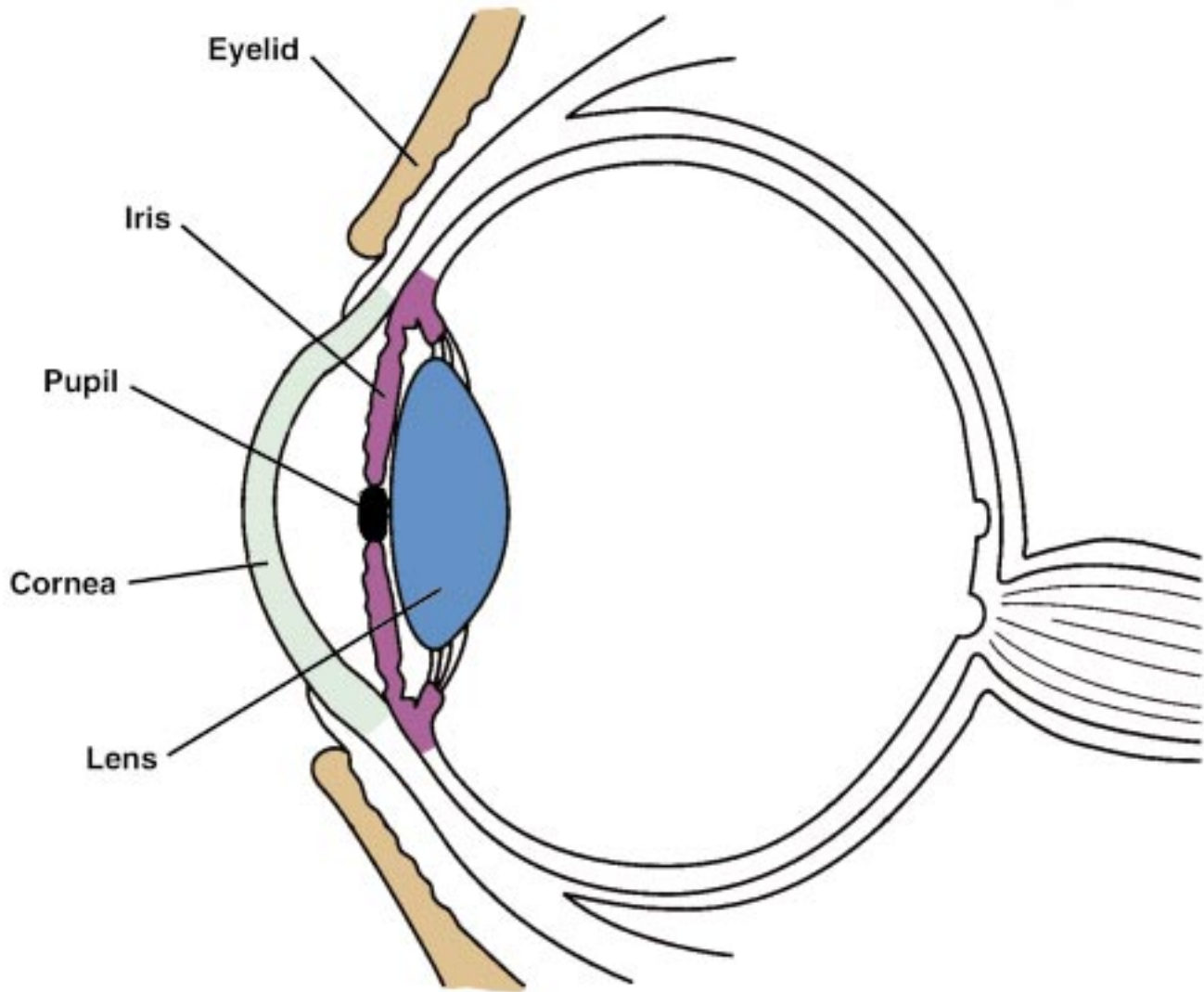
Cataracts

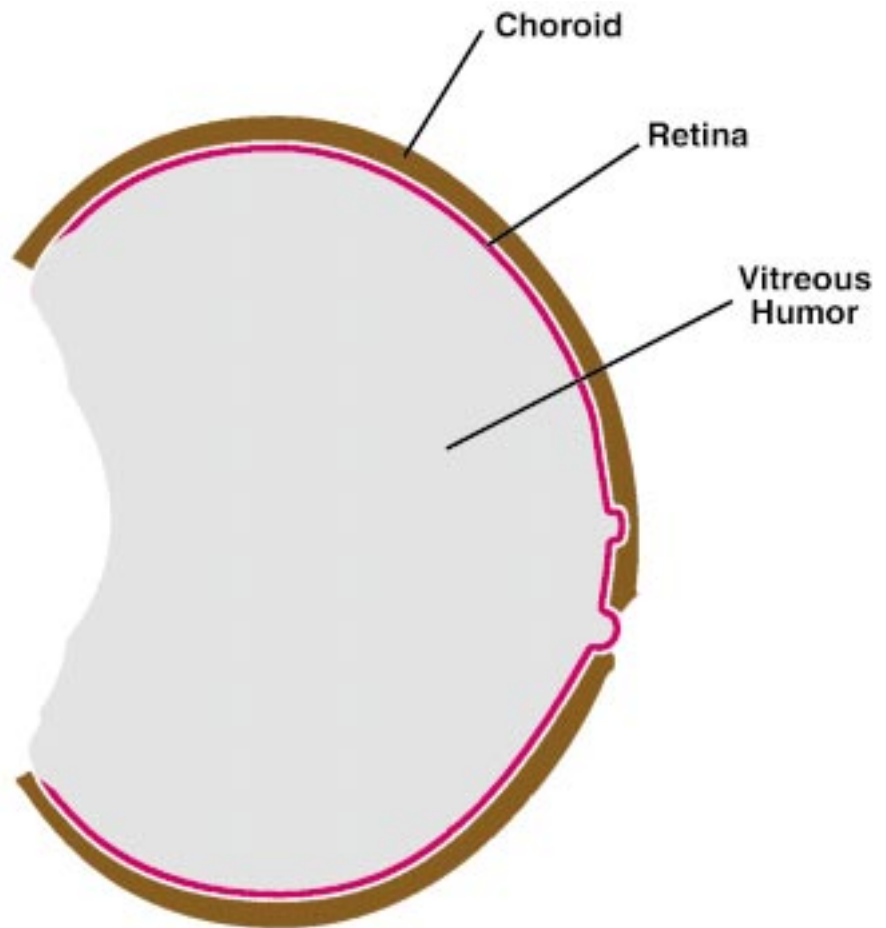
To replicate the visual distortion experienced by a person with an advanced case of cataracts, apply a generous amount of petroleum jelly to the outside of both lenses of a pair of non-prescription glasses.

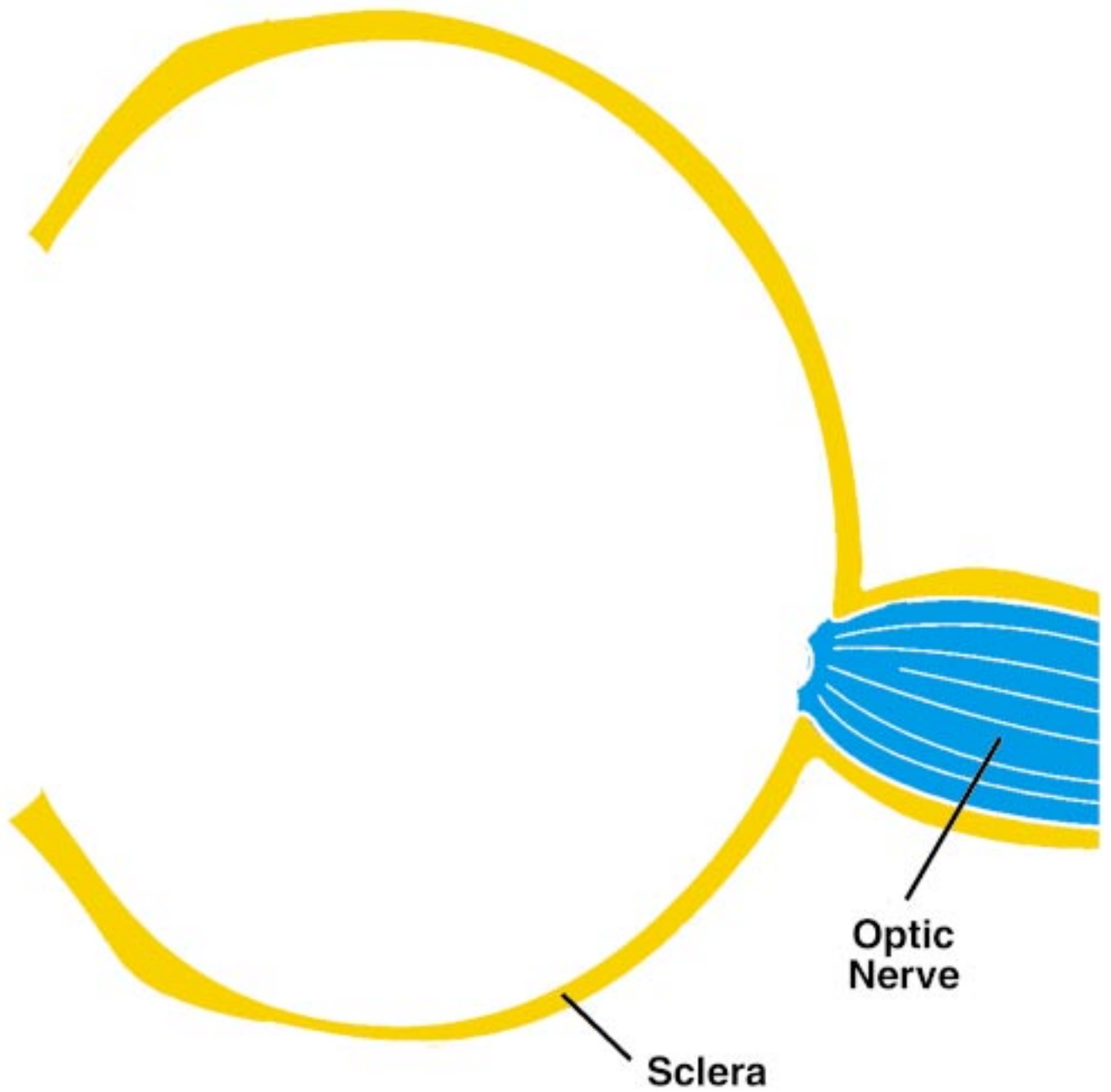
Eye Anatomy Flip Chart

To use the eye charts in a training or classroom environment: Photocopy the graphics containing layers one, two, and three on separate transparencies. Then, as different parts of the eye are examined and explained, place the first layer on the overhead projector. As the lesson continues, layers two and three should be placed directly on top of the first layer. In this way, the eye's anatomy and interdependencies can be better understood.

EYE ANATOMY FLIP CHART LAYER 1









The Anatomy of the Eye

- ▲ **Choroid (KOR-oyd)**
A layer of blood vessels that feeds the retina.
- ▲ **Cornea (KOR-nee-uh)**
The clear outer part of the eye's focusing system located at the front of the eye.

- ▲ **Eyelid**
The skin-covered structure that protects the front of the eye; limits light entering the eye; spreads tears over cornea.
- ▲ **Fovea (FOH-vee-uh)**
The center of the macula; gives the sharpest vision.

▲ **Iris**
The colored part of the eye; regulates the amount of light entering the eye.

▲ **Lens**
The clear part of the eye behind the iris that helps to focus light on the retina. Allows the eye to focus on both far and near objects.

▲ **Macula (MAK-yoo-luh)**
The small sensitive area of retina that gives central vision; contains the fovea.

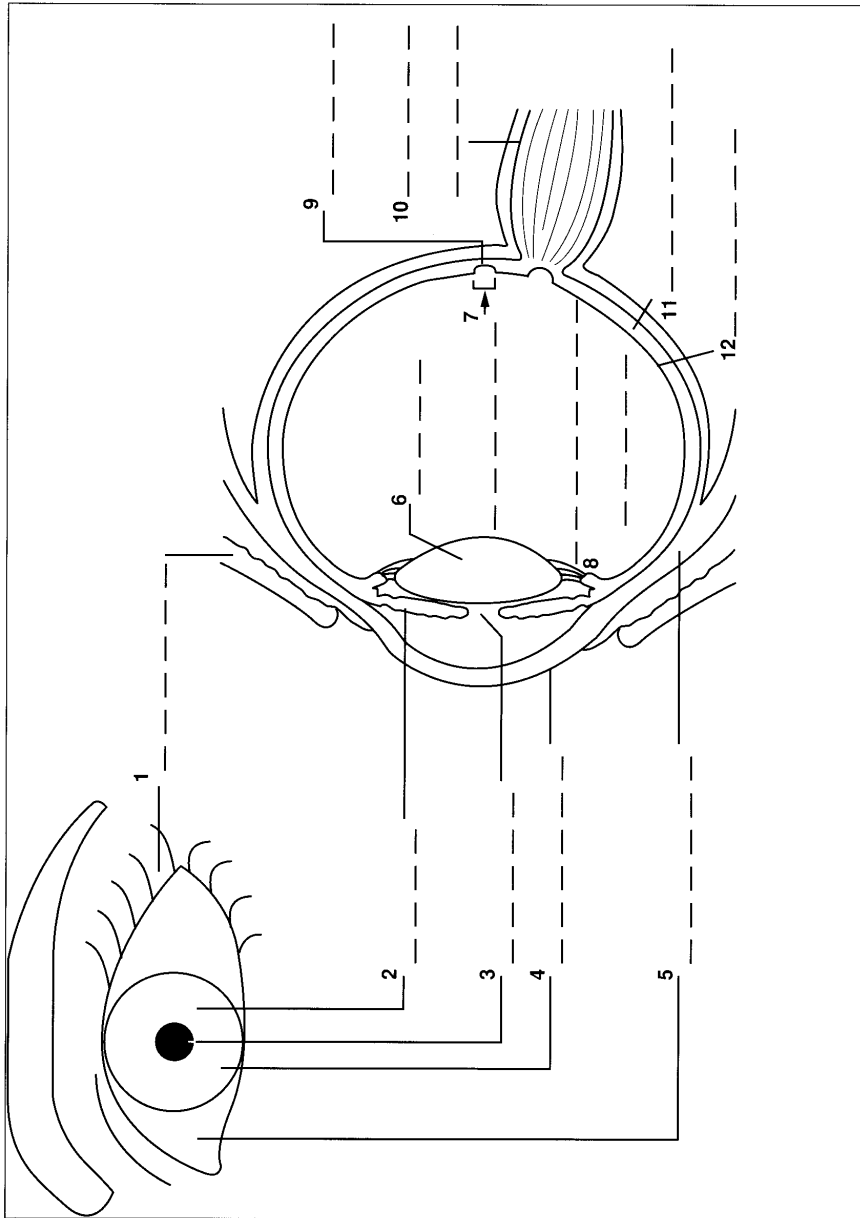
▲ **Optic nerve**
The bundle of over one million nerve fibers that carries visual messages from the retina to the brain.

▲ **Pupil**
The opening at the center of the iris. The iris adjusts the size of the pupil and controls the amount of light that can enter the eye.

▲ **Retina (RET-in-nuh)**
The light-sensitive tissue lining the back of the eyeball; sends electrical impulses to the brain.

▲ **Sclera (SKLEH-ruh)**
The tough, white outer coat of the eye.

▲ **Vitreous Humor (VIT-ree-us)**
The clear gel filling the inside of the eye.



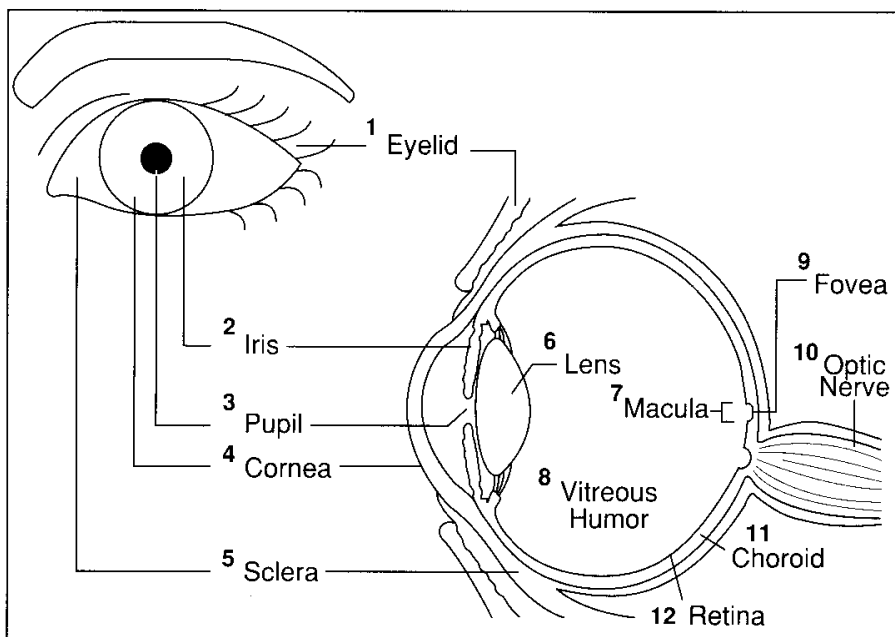
Word Scramble Exercise

Scramble

Unscramble the parts of the eye listed below. *Hint:* The location of each is shown on the diagram.

1. dyelie _____	
2. siir _____	
3. lpup _____	
4. onarce _____	
5. rsleca _____	
6. nesl _____	
7. aclamu _____	
8. stivorue mhuro _____	
9. ovafe _____	
10. pocit verne _____	
11. drohcio _____	
12. tranie _____	

Answer Key to Eye Anatomy Handout



APPENDIX A

Common Optical Terms

ACCOMMODATION: (e-kom-e-da-shen) In younger people under age 40, the lens is adjusted by the ciliary muscles to focus clearly on near as well as far vision. With age the lens is less able to change, eventually requiring reading glasses or bifocals for close work.

AGE RELATED MACULAR DEGENERATION: The most common form of macular degeneration is AGE RELATED MACULAR DEGENERATION (ARMD). It is believed that one contributing factor of ARMD is excessive light exposure over a person's lifetime. Limiting excessive light exposure (eg., wearing sunglasses and a hat outside) and a diet rich in antioxidants as well as zinc may prevent or retard the development of ARMD. In general, the lighter a person's complexion the greater the risk of ARMD.

AMBLYOPIA: (am-bli-o-pi-a) "Lazy eye" poor vision in a healthy eye caused by disuse

ASTIGMATISM: (uh-STIG-muh-tizm) A condition in which the surface of the cornea is not spherical; causes a blurred image to be received at the retina.

BINOCULAR VISION: (be-nok-ye-lar vizh-en) The blending of the separate images seen by each eye into a single image; allows images to be seen with depth.

BLIND SPOT: (1) A small area of the retina where the optic nerve enters the eye; occurs normally in all eyes (2) Any gap in the visual field corresponding to an area of the retina where no visual cells are present; associated with eye disease

BLINDNESS: Legal blindness is defined as 1) visual acuity of 20/200 (only being able to see the big E on the eye chart) or less in the best eye even with the eyes corrected by glasses or contact lenses; or 2) the peripheral visual field is reduced to 20 degrees of visual angle or less. Twenty degrees of visual angle is about the size of a one foot ruler held at arms length.

CATARACT: (kat-e-rakt) An opacity or haziness of the lens of the eye. A cataract is noticed particularly at night when oncoming headlights produce glare disability or/and discomfort. It may or may not reduce the vision depending on size, density and location. If a cataract reduces visual acuity significantly, an Ophthalmologist can replace the defective lens with an artificial lens

CENTRAL VISION (sen-tral vizh-en) See VISUAL ACUITY.

CONCAVE LENS: (kon-kav lenz) A lens that diverges light rays. The diopter value of this lens is always preceded by a minus sign.

CONVEX LENS: (kon-veks lenz) A lens that converges light rays to a point. The diopter value of this lens is always preceded by a plus sign.

CONES, CONE CELLS: (kon cel) One type of specialized light-sensitive cells (photoreceptors) in the retina that provide sharp central vision and color vision. Also see RODS.

CONJUNCTIVITIS: (kon-jungk-te-vi-tis) An inflammation of the thin transparent tissue layer within the eye containing blood vessels. The conjunctiva covers the outer surface of the eyeball, starting at the

limbus (edge of the cornea) and extends backward to form a recess under each lid before coming forward and covering the inside surface of each eyelid. It contains mucous secreting cells that allow the eye to move smoothly in various directions. It also helps lubricate the cornea during blinking. A contagious but treatable condition.

CONTRAST SENSITIVITY: (kan-trast sen-si-tiv-i-ty) The ability to perceive differences between an object and its background.

DILATION: (dil-a-tion) Process by which the pupil is temporarily enlarged with special eye drops (mydriatic); allows the eye care specialist to better view the inside of the eye

DIOPTRER: (di-op-ter) A unit of measure of the refractive power of a lens. One diopter is equal to convergence of light rays at one meter. Two diopters are equal to convergence at .5 meters.

DIPLOPIA: (dip-lo-pi-a) Commonly known as double vision. In children, diplopia is often associated with a muscle imbalance such as esotropia. A refractive error may also cause enough blurring that a person sees two objects.

FLOATERS: (flot-ers) Small condensations of cells in the vitreous body, the fluid in the eye which cast shadows on the back of the eye known as the retina. This is normally associated with aging. Floaters may indicate a more serious problem such as a retinal detachment. If you suddenly see a lot of floaters, please see your eye doctor.

GLAUCOMA: (glou-lo-me) An abnormal condition in which the pressure within the eye is elevated to the point where the visual cells and nerves are affected. Glaucoma is the major cause of vision loss and blindness. Medicines and surgery are needed to control the elevated pressure. African Americans are at increased risk for glaucoma. Glaucoma often will lead to a loss of peripheral vision before central vision is affected. Often the patient will not notice the loss of vision until too late for treatment.

HYPEROPIA: (hy-pur-OH-pee-uh) Farsightedness; ability to see distant objects more clearly than close objects; may be corrected with glasses or contact lenses.

LOW VISION: (lo vizh-en) Visual loss that cannot be corrected with eyeglasses or contact lenses and interferes with daily living activities.

MYOPIA: (my-OH-pee-uh) Nearsightedness; ability to see close objects more clearly than distant objects; may be corrected with glasses or contact lenses.

NEAR VISION: (nir vizh-en) Normal field of vision up to five feet.

OPHTHALMOLOGIST: (of-thal-mol-o-jist) A physician (MD or DO) who specializes in the diagnosis and treatment of eye problems and diseases. The ophthalmologist works with the use of glasses, contact lenses, eye medication and surgery.

OPTICIAN: (op-tish-en) A technician who fits a person for glasses. He/she does not test for glasses. Some opticians also fit contact lenses.

OPTOMETRIST: (op-tom-i-trist, OD) A licensed non-physician educated to detect eye problems with special emphasis on correcting refractive errors. Depending on training, an optometrist may use diagnostic and therapeutic medicines. An optometrist does not perform surgery.

PERIPHERAL VISION: (per-IFur-al) Side vision; ability to see objects and movement outside of the direct line of vision.

PRESBYOPIA: (prez-bee-OH-pee-uh) The gradual loss of the eyes' ability to change focus (accommodation) for seeing near objects caused by the lens becoming less elastic; associated with aging; occurs almost all people over age 45.

REFRACTION: (ri-fak-shan) A test to determine the best eyeglasses or contact lenses to correct a refractive error (myopia, hyperopia, or astigmatism).

RODS, ROD CELLS: (rod sels) One type of specialized light-sensitive cells (photoreceptors) in the retina that provide side vision and the ability to see objects in dim light (night vision). Also see CONES.

SNELLEN CHART: Industry standard chart of letters used to test visual acuity. The chart is placed 20 feet away from the patient. If the patient has "normal" vision, the patient can read the 20/20 line with no difficulty.

TRACHOMA: (tra-ko-ma) A viral infection of the cornea and conjunctiva which may produce scarring and impaired vision.

VERGENCE: (ver jens) Term used to describe simultaneous eye movements when the eyes are looking at an object in front of the face.

Convergence: Both eyes move in

Divergence: Both eyes move out

VISUAL ACUITY: (vizz-oo-el e-kyooi-te) The measure of the clearness of sight. Normal visual acuity is designated as 20/20 eyesight as measured by standard Snellen eye chart. 20 feet is the standard measure of normal distance vision. This means that an individual should be able to see clearly the 20/20 line on the chart from a distance of 20 feet.

VISUAL FIELD: (vizz-oo-el feld) The entire area that can be seen when the eye is forward, including peripheral vision.

APPENDIX B:

Glossary of Eye Problems and Conditions

ADIE'S TONIC PUPIL

Adie's tonic pupil is a condition in which the pupil size of the two eyes is not the same. The difference is greatest in bright light. This condition occurs predominantly in women between 20-40 years of age. Adie's pupil may be confused with other diseases. This tonic pupil has several clinical features that easily distinguish it from others. It is usually unilateral (on one side), occurring bilaterally (on both sides) in only 10% of all cases.

When a person has this condition, he/she usually notices that one pupil is larger than the other. The person may or may not experience blurring vision but will have some visual complaints due to the large pupil. In addition, the person may also have tension headaches.

Adie's tonic pupil can be diagnosed by examining the pupil's reaction to light in a light-near dissociation and a pilocarpine or mechloryl test. Adie's pupil will dilate irregularly and show minimal or no reaction to light or near stimulus.

There is no treatment indicated, but it is important to inform the patient about the condition so that future doctors do not have to go through the same tests or make the diagnosis that has already been made. Having the Adie's tonic pupil should not pose problems and will not interfere with most visual demands.

AIDS/ HIV INFECTION

The Human Immunodeficiency Virus (HIV) is the virus that causes AIDS (Acquired Immune Deficiency Syndrome) in humans.

There are some changes that take place in the eye of an AIDS patient that an eye doctor can detect on a routine eye exam. Because of its impact on the immune system, AIDS can cause normally benign viruses of the eye to develop into harmful infections. In an immunocompromised individual such as a person with AIDS, the virus may now become an opportunistic infection and lead to inflammation and hemorrhage at the back of the eye. These eye signs are present at the early stage of the disease. There have been instances where the eye doctor was the first health care professional to suspect AIDS in the patient. If AIDS is suspected, the patient is immediately referred to a physician for HIV blood tests. Ocular symptoms of AIDS include: blurred vision, double vision (diplopia), light sensitivity (photophobia), blind spots in vision, decrease in vision, and any combination of the above.

ALBINISM

Albinism is an inherited condition in which the cells of the body cannot produce enough melanin (a pigment or coloring substance) to color the skin, eyes, or both. A person with albinism may be missing melanin pigment from the skin only (a cutaneous albino) or from the eye only (an ocular albino).

A person with either ocular or oculocutaneous albinism may be very sensitive to light (called photophobia) because the melanin necessary to control the amount of light reaching the receptor cells (cells

which collect light of vision) is absent. Ordinary room light will then seem very bright and may even cause eye pain. Albinos may also have nystagmus (where the eyes seem to wander from side to side), strabismus (where the eyes are not lined up properly and one is either turned in or out), and vision may be bad due to improper development of the eyes

ANISOCORIA

A condition in which the pupils differ in size. Average size pupils range from 3-4 mm. All pupils are small at birth. Differences in size become more apparent as the individual grows and achieves maximum pupil size by adolescence. The pupil may become smaller with advancing age.

Anisocoria may be congenital or acquired, as from ingestion of oral contraceptives. The condition may be a first indication of pupillary defects but may also exist in absence of ocular disorder such as Adie's Tonic Pupil, Horner's Syndrome, or cranial nerve III palsy.

AMBLYOPIA

A condition in which the eye has reduced function due to deprivation of neural function.

ASTIGMATISM

Astigmatism is a refractive condition in which the eye's focusing elements are unable to form a single image for a single object. The two focusing elements most commonly responsible for astigmatism are the cornea (the clear front part of the eye) and the lens (inside of the eye). The vast majority of astigmatics have very low astigmatism. High astigmatism is present in a very small percentage of young children, but is of major concern not to diagnose this before age 2 or 3 to prevent the child from becoming amblyopic (decrease in vision due to lack of neural stimulation).

Usually, astigmatism is caused by an inherited irregularly shaped cornea. Astigmatic corneas are most commonly steeper in the vertical direction than in the horizontal direction. The crystalline lens may also cause small amounts of astigmatism. The use of contact lenses may reduce astigmatism, because of the changes they can produce on the cornea. Small amounts of astigmatism usually do not noticeably impair vision. However, without correction, there is no distance (near or far) at which an uncorrected astigmatic has a completely sharp retinal image. Portions of an object (perhaps vertical components) may appear clearer than others.

Astigmatism may be corrected by using cylindrical optic lenses depending on which meridians of the eye are astigmatic. Some patients find that it takes some time to adjust to spectacles with a correction for astigmatism. Without the correction, the brain tends to compensate for visual distortions produced by astigmatism. When a correction is applied, the brain may take a few days to modify its interpretation of the visual scene.

BLEPHARITIS

Blepharitis is a common condition of the eyelids. The margin of the eyelids becomes swollen and red with inflammation, and a crusty discharge may be at the base of the eyelashes. Some lash loss may occur but in milder cases the lashes will grow back. In more severe cases, the eyelash loss will be permanent.

Causes of blepharitis are unknown but it is often associated with allergies or seborrhea (dandruff) of the scalp. This condition rarely results in loss of vision. Symptoms include itching, burning, tearing, crustiness around the eye upon awakening, swollen eyelids, and lashes sticking together in the mornings.

Blepharitis is often treated with lid scrubs, artificial tears, warm soaks (four times/day), and antibiotic eye drops. The disorder may become chronic since there is no cure.

BOURNEVILLE'S SYNDROME - see TUBEROUS SCLEROSIS

CHALAZION

An inflammation of an eyelid gland, chalazion is caused by a block of the meibomian gland duct. It may appear as a bump or swelling on either the top or bottom eyelid, and is painless. If the chalazion has grown large enough to press on the eye, it may cause damage to vision by inducing astigmatism.

Treatment of chalazion may include warm soaks (four times/day), sulfonamide antibiotic eye drops, or surgery. If the chalazion doesn't disappear after three to four weeks, it may have to be removed surgically. The eye is patched after surgery, and antibiotic eye drops are often prescribed. This condition may become chronic, and prevention can be achieved through personal cleanliness and the application of warm soaks at the first sign of inflammation.

CHICKEN POX

Chicken pox is caused by an infection by the varicella virus. Persons with chicken pox develop a red rash on the face, red, itchy eyes (where the white part of the front of the eye looks very red), and fluid-filled small cysts around the eye. Chicken pox can be transferred to another person by breathing air that has been contaminated or by coming in direct contact with the infected person.

The red eye is usually treated by using a cool compress (that is, by placing a cool moist wash cloth over the eye area while the eyes are closed). Antibiotic ointment may also be used, and the eye drops reduce the red eye and facial rash. Steroid eye drops may be used to reduce any inflammation. Aspirin should NOT be given to children because of the risk of children developing a condition called Reye's Syndrome. Patients with chicken pox need to be seen by the eye doctor every 1-7 days depending on the seriousness of the case. Steroid eye drops must be tapered. Patients need to follow the dosage instructions very strictly as prescribed by the eye doctor.

CONJUNCTIVITIS

Conjunctivitis or "pink eye" is a common infection of the conjunctiva (the white part of your eye). Conjunctivitis can be caused by large doses of ultraviolet radiation from the sun, as in snow blindness, by allergies to pollen, medications, food or smoke, or by bacteria or viruses.

Depending on the cause of the conjunctivitis, symptoms can vary. Conjunctivitis caused by overexposure to UV can cause redness and a burning sensation. Allergic conjunctivitis can result in redness, itching, and a watery discharge. Bacterial and viral infection conjunctivitis display symptoms of redness, itching, tearing, light sensitivity, and a nightly thick discharge that causes lashes to stick together in the morning.

Treatment involves shielding eyes from excessive light, avoiding allergy-producing agents, and prescription of medications such as sulfonamide drugs or antibiotics. Redness should decrease after three to seven days.

CORNEAL ULCER

Corneal ulcers occur when the cornea is worn down or damaged by injury, exposure to irritants, bacterial, viral, or fungal infections. Ulceration may lead to scarring and loss of sight. It is a common cause of

blindness around the world. Symptoms are usually extreme pain with a feeling of something in the eye. It can also be accompanied by eye light sensitivity, and decreased vision.

Ulcers may occur in cases of injury, facial palsy (Bell's Palsy) or unconsciousness in which the lid does not adequately protect the cornea; they can be treated with eye pads and/or anesthetic ointments until the ulcer heals. Ulcers caused by bacteria are often associated with the staphylococcus or streptococcus bacteria. Other bacteria may infect the eye when the cornea is weakened by disease or additional infections. Bacterial ulcers can be treated with antibiotics or steroids-antibiotics. Ulcers due to viruses are most often caused by the herpes simplex virus. The virus is treated with antiviral drugs and antibiotics. These drugs cannot cure the herpes simplex virus, but it can stop the reproduction of viral cells and prevent infections. Steroids are not recommended since they impair the body's rejection of the virus. Fungal-related ulcers are most often caused by yeast. The condition may require hospitalization and treatment with antibiotics. Healing of these ulcers often results in scarring of the cornea that may affect your vision.

DIABETES

Vision lost from diabetes cannot be restored. Diabetes is the leading cause of new cases of blindness in the United States. Prevention education is crucial.

Diabetes is a condition resulting from decreased production of insulin, or by decreased ability to utilize insulin. Insulin, which is produced by the pancreas, is a hormone that is necessary for cells to be able to use blood sugar.

The exact causes of diabetes mellitus are unknown, though heredity and diet are believed to play a significant role in its development. Diabetes results from insufficient insulin production in the body. It can also result when the pancreas produces insulin, while the cells are unable to use it efficiently (insulin resistance). Insulin is necessary for blood sugar (glucose) to go from the blood to the interior of the cells. If the sugar cannot enter the cell, the body cannot use it. The excess sugar remains in the blood and is then absorbed by the kidneys. Symptoms such as excessive thirst, frequent urination, and hunger develop.

Diabetes occurs in a number of forms. The most common types are Type I, or insulin-dependent diabetes mellitus (IDDM); Type II, or noninsulin-dependent diabetes mellitus (NIDDM); and Gestational Diabetes Mellitus.

Insulin-dependent diabetes mellitus (IDDM or Type I) is often found in people under the age of 30, who must then receive insulin injections. Risk factors for IDDM include viral infections, autoimmune disease, and a family history of diabetes.

Noninsulin-dependent diabetes mellitus (NIDDM or Type II) usually occurs in severely overweight adults and seldom requires insulin treatment. Treatment includes a special diet and an exercise program. Risk groups for Type II are: the obese, those under physiological or emotional stress, pregnant women, those on certain medications, people over 40, and those with a family history of diabetes.

Gestational diabetes first appears during the second or third trimester of pregnancy and usually disappears after pregnancy is completed.

ECTROPION

A disorder of the eyelids in which the lower lid turns outward, ectropion is generally caused by aging but may result from scarring of the eyelids or nerve damage. The exposure of the lower lid may cause

tearing, irritations, and inflammation of the white part of the eye (conjunctivitis). **Entropion** can be corrected with minor surgery using a local anesthetic. A portion of the sagging lid may be removed during the procedure and skin grafting may be required.

ENTROPION

A disorder of the eyelid in which the lid turns inward. The lashes of the lid can scrape against the clear or white part of the eye and may result in eye irritations. This condition is generally associated with aging but can occur as the result of an injury, burn, scarring, or squamous cell carcinoma. Entropion usually affects only the lower lid and is most common in those over 50 years old. Symptoms might include redness, eye irritations, tearing, or a sensation of something in the eye.

For a temporary treatment, one can tape the eyelid in place with adhesive tape. Eyelid surgery can be done to correct it permanently. The procedure may involve the removal of sections of the lid or excision of scar tissue with skin graft. Stitches may be placed to hold the lid in an outward position.

GLAUCOMA

Glaucoma is a group of eye diseases responsible for over 8.5 million cases of blindness in the world. According to the National Society to Prevent Blindness, approximately one of every seven blind Americans is blind as a result of glaucoma.

The disease affects about one percent of people over age 40. Most at risk for developing glaucoma are people with a family history of glaucoma, those over 40, Blacks, diabetics, and those with extreme nearsightedness. Glaucoma is characterized by an abnormal rise in eye pressure due to blockage in the drainage system of the eye or overproduction of aqueous fluid (a watery fluid that brings nutrients to the eye and also removes waste materials). As pressure builds, it affects the function of the retina and optic nerve. As the blood supply to these organs is reduced, nerve cells and fibers are destroyed and blindness will result if not treated.

There are many types of glaucoma, but the two most common forms are open angle and narrow angle glaucoma. Open angle accounts for roughly 70 percent of all cases of glaucoma. It occurs when the angle of drainage (filtration angle) appears normal but, for reasons not understood, fluid is unable to go through the drainage system. Pressure builds up inside the eye. The disease progresses slowly and painlessly, with few and transient symptoms. The symptoms may include tunnel vision, or scotomas (blanks spots in the peripheral field of vision) that eventually destroy central vision. In narrow angle glaucoma, which accounts for five percent of all cases, the drainage angle is blocked by the iris. Narrow angle glaucoma can occur suddenly. Symptoms include pain, redness, blurred or clouded vision and halos around lights. The disease may progress to rapid and permanent vision loss.

Glaucoma may be diagnosed during a routine eye exam by high eye pressure, cupping of optic disc and visual field loss. Three tests: tonometry (measure eye pressure), gonioscopy (examine the angle), and perimetry (measures field of vision) may be performed in the screening and diagnosis of glaucoma. Glaucoma may be controlled but not cured. The aim of treatment is to lower the eye pressure to prevent vision loss. Treatment includes medications, surgery, or laser therapy. Open angle glaucoma may be treated with drops that reduce the size of the pupil, inhibit aqueous production, or increase the outflow of the drainage system. Surgery or laser therapy is needed if medications fail to reduce the eye pressure. Laser surgery makes a small hole to allow better drainage of the aqueous humor.

GRAVES DISEASE -see THYROID EYE DISEASE

HERPES SIMPLEX VIRUS

Herpes Simplex virus causes most corneal blindness in the US. According to the National Institute of Health, 500,000 cases of ocular herpes simplex are diagnosed each year. This is the same virus that produces cold sores or fever blisters and is a close relative of the virus that causes genital herpes. If you have had one herpes related eye infection, you may get another one. They tend to recur because the virus resides in the nerves around the eye and periodically travels down those nerves to cause reinfection. The infection can be triggered by stress, fever, or intense sunlight. Avoiding these triggers can sometimes help prevent another attack.

When herpes strikes the eye it can cause more than just conjunctivitis (inflammation of the white part of the eye). It can also affect the cornea (clear part of the eye) and cause major problems. When the virus is multiplying, it produces tiny clusters of ulcers called dendrites that branch out over the surface of the eye. When the virus gets deeper in the eye it can cause severe inflammation that may lead to blurred vision, pain, and corneal scarring.

Herpes can be treated with antiviral drugs such as vidarabine, acyclovir, trifluridine. These drugs are not a cure for herpes. They stop the reproduction of the virus cells but cannot rid the body of the virus. Severe scarring can be treated with cortisone eye drops. Cortisone is a steroid that may actually worsen the herpes infection and is used only for short periods of time. Severe vision loss due to scarring may be corrected with corneal transplant.

HERPES ZOSTER VIRUS

Herpes zoster or shingles is a painful skin disease that may involve the eye. It is caused by the same varicella virus that causes chicken pox. According to the National Institutes of Health, it is responsible for seven percent of all skin disorders, many of which affect the eye.

Generally only one eye is affected. Complications may include corneal ulcers, scarring, and cataracts, which can cause loss of vision in the affected eye. Additional conditions may include keratitis (corneal inflammation), increased eye pressure resulting in glaucoma, uveitis, secondary infections and eye muscle paralysis. If the shingles are around the eye they can cause a red eye and serious inflammation inside the eye. It is usually accompanied by skin vesicles (small fluid filled bumps) around the eye and intense pain in the forehead and scalp. The virus travels along the nerve fibers. Although these fibers have pathways throughout the skin, only one side of the body is affected. A shingles infection on one side of the face will not usually spread to the other side.

Treatment of the eye disease caused by zoster is problematic. Corneal ulcers are often treated with soft contact lenses that remain on the affected eye for a period of months until the ulcers heal. Keratitis is treated with antiviral drops or ointments. These drugs are effective only when the virus is active. Since the virus is not destroyed, it may become active again and the keratitis may recur. Glaucoma caused by the virus infection may be treated with medications or eye drops and any cataract formed may be removed. Eye muscle paralysis is not treatable with medications or therapy but usually heals itself in time. Zoster scarring causes unique problems. Vision loss caused by zoster scarring cannot be corrected by corneal transplantation. The scarred cornea becomes avascularized, a condition in which blood vessels invade the cornea and interfere with post transplantation healing.

HOEDEOLUM (Sty)

An infection on the outside or inside of the eyelid. It is also called a sty. As the sty begins to form, the entire lid swells and becomes painful and tender to the touch. A localized area on the lid margin will become red and swollen with pus. If the sty is left untreated, it will eventually burst, drain, and heal itself. Otherwise, treatment consists of warm soaks or surgical removal.

HYPEROPIA

A refractive condition in which light focuses behind the retina, resulting in clear distance vision but blurred near vision.

Hyperopia is usually corrected with plus powered spectacles or contact lenses. These lenses converge the incoming light rays the appropriate amount so that the image focuses on the retina. Treatment is usually based on patient comfort. Eye doctors may elect not to treat a mildly hyperopic patient who is asymptomatic. The actual amount of hyperopia present usually does not increase with age but manifests itself clinically as you lose the ability to accommodate.

MACULAR DEGENERATION

The macula receives and analyzes light from the center of the visual field. Although the macula comprises only 0.5 percent of the entire surface of the retina, it provides the most important sight. Whereas a person who suffers from tunnel vision can at least see straight ahead and read and recognize fine detail, a person suffering from severe macular degeneration can only see the sides of the tunnel—nothing right in front of the eyes. Macular degeneration is one of the chief causes of vision loss among elderly people. The two major types of macular degeneration are inherited macular dystrophies and age-related maculopathy (ARM). ARM affects over half a million Americans over the age of 65. There are two types of ARM: a dry form which accounts for 90 percent of all cases and a wet form of ARM that accounts for 10 percent.

Dry ARM is the simple degeneration of the macula. It usually takes place slowly, and only rarely does it completely destroy the macula. Some central vision remains and most victims are able to read with the help of magnifying glass or other low vision aids.

Wet ARM is usually faster and more destructive than the dry type. It produces a sudden growth of new but abnormal blood vessels within the macula. They produce scars that can destroy the macula at a point where even reading is impossible. When these new blood vessels start to form, they can leak fluid and blood, which collect within the retina. Aside from blocking vision, the fluid also blisters the retina away from the wall of the eye and causes vision distortion. Straight lines therefore appear to be bent and curved.

A breakdown in the blood supply to the retina may cause macular degeneration. It may also develop due to an infection, ocular trauma or injury, drugs, other diseases such as diabetes or heredity. There is evidence of a possible link between ARM and hardening of the arteries. The most common symptoms are blurred vision and increased difficulty in seeing details (near and/or far), even with corrective lenses. Shapes and contours may look distorted and shimmer. Bright colors may look dull, and blind spots (macula scotoma) may appear in the center of the visual field. Because ARM sometimes affects only one eye, some people are not aware that they have it because their good eye compensates.

During the normal eye exam, the eye doctor might find scattered white and yellow spots called drusen in the back of the eye near the macula. These spots are a bit like liver or age spots. Current research suggests that they are accumulations of waste material produced by the retina that cannot be eliminated.

There is no cure for macular degeneration, but there are treatments and techniques that might halt the progression of the disease in some cases and delay it in other

MYOPIA

A refractive condition in which light focuses in front of the retina (the nerve tissue in the back of the eye that allows one to see). This results in clear near vision, but blurry distance vision. Congenital myopia, or myopia present at birth, occurs no more than one to two percent of the population. However, acquired myopia, developed after infancy, poses a larger problem: almost one third of the population in any industrialized society will become myopic after several years of schooling or during the adult years. According to a US Government report, sixty out of 100 children between the ages of six and 11 have myopia; about 26 of every 100 teenagers and around 30 of 100 adults wear a correction for myopia. Among senior citizens, the prevalence of myopia is about 16 percent. An inherited condition in most cases, myopia may also occur as a result of prolonged tension on the eyes during close work and elongation of the visual axis. Unlike hyperopia or astigmatism, myopia tends not to progress, and tends to progress faster during the younger school age years than during adult years.

The primary sign of myopia is not being able to view distant objects clearly and distinctly. A myope may also find himself squinting when looking at the distance in order to make the fuzzy image clear. After long periods of near work, highly myopic patients may complain of eye strain and fatigue.

For most cases of myopia, eye doctors will prescribe minus powered spectacle or contact lenses for patient wear. These will spread out the incoming rays of light by an appropriate amount, so they will focus on the retina. There are other less common procedures, such as orthokeratology, in which a hard flat contact lens is prescribed to flatten the cornea, and radial keratotomy, in which surgeons make incisions in the cornea in order to flatten it.

NEARSIGHTEDNESS - see MYOPIA

NEUROFIBROMATOSIS (VON RECKLINGHAUSEN'S DISEASE)

Neurofibromatosis (NF) is the most commonly inherited disease. Persons with neurofibromatosis may develop lesions and tumors in the eye and in the central nervous system (brain and spinal cord) as well as spots on the skin. Tumors in the eye can lead to glaucoma if they grow over the optic nerve head, the point where the eye nerve leaves the eye to carry information to the brain. Tumors may also develop in the colored part of the front of the eye but these are usually so small that only an eye doctor can see them with special magnifying instruments. Spots on the skin are not tumors but discolorations called cafe au lait spots (from the French "coffee with cream"). These spots are seen in the trunk area (the chest, abdomen and thighs). In the armpit area a person with NF may have freckles. Tumors affecting the central nervous system may cause mental retardation and hearing loss.

Neurofibromatosis is a genetically inherited condition for which there is no cure. Treatment consists of prescribing eyedrops for the glaucoma that may result and removing tumors that can be removed. Tumors that are too large may need to be treated with chemotherapy. Family members of the patient need to be examined for the disease. Even if other family members are found to not have the disease it is important for the whole family to be informed and counseled about the disease and the chance of the patient passing on the disease to children. Individuals need to have regular health examinations (including eye examinations). Even if tumors have been removed, or if there are no spots on the skin, the person needs to be seen by the eye doctor at least once every six to 12 months to make sure that no more tumors or glaucomas are developing.

NIGHT BLINDNESS - see RETINITIS PIGMENTOSA

NYSTAGMUS

Nystagmus is a term for an involuntary movement of the eyes. The eyes may move vertically, horizontally, in circles or any combination of the three. The condition causes focusing problems and blurred vision. Nystagmus may be congenital (present at birth), or acquired as a result of another disorder.

Jerking nystagmus is the most common form of the disorder. The eyes move faster in one direction than the other. It may be caused by damage to structures involved in vision, changes in the brain stem, cerebellum or vascular system, over stimulation of the systems within the inner ear, hypertension, stroke, multiple sclerosis, drugs or alcohol toxicity, or brain inflammation, including meningitis and encephalitis. Pendular nystagmus is the less common form of the disorder. The eyes move horizontally (left to right) and equally quick in both directions. Pendular nystagmus may be associated with congenital cataract or disorder of the optic disc. It may be acquired after birth as the result of astigmatism, albinism, optic atrophy or corneal opacification or cataracts.

Individuals with nystagmus usually complain of blurred vision, or focusing problems. The underlying causes of nystagmus are treated to alleviate the symptom. If the cause is astigmatism, prescription eyeglasses may be helpful. Control of the disease or cause usually results in control of the nystagmus. In unmanageable conditions, the patient may learn to hold the head or body in accommodating positions or learn to focus with one eye.

PAPILLEDEMA

Papilledema is a condition in which the optic nerve is swollen due to an increase in intracranial pressure (pressure of the fluid within the brain). Intracranial pressure may be the result of cerebral tumor, hypertension, hematoma (blood tumor) or hydrocephalus (an increase in cerebrospinal fluid within the cranial cavity). Symptoms of papilledema are usually transient visual loss, enlargement of the blind spot, headaches, double vision, nausea, and vomiting.

Papilledema is a serious condition that requires prompt medical attention. Papilledema may be diagnosed by a visual field examination, ultrasonography, computerized tomography, and fluorescein angiography, a test in which fluorescein dye is injected into the body and observed as it travels through the eye. Papilledema is treated according to its causes. Hydrocephalus is treated with a shunt to drain the fluid out of the cranial cavity. Tumors are surgically removed. Medications or surgery may be necessary for hypertension or hematoma.

PINK EYE - see CONJUNCTIVITIS

PTERYGIUM/ PINGUECULA

Pinguecula is a small, yellowish, raised mark on the white part of your eye. It's usually associated with age and it is a harmless condition. Its cause is unknown, but it may be related to irritation from dust and ultraviolet radiation (sunlight) exposure.

Pterygium is a patch of raised tissue on the white part of the eye. It is usually a winged shaped fold of tissue that can block your vision if it grows into the cornea (the clear part of your eye). Prevention involves wearing protective lenses in dusty, windy, or sunny environments.

Few symptoms are associated with this condition. The eyes may feel a little bit dry or gritty. If eye irritation is present, eye drops keep the eyes moist. Steroids can be given in more severe cases. Surgical

removal is considered if the condition is interfering with contact lens wear, causing extreme irritation, or decreasing vision by blocking the pupil. A new treatment for dry eye blocking the lacrimal ducts (tear drains) with collagen or silicone plugs may afford relief from the irritation and prevent further growth of pterygia.

RACEMOSE HEMANGIOMATOSIS - see WYBURN-MASON SYNDROME

RETINAL BREAKS/ TEARS

The retina is a tissue which lines the inside surface of the back of the eye and which contains the receptor cells which collect and transform light to allow us to see. If the retina has a weak spot, a blow to the head can cause breaks or tears in this tissue. When this happens there is a loss of function in the part of the eye where the tear occurs and therefore a loss of vision in that part of the visual field. Losses of vision caused by such an injury may not be noticed by an individual if the break or tear is very small, but large tears of the retina will cause a noticeable loss of vision.

Weak spots in the retinal tissue may be a normal variation among people and cannot be prevented, but some conditions make the retina more vulnerable to tears and breaks. Most of these conditions, however, can only be detected by instruments used by an eye doctor on examination of the back of the eye and this is one of the reasons why it is so important to have an annual eye exam.

If a break or tear in the retina has occurred, the person may notice some flashes of light or flashing spots in their visual field. There may also be a slight change in the way colors are seen and/or a person may see a cobweb-like image which seems not to move with the eye. The flashes of light may be temporary, but the color vision and the image in the eye will usually not go away on its own.

Not all weak retinas need to be treated. The doctor may decide that the condition should just be monitored with an eye exam as often as once every three to six months. If treatment is needed, it is best done before a break actually occurs. A fine, painless laser is used to "tack down" the part of the retina where the tear is most likely. The eye doctor can best advise a patient as to when laser prevention should be done. If a tear or break has already happened then laser may still be used if the tear is small, but if the tear is large other forms of treatment may be needed. Usually some vision is lost as a result of the treatment but this is very small as compared to the loss expected if the tear gets larger. The loss is usually not in the central or fine seeing part of the visual field, and may not be noticeable.

RETINAL DETACHMENT

The retina (the tissue lining the inside surface of the back of the eye which contains the receptor cells which collect and transform light to allow us to see) is made up of three different layers of cells. Sometimes a separation of the retina from the underlying tissue at the back of the eye at different layers within the retinal tissue itself, can occur. Retinal detachment is usually caused by some type of force or blow to the head, and usually occurs in a weak part of the retina. Weakened retinal tissue may be due to thinning of the tissue in persons who are very nearsighted, to a tear or a hole in the tissue that is already there, or to eye surgery (such as cataract surgery) that can leave a part of the retina weaker than before. Fortunately damage due to modern eye surgery is rare.

Persons at risk for a retinal detachment (very nearsighted persons, persons who have had cataract surgery in the past, and persons who have been told by an eye doctor that they are at risk) need to be very careful to avoid forceful blows to the head. Such persons should generally avoid situations such as high-contact sports, physical fights, or other forceful activities. However, individuals should seek the advice of

an eye doctor before making any changes in their lifestyle or activities, worrying about the possibility of a detachment.

If a retinal detachment does occur, a person may experience a curtain effect, where it seems that a curtain is falling down or being drawn over part of the visual scene. Other persons report flashes of light or spots of light, or may see images which appear to be floating in front of them. Some people do not notice any indication that a retinal detachment is occurring, and may only be informed of it after an eye exam by an eye doctor. If a person experiences any symptoms or images, they should see their eye doctor within 24 hours for immediate treatment to prevent further "peeling" away of the retina from the underlying tissue.

If the retina is torn away from the underlying tissue, one form of treatment, scleral buckling, may cause some reattachment, but vision is not usually recovered fully. If the retina separates within the layers itself, treatment is aimed at preventing an expansion of the detached area, and vision is usually lost permanently in that part of the retina. It must be emphasized that it is only the affected part of the retina that loses vision and not the whole tissue, and that detachments most often happen in a part of the retina responsible for peripheral vision. Patients most often keep all of their central or fine seeing vision.

RETINITIS PIGMENTOSA

Retinitis pigmentosa (RP) is a disease in which specialized receptor cells at the back of the eye are slowly destroyed. This leads to what is commonly known as night blindness, along with other visual problems. These specialized cells are called rods and are the main cells responsible for receiving light and transmitting information to other cells (which eventually send the information to the brain) about night or dim light seeing. They are also responsible for peripheral seeing. The human body cannot replace the rod cells that are lost and so the disease leads to a very slow loss of night vision and eventually a narrowing of the visual field (the area of a visual scene that one can see at any one time), what is commonly known as tunnel vision (only central vision is kept but the surrounding vision is lost). The first vision loss noticeable in a person with RP may not happen until after age 20, and the vision loss is very slow. It takes many years (10 or 20 or more) before a person becomes what is classified as legally "blind." Legal blindness is not total blindness but is defined as a reduction in reading vision to 20/200 or worse (about ten times as bad as the average person), and/or a narrowing of the visual field to 260 or smaller (about one-fifth of what it used to be).

Doctors do not know exactly what causes this destruction of rods in RP, but it is a genetic condition and may be passed from parent to offspring. A person with the disease must understand that they could not have prevented themselves from getting the disease. The emphasis instead should be on planning for future generations. Affected persons need a lot of support during the long and slow loss of vision.

The first thing that a person with RP notices is usually a general problem with seeing at night, or seeing in dim light which slowly seems to get worse. After many years the person may notice that the area of a scene he or she is able to see is getting narrower and narrower. There is no cure for RP. A patient will be able to cope on their own for many years, but will eventually need low-vision magnifying lenses and training to be able to function as before. A person with an advanced stage of RP will have tunnel vision and will have trouble moving around and need training on getting around by themselves.

SHINGLES - see HERPES ZOSTER VIRUS

STARGARDT'S DISEASE

Stargardt's disease is a rare condition in which there is a gradual destruction of a specific type of receptor cells at the back of the eye. These cells, called cones, are located in the region of the fovea and are responsible for collecting light of seeing central or fine things and lets us see things when we are looking directly at them. Stargardt's disease therefore leads to a loss of central vision and fine or reading vision.

Stargardt's disease is known to be a genetic condition passed from parent to offspring. What exactly causes the destruction of the cone cells is not yet known. Though some are born with the defective genes, the actual disease does not usually start until late childhood or early adulthood, at which time central reading vision is affected. The rate of loss of vision in Stargardt's disease varies with different persons though it usually takes some time before a person becomes legally blind (that is having a reduction in reading vision to 20/200 and/or worse or a narrowing of the visual field to 200 or smaller). A person with Stargardt's disease may be classified as legally blind due to the reduction in reading and central vision. This patient can still be taught to read with his side vision with the help of special lenses and some training. Vision will get worse over time and there is no known medical or surgical cure for the disease. Treatment is aimed at helping the patient cope with the reduction in vision and training to use side vision to continue with daily living activities.

STRABISMUS

Strabismus is an ocular condition in which the eyes are not properly aligned. This results in the use of one eye for fixation while the other is directed to some other point in the field of vision. Strabismus affects about two percent of the nation's children and about half of this number are born with eyes that cross.

There are several causes of strabismus, including birth injuries, genetic factors, faulty muscle attachments, hyperopia, and fever. The pre-school years are critical in the development of a child's eyes and it is important that parents closely observe their child's gaze for any irregularities. The primary sign of strabismus is a wandering of one or both of the eyes, whether the misalignment be slight or marked. This is commonly called "lazy eye." Other signs to look for include head tilt; drifting of an eye when the child is tired, ill, or in bright light; any tendency to shut one eye, especially in bright light; rubbing the eyes; excessive blinking; or holding objects too close to the eyes.

Because of altered cosmetic appearance, children with strabismus may be teased, and thus become withdrawn or belligerent: parents must watch for behavioral changes as well. Children old enough to speak may complain of double vision (diplopia) because each eye is looking at a different visual scene; the eyes are pointed in different directions. If the child does not see double, he or she may have subconsciously learned to ignore what one eye sees and only pay attention to the other eye. This may weaken the suppressed eye.

The goal is to develop normal vision in each eye and achieve proper fusion of the images in each eye and depth perception. Glasses are sometimes prescribed. Patching one eye for a period of time (from weeks to a year) may also be done. The better-seeing eye is covered, forcing the lazy eye to work. Medication (eyedrops or ointment) can be used as an alternative to patching. These cause the better-seeing eye to see blurred, so the other one is forced to work. Surgery can be performed on the eye muscles outside the eyeball to align the eyes properly if non-surgical methods are unsuccessful. Eye exercises (orthoptics) may be suggested either before or after surgery to train the eyes to see comfortably.

Strabismus is a treatable condition, and the earlier it is diagnosed, the more favorable the prognosis. If not treated in time, strabismus leads to a condition called amblyopia, in which the eye has become

function due to deprivation of neural stimulation. Therefore, parents must be attuned to the signs and symptoms of strabismus and act in a timely fashion. In addition, it is extremely important that while on a treatment program, the child is seen regularly by the eye care practitioner to monitor progress.

STURGE-WEBER SYNDROME

Sturge-Weber syndrome is a disorder of the blood system in the eye. Patients with this syndrome are at risk for glaucoma and retinal detachments. The most startling sign of Sturge-Weber syndrome is a port-wine stain on the face, also known as "nevus flammeus" which is a reddish discoloration of the forehead, cheeks and nose. Sometimes the port wine stain is only in the chin area, and in this case glaucoma is less likely. Patients with Sturge-Weber syndrome may suffer from mental retardation, epileptic seizures, and cerebral lesions. It is not sure how Sturge-Weber syndrome is acquired but it is known to be genetic and can be passed on from parent to offspring.

Treatment is aimed at controlling glaucoma that develops with eye drops, and lasers to remedy retinal detachments which are large or are threatening sight, and using anticonvulsants for epilepsy. The prognosis depends on the seriousness of the case and may range from only minor visual disturbance to loss of a large part of the visual field. Anticonvulsants may need to be used throughout life. Patients with Sturge-Weber syndrome need to be seen by their eye doctor at least once every six months. If glaucoma is present, the patient may need to be seen as much as every one or two weeks for the first few months.

STY - see HODEOLUM

SYMPATHETIC OPHTHALMIA

Sometimes in very rare cases an injury or surgery to one eye will cause an inflammation in the other eye. This inflammation can happen anywhere from 10 days to 50 years after the injury to the first eye (but usually it occurs by 4-8 weeks). It is not certain why this happens. The inflammation in the second eye is called a sympathetic response: there is not actually anything in that second eye to cause an inflammation except simply an unexplained response to the injury in the first eye. This inflammation is very serious especially if the first eye had suffered an injury which left it much less functional than before, and the other eye is the only eye that is working well. It is very important to protect the sight in the second eye.

Persons who develop a sympathetic ophthalmia will experience symptoms similar to all other forms of eye inflammation such as pain in both eyes, decrease in how well one can see, increased sensitivity to light, and a red eye. It is very important to inform the eye doctor about eye injury or eye surgery in the past.

The sympathetic ophthalmia is treated in the same way as all other eye inflammations. Steroid eye drops are prescribed to be used every day for a few weeks to reduce the inflammation in the eye, then less regularly for another four to five months. The patient needs to have an eye examination every one to seven days until the inflammation goes down, then every three to four weeks. There is a risk that the steroid eye drops will cause an increase in the fluid pressure in the eye, but that can be reversed by the doctor with other medications if caught early. If treatment is done early and is successful, full vision and health can be restored to the eye which had the sympathetic response. There is a chance that the inflammation may flare up again at a later date so it is important for patients who have been treated to have check ups at the eye doctor at least once every year.

THYROID EYE DISEASE

Thyroid eye disease, also known as Graves' disease, is not really an eye disease at all, but an endocrine disease that affects the eyes. It starts in the endocrine system, or orbit (the bony cavity that holds the eye). The tissue inside the orbit becomes enlarged, forcing the eyes to move over to make room. As an added complication, the muscles that move the eyes can become swollen and may not function properly. In some people, the eyes are thrown out of alignment by the increased pressure. This can cause crossed eyes and double vision. Or, others, the eyes are just pushed out a bit farther, giving a very wide-eyed or pop-eyed look. Sometimes there is a part of the eye just below the center (the exposure region) that the eyelids cannot cover. This can cause the cornea to become dry and lead to scarring and vision loss. Regardless of how Graves' disease makes a person's eyes look, the condition can also cause increased pressure in the eyes, which in turn can damage the optic nerve.

Most people who develop the condition have a history of an overactive thyroid gland. Graves disease can develop years after the thyroid condition has been treated and taken care of. The main complaint of some people with this condition is swollen eyelids. This can be accompanied by mild inflammation of the white part of the eye (conjunctiva), tearing, eyelid retraction, protruding eyeballs, and impaired or constricted vision. Eyelid retraction and protrusion of the eyeballs may lead to exposure keratitis (inflammation of the cornea), and corneal ulceration.

One way to help reduce swollen eyelids is to elevate the head of the bed about six inches. This puts gravity to work reducing the accumulation of fluid in the eyelids during the night. If the eyes are so much that the cornea is becoming dry, use a soothing ophthalmic ointment at night and artificial tears during the day. In cases where a great deal of the cornea is being exposed, a surgeon might put some stitches at the corner of the eyelids to prevent the eyes from opening all the way. In extreme cases where a person's sight is at stake, cortisone tablets are prescribed to reduce pressure on the optic nerve and to reduce swelling in other vital ocular structures. Muscle surgery and surgery for decompression of the orbits may become necessary.

TOXOPLASMOSIS

Toxoplasmosis is an infection of the eye by the *Toxoplasma gondii* protozoan parasite. This parasite is usually found in animals and is transferred to humans primarily through the consumption of raw or uncooked meat (as happens when testing meat while cooking). Playing with kittens or cats not washing one's hands properly after cleaning out the litter box is another means of transmission. Persons with AIDS (Acquired Immune Deficiency Syndrome) have a reduced immune system and therefore may be more susceptible to catching the disease than other individuals, but having a toxoplasmosis infection in no way implies that the infected person also has AIDS.

Persons infected with the parasite may experience blurred vision or possible pain, or may notice images floating in front of them that sometimes seem to move with their eye. A toxoplasmosis infection may also lead to a uveitis.

An eye doctor can diagnose a toxoplasmosis infection by looking into the back of the eye after dilating the pupils and examining the retinal tissue (the tissue which lines the inside surface of the back of the eye and which contains the receptor cells which collect and transform light). The toxoplasmosis infection can be treated with antibiotics, which in mild cases may be in the form of eye drops, but in severe cases should be taken by mouth to reach the infection at the back of the eye. Any inflammation that is present in the eye can be treated with steroid eye drops to reduce any pain or blurred vision caused by the inflammation. Both medications need to be prescribed by an eye doctor or a general physician.

Persons with toxoplasmosis infection need to be seen by the eye doctor every 3-7 days for the first two weeks for an evaluation of the infection and to conduct blood tests if other conditions such as AIDS are possible. The eye doctor can regulate the medications and the visits to the office as seen fit. There may be some permanent damage to the eye but vision reduction may be minimal.

TRACHOMA

A contagious disease of the eyelids (conjunctiva) and clear (cornea) part of the eye. Trachoma is a leading cause of blindness in the world and may affect over 500 million people. The infection is widespread in developing countries with poor sanitation and inadequate medical care. Trachoma is caused by the bacterial *Chlamydia trachomatis* and may be linked to bacterial infections caused by *Cochlearia bacillus*, *Morax-Axenfeld diplobacillus*, and the *gonococcus bacillus*. It thrives in overcrowded areas lacking clean water and proper sewage disposal and sanitation.

Initial symptoms include pain, sensitivity to light, and reduced vision. The eye will produce an excess amount of tears and discharge. Muscle spasms will develop in the eyelids and will cause the lashes to turn inward. This will further irritate the eye and will scar the clear part of the eye. As the scarring becomes more severe, blindness may result. It can be successfully treated in the early stages with sulfonamide drugs, antibiotics, or surgery. Advanced stages of trachoma may resist treatment and may result in blindness. Trachoma can be prevented by improving sanitary conditions and personal cleanliness.

TRAUMATIC ENDOPHTHALMITIS

Traumatic endophthalmitis is an inflammation of the whole eyeball in response to injury or physical trauma to the eye. Usually this is compounded by an infection, usually bacterial, which takes hold of the weakened, injured eye. Not all eye injuries lead to inflammation or infection, but one should not hesitate to see the eye doctor if they feel any sort of bothersome pain or decrease in vision following an eye injury. Traumatic endophthalmitis is a very serious condition, and should not be taken lightly. This condition requires immediate hospitalization of the patient with the administration of intravenous antibiotics to get rid of the infection as fast as possible. The only way to reduce the possibility of traumatic endophthalmitis is to ensure the safety of the eye and minimize the chance of eye injuries.

Symptoms of traumatic endophthalmitis include highly swollen eyes and a fast and significant decrease in vision. Persons who think they may have traumatic endophthalmitis following an eye injury should visit an eye doctor immediately. If the pain is intense and the eyes are very red, help should be sought immediately at a hospital emergency room. Timely treatment of the endophthalmitis can curtail the inflammation and infection and restore vision; but if left untreated, it can lead to vision loss and sometimes necessitates eye removal. There is also the possibility of an inflammation of the remaining eye even after the first eye is removed completely. This can lead to a weakening of the remaining eye and a reduction of vision in that eye.

TRICHIASIS

A condition in which the eyelashes are misdirected and grow towards the eye. The lashes rub against the eye, resulting in eye irritation or infection. This occurs spontaneously or can be caused by an injury, infection, or disease such as trachoma. As the lashes rub against the eye, they will cause irritation, pain, tearing, or a feeling of debris in the eye.

The lash can be removed by plucking it with fine forceps. If regrowth is a problem, the lash roots can be destroyed by electrolysis. Electrolysis damages only the roots of the eyelashes and does not cause harm to the eyelids or the eye itself.

TUBEROUS SCLEROSIS (BOURNEVILLE'S SYNDROME)

Tuberous sclerosis is a genetically inherited condition. A person with the syndrome may not feel ill, but there may be obvious visible signs on the body, including the presence of yellowed bumps on the upper cheeks in the shape of a butterfly.

These yellowed spots are usually seen just before a person reaches adolescence (age 11-14). Other signs include yellowed sores around and beneath fingernails and toenails, patches on the skin which have an orange-peel appearance, light-colored patches on the skin, kidney problems, bone problems and liver, thyroid, pancreas and testes problems. In the eye there may be an astrocytic hamartoma (an over growth of tissue that is normally in the eye) of the retina or optic disc but this usually does not produce any problems.

Because tuberous sclerosis is an inherited condition, more than one person in a family may have the disease. A health care worker can advise a family about the condition and about the chance of passing it on to the children. Usually persons with the syndrome do not need treatment but should be checked at least once a year to make sure that problems do not develop.

TUNNEL VISION - see RETINITIS PIGMENTOSA

UV RADIATION EXPOSURE

Ultra violet radiation injury usually results from exposure to a welder's arc (welder's flash) or from being in a sunny or snowy area (snow blindness) without proper UV radiation protection. UV radiation injury makes the eyes red, gritty-feeling and very sensitive to light. Long-term exposure to UV from sunlight may also lead to cataracts or other blinding conditions. Take preventative measures and wear proper UV radiation protection. After exposure, protect and rest the eyes. A doctor may apply a pressure patch with a topical antibiotic to prevent infection, an anesthetic to reduce pain, and a cycloplegic to eliminate muscle spasms.

UVEITIS

Uveitis may be defined as any inflammation of any part of the inner coat of the eye. The uvea is the middle coat of the back of the eye but also extends into the front part of the eye which is visible from the front. The colored part at the front of the eye (iris) is part of the uvea. Inflammation of the uvea at the front of the eye is called anterior uveitis and inflammation at the back of the eye is called posterior uveitis. Inflammation is a non-specific response of the body to an injury: inflammation can happen regardless of whether the injury is caused by a physical blow or a chemical burn, an infection, or another cause.

Conditions causing an increased risk for uveitis include sarcoidosis (a disease of collagen tissues), tuberculosis (a disease affecting mainly the lung), arthritis (a condition which causes inflammation of the joints), syphilis (a sexually transmitted disease), AIDS (Acquired Immune Deficiency Syndrome), recent eye surgery, and recent eye injury or eye infection.

Symptoms of an active uveitis include pain in one or both eyes, sensitivity to light, blurred vision, and tearing. If the uveitis is posterior, the person may also experience floaters (an image of something floating in front of them).

The main treatment for uveitis is to treat the inflammation with steroid eye drops or other anti-inflammatory medications, and if the inflammation is due to an eye infection, antibiotic eye drops. Any other general body disease or condition causing the uveitis is also treated: a patient may need to see a physi-

can to have the appropriate testing done (blood tests, urine tests, chest X-rays, etc.) for such conditions and to prescribe the best remedy for the condition. A patient with uveitis needs to be seen by the eye doctor very often (every three to six months if uveitis is long-standing, but every one to seven days if it is active and serious). Persons may need to take eye drops on a very strict schedule of as much as one month. If the uveitis is left untreated a person may develop secondary glaucoma as a result of pressure build up in the eye and/or the eye infection may get on and lead to loss of the eye. With the proper treatment, a complete cure of the inflammation is likely. A recurrence is treated in the same way as an initial flare up and, with the proper treatment, there is again a good chance of cure.

VITAMIN A DEFICIENCY

Vitamin A is a very important nutrient to the receptor cells of the eye (the rods and cones which line the inside of the back of the eye and which collect light allow us to see). A deficiency can occur if a person is not eating enough foods with Vitamin A (called a primary deficiency), or the cells of the body cannot fully absorb the Vitamin A from food (called secondary deficiency). Primary deficiency is less common in developed countries. Whether the deficiency is primary or secondary the receptor cells in the eye suffer and sometimes cannot work to their fullest potential. The cornea (the front clear part of the eye) can also be affected in Vitamin A deficiency. The cornea may become ulcerated and develop scars which block out certain spots in the visual field (the visual scene that one can see all at one time). Persons with Vitamin A deficiency may have dry eyes which causes them to feel as if something is embedded in the eye. They may also experience pain in the eyes, night blindness, or even a serious loss of vision. The loss of vision is very slow and can be stopped with treatment.

Tests for Vitamin A deficiency are done by both eye doctors and general physicians. The eye doctor takes samples of cells from the conjunctiva (the clear tissue over the white front part of the eye) in a very quick and painless procedure. These cells are then examined to check if there is enough Vitamin A in the eye. The physician can test the level of Vitamin A in the body with a blood test. If these tests give uncertain results, other painless tests can be done. Electrodes connected to parts of the face and head can test how the eye adapts to the dark, and this indicates Vitamin A levels in the eye.

Vitamin A deficiency is treated with a special Vitamin A syrup that is taken consistently over a series of weeks. Zinc may also be prescribed in the diet. The dry eye is treated with eye drops and ointments as often as every 15 minutes or every hour if the dry eye is very serious. Patients need to have eye check ups every few days to weeks to monitor the dry eye. If the cornea is scarred, the patient may need a cornea transplant to restore good vision. Vitamin A deficiency can usually be treated successfully, but there are some cases where the patient may need to be admitted to the hospital for more extensive care.

VOGT-KOYANAGI-HARADA SYNDROME

Persons of Asian descent are at higher risk than the general population for a condition called Vigt-Koyanagi-Harada syndrome (VKH). It may be caused by a flu-like infection. VKH leads to inflammation in the eye causing a decrease in vision in both eyes, red eyes, pain and sensitivity to light, nausea, headaches, fever, tiredness, a decrease in hearing, and patches of light areas on the skin. The eye doctor can test for uveitis by using a special microscope to look into the eye. If there is inflammation, the doctor will see inflammatory cells floating in the fluid in the front part of the eye. VKH syndrome is a very serious condition and the first time an inflammation attack occurs a person may need hospitalization to treat the eye inflammation with steroids. Flare-ups after the first time can be treated with steroid eye drops. Sometimes for more serious cases systemic steroids (take by mouth) may be needed if a more aggressive attack of the inflammation. Cycloplegic eye drops are sometimes prescribed to relax the eye and make the patient more comfortable.

The eye doctor must monitor the pressure of the fluid in the eye because steroid eye drops tend to raise the fluid pressure in the eye (the intraocular pressure) and this can lead to glaucoma and other problems in the eye. Steroid eye drops should be tapered slowly, because a sudden decrease in the dosage can lead to rebound inflammation. Flares of inflammation can happen up to nine months after the steroid drops are stopped, but a repeat of the treatment sequence usually cures the inflammation again. There is usually no long term damage done to the eye or to vision if the uveitis is treated early, and therefore anyone who experiences any of the symptoms listed above (red eyes, pain and sensitivity to light, etc.) should visit the eye doctor for testing and for early treatment.

VON RECKLINGHAUSEN'S DISEASE - see NEUROFIBROMATOSIS

WYBURN-MASON SYNDROME (RACEMOSE HEMANGIOMATOSIS)

Wyburn-Mason syndrome is a congenital condition; a person is born with it and cannot get the syndrome in any other way. Individuals with the condition are born with large winding blood vessels in the retina (the nerve tissue which collects light to allow us to see) and the arteries and veins of these vessels are linked to each other. This does not get worse over time and stays unchanged from birth. It is not certain yet how Wyburn-Mason syndrome is passed on and therefore it is hard to predict who will have the condition. Persons with the syndrome are at risk for having a massive hemorrhage in the eye but until that happens no treatment is necessary. The hemorrhage happens unexpectedly so one cannot tell when it is going to happen or if it is going to happen, but it cannot be prevented. Persons with Wyburn-Mason syndrome need to see their eye doctor at least once per year.

APPENDIX C:

Eye Care Resources for Migrant Health Clinicians

Listed below are some resources for starting or maintaining an eye care program at your site. Listing of a resource does not imply an endorsement from the Migrant Clinicians Network; not all of the organizations or materials listed have been reviewed by MCN, and there are many more resources available than those listed here. (Other places to look for eye care resources include agencies that work with issues surrounding literacy, HIV/AIDS, and diabetes.) This directory is meant as a starting point for gathering information, resources, and useful referral sites for clinicians promoting eye care services and preventive practices among migrant farmworkers.

Education Materials

American Academy of Ophthalmology

PO Box 7424
San Francisco CA 94120-7424
415-561-8500
FAX 415-561-8575
email: public_services@aaopt.org
website: <http://www.eyenet.org>

Call for catalog of publications. Clinical education and ophthalmic practice materials for clinicians including monographs and self-assessments. Patient informational brochures, posters, videos, including some Spanish-language products and a few in other languages.

First Aid for Eye Injuries Poster

Available in English and Spanish, large-print instructions and graphics for foreign bodies, cuts, blows, and chemical burns. \$10 non-member.

National Children's Eye Care Program

This program gives parents tools to recognize the signs of disease and disorders in their young children age zero to four. Graphics showing warning signs can be viewed in a printable format and copied from the website.

National Eye Care Project

Call 1-800-222-EYES(3937) for written materials on conditions affecting the eye.

The Physician's Guide to Eye Care

By Jonathan D. Tobe, MD, ©1993. A good basic clinical reference for eye care. Available from AAO. \$55.

Vision for Your Future: An Eye Safety Curriculum for Middle and Junior High Schools

Two units “Anatomy of the Eye” and “Injury of the Eye” have website materials that can be downloaded and used in educational settings

American Optometric Association

243 North Lindbergh Blvd.
St. Louis MO 63141
314-991-4100 or 800-365-2219 (order department)
FAX 314-991-4101
website: <http://www.aoanet.org>

Call for publications catalog, Spanish materials available. Free guide “Communicating With Your Spanish Speaking Patients” with the order of any three Spanish language publications. Non member prices available on request.

AOA Fact Sheets

One-page tear-off fact sheets on a variety of eye care issues and conditions. Good illustrations. Text-heavy, but could be used in one-on-one patient education. Sheets on cataracts, family eye health, children’s vision, wearing contact lenses, glaucoma and health conditions affecting the eyes are available in Spanish. Other titles of use in migrant health include: “Protecting Your Eyes from UV Radiation,” and “What Black Americans Should Know About Eye Health.”

Diagram of the Human Eye

Spanish-language version, including a description of the mechanism of sight.

Save Your Sight/¡Cuide su Vista! Poster

11"x17" poster encouraging yearly eye exams as well as seeing a health care professional with any eye concern. Black and blue print on white

Ojos por el Mundo (Librito)

16-pages, full color comic-book format in Spanish, highlights the eye care needs of the members of two Hispanic families

Centers for Disease Control and Prevention

National Center for Chronic Disease Prevention and Health Promotion
1600 Clifton Road NE
Atlanta GA 30333
404-639-3311
e-mail: netin6@cdc.gov
website: <http://www.cdc.gov/nccdphp/ddt/pubs/pub.htm>

Taking Charge of Your Diabetes (2nd ed, 1997) and Controle Su Diabetes (1997)

The CDC has available a variety of publications containing a great deal of information about many public health issues. Through their Chronic Disease Prevention and Health Promotion Center, they have several diabetes publications: "Taking Charge of Your Diabetes" in both English and Spanish is available in printable versions from their website and includes a chapter specifically on "Eye Problems." Though the chapter contains a lot of text for a patient handout, it has pictures and information that could be used in developing materials or educational programs.

Helen Keller International

90 Washington Street, 15th Floor
New York NY 10006
212-766-5266
FAX 212-943-1220
website: <http://www.hki.org>

Helen Keller International has educational materials directed at both patients and providers. Below are some that might be useful in work with migrant farmworkers. Also available are publications on onchocerciasis, trachoma, and rehabilitation for the rural blind. The website has an order form.

Basic Eye Care: Training Activities for Community Health Workers

Covers most common eye problems a health worker will see: signs, symptoms, and appropriate actions or treatment. \$22.

Simple Eye Care for Health Workers

Easy-to-use reference for health workers who have received minimal formal training in eye care. Color photographs, 24pp. \$5.

Providing Low-Cost Spectacles: A Practical Guide

Project ideas and management strategies for providing glasses \$8.

Vitamin A Training Activities for Community Health And Development

18 activities with handouts ready for photocopying. \$10.

El Diseño de Actividades Contra la Deficiencia de la Vitamina A en Guatemala

Appropriate materials for Spanish-speaking populations vulnerable to vitamin A deficiency and resulting eye problems. Spanish. \$10.

The Hesperian Foundation

1919 Addison Street, suite 304
Berkeley CA 94704
510-845-1447

FAX 510-845-0539
email: hesperian@igcapc.org
www.hesperian.org

Where There is No Doctor and Donde No Hay Doctor

Chapter 15 of this book, "The Eye" has good basic descriptions of the signs and symptoms of eye disease, injuries and vision problems as well as basic eye first aid. Good reproducible black and white pictures of eye conditions and eye anatomy. Spanish version is valuable for labeling parts and conditions \$17.

Helping Health Workers Learn and Aprendido a Promoter la Salud

A good resource available in both English and Spanish for techniques of field-based health education and promotion. Chapter 2, "Practice in Using Guides, Charts, and Record Sheets" includes an example of a learning activity on eye conditions described in *Where There is No Doctor*. \$22.

Interprofessional Fostering of Ophthalmic Care for Underserved Sectors (InFOCUS)

327 Tealwood Drive
Houston TX 77024
713-468-3040
Contact Person: Barbara Kazdan

A non-profit agency promoting eye care for underserved communities. Provides trainings on primary eye care and use of the biomicroscope.

I Can See – A Children's Book About Eye Care

Twenty-two page book which explains to children how the eye works, preventive eye care, and what to expect at an eye examination.

Lighthouse International

Lighthouse Center for Education
111 East 59th Street
New York NY 10022-1202
212-821-9200 or 800-829-0500
TTY 212-821-9713
website: <http://www.lighthouse.org>

The Lighthouse Center for Education offers a variety of newsletters for professionals, parents, and the visually impaired, as well as continuing education opportunities and a publications catalog. They have specific resources for parents of children with vision impairments. Several of their publications are in large print formats and many are available in Spanish. They also sell cardboard glasses that simulate functional vision loss for educational programs. Some of their publications which may be helpful for migrant healthcare settings are listed below.

The Functional Vision Screening Questionnaire

A screening tool that identifies older people who may be experiencing a vision problem and may need a referral to an eye care professional. 15-item questionnaire available in several languages including Spanish and French. Single pad (25 questionnaires) \$9.95.

Diabetes, Vision Loss, and Aging

Booklet with information about diabetes ocular complications of the disease and management of medication with impaired vision. In English and Spanish. Single copy for \$0.50 to \$0.75 each depending on order quantity.

Low Vision Information

Brochure which includes "A Photographic Essay on Partial Sight," a simulation of outdoor scenes and text as viewed by persons with various diseases of the eye. Also depicts an array of low vision devices (A poster version of the photo essay is also available). In English and Spanish. Single copy for multiple copies \$1 each.

Migrant Clinicians Network (MCN)

PO Box 164285
Austin TX 78716
512-327-2017
FAX 512-327-0719
email: mcn@mcn.com
website: <http://www.migrantclinician.org>
Eye Care Contact Person: Jan Rieb

MCN provides technical support of outreach workers and clinicians who serve migrant farmworkers through trainings, educational materials and screening tools for primary eye care.

Streamline

MCN's newsletter on migrant health issues Oct/Nov 1998 issue featured "Vitamin A Needs of Children of Farm Worker Families" Other issues have also included eye care topics and monographs of eye care articles are available.

Primary Eye Care Manual for Migrant Farmworkers and Their Families

Information on how to set up and maintain a primary eye care program in a migrant health care setting. Includes education materials on eye anatomy, common eye problems and primary and preventive eye care, as well as a glossary and resource guide.

Eye Care Training Guide

A companion to the Primary Eye Care Manual, describes how to conduct a training at your site when implementing a primary eye care program.

Rural Women's Health Project

Box 12016
Gainesville FL 32604
352-336-1816 or 352-372-1095
rwhp@cafl.com
Contact Persons: Robin Lewy and Fan Ricardo

A series of four short photonovels addressing: eye washes and basic first aid, the prevention of eye injuries in the field, accessing medical services and Workers Compensation, and preventing and managing UV Damage/Pterygium. These materials were developed for Spanish-speaking citrus workers, but address eye injury prevention topics appropriate for all farmworkers. The photonovels are accompanied by a 25 page black and white photo Flip Chart and a Users Guide. Photonovels available in Spanish.

Eye Care Services

Eye Deal Eyewear

4551 Northgate Ct.
Sarasota, FL 34234
(941) 358-7450
Contact: Mike Trombley

Eye Deal Eyewear's Instant Eyeglasses are a unique design that combines frames and lenses so that an individual's prescription can be dispensed in only a few minutes following an exam. Combining quick delivery with low cost enables Instant Eyeglasses to be utilized in new innovative applications.

Glaucoma 2000 Referral Program

American Academy of Ophthalmology
655 Beach Street
San Francisco CA 94109
P.O. Box 7424
San Francisco CA 94120-7424
415-561-8500
FAX 415-561-8575 or 415-561-8520
email: public_services@aaopt.org
website: <http://www.eyenet.org>
Glaucoma 2000 Referral Line, 1-800-391-EYES(3937)

This public service project of the AAO and partners provides eye care for uninsured or underinsured persons at risk for glaucoma. Individuals can call the Glaucoma 2000 Referral Line, 1-800-391-EYES(3937) for a referral to a local participating ophthalmologist. Callers are screened for risk factors and eligibility. To be eligible the caller must be at risk of glaucoma, a US citizen or legal resident, and without current medical eye care. Eligible individuals receive a medical eye examination for glaucoma at no charge and medical care at no charge if they are diagnosed with glaucoma through the program. At the time of the printing of this guide Spanish speakers were not available at the 1-800 number.

Lions Clubs International

300 22nd Street
Oak Brook IL 60523-8842
630-571-5466
email: lionpr@worldnet.att.net
website: <http://www0.lionsclubs.org/Lion>

Lions clubs provide a broad range vision and eye care services through local efforts. They support many of the world's eye banks as well as clinics hospitals and eye research centers. They provide eye glasses Braille-writers, large print texts, white canes and guide dogs. Some Lions Programs are listed here, but check with your local or state Lions Clubs to find out what is offered in your community, or to inform them about an unmet eye care need. All services can be accessed through a local/regional or state Lions Club.

Alabama Lions Sight Conservation Association, Inc.

700 South 18th Street, Suite 03, Birmingham AL 35233. 1-800-96-SIGHT Provides free eye care to the medically indigent of Alabama, including eye examinations eye glasses eye medication, prostheses surgery/hospitalization and contact lenses Free vision and glaucoma screenings in schools and communities throughout the state.

Georgia Lions Lighthouse Foundation

1775 Clairmont Road, Decatur GA 30033. 404-325-3630, 1-800-78-SITE. Serves all residents of Georgia with vision services including treatments and surgeries Mobil Eye Clinic provides free refractive eye exams, glaucoma screenings and eye glasses to those in financial need throughout the state. Operation I Care provides free recycled glasses Applications available at all county health and welfare departments or by calling the Foundation.

Lions Eye Foundation of Southern California, Lions Sight and Hearing Eyemobile

In addition to an eye bank, the Foundation has an Eyemobile which travels into the various communities of Los Angeles County and San Gabriel Valley at the request of Lions Clubs to perform screening procedures by technicians to detect vision and hearing impairments low or elevated blood pressure and provide diabetes education. (District 4L4, the Orange County Communities provides similar services)

Mid South Lions Sight and Hearing Service, Inc.

188 S. Bellvue Suite 421, Memphis TN 3804. 901-726-1771 or 1-800-642-3443. Supported by Lions Clubs in the Missouri-Arkansas-Tennessee-Mississippi four-state area. Patients who meet income guidelines are eligible to receive sight-related services (examinations therapies and surgeries) at Mid-South's Sight Clinic At the Clinic Mid-South organization provides room and board and all medical costs associated with the required care.

Missouri Eye Research Foundation

Provides Glaucoma screening: any Missouri Lions Club can schedule the use of the equipment and its operator. Amblyopia screening using Blaroid phot equipment for pre-school children through-

out Missouri. Indigent Patient Eye Care: individual is screened for eligibility for various government programs. If found indigent but not qualified for government aid, the Foundation will pay reduced fees at UMC for evaluations and minor treatment. For major treatment or surgery, UMC will provide the service and seek alternate sources for recoupment of expenses

Oregon Lions Sight and Hearing Foundation

Oregon Lions Mobile Screening Unit provides visual acuity, hearing, diabetes blood pressure and glaucoma screenings Any Oregon (Multiple District 36) Lions-affiliated club can host the tractor-trailer mobile unit. Another service affiliated with the foundation is the Bob Miller Deaf Kids Fund, a nonprofit organization providing needy school children with basic vision and hearing care School officials access the fund on behalf of a school-age child in Oregon counties: Benton, Clackamas, Columbia, Hood River, Linn, Marion, Multnomah, Polk, Washington, Tillamook and Yamhill. Also Washington state counties: Clark, Cowlitz and Skamania.

Sight and Hearing Mobile Screening Unit, Lions of Virginia, District 24-A, Inc.

To reserve: 703-916-0973. Two mobile sight and hearing vans containing the necessary equipment for sight and hearing screening tests Any club in the district may reserve the van. Contact the Lions Club in your area to reserve the van (in Virginia). No charge to club or community for use of the van, local club also staffs van.

Southern California Lions Eye Institute

Located at the Sinskey Eye Institute in Santa Monica, with eye clinics in a variety of specialties Referrals are made by a member of a Lions Club in Southern California, and all services are provided on a sliding fee scale and are provided regardless of ability to pay.

Tennessee Lions Eye Center at Vanderbilt Children's Hospital

Special outreach initiative to screen pre-verbal children across Tennessee using photoscreener operated by Lions Clubs volunteers throughout the state.

Virginia Lions Eye Care Clinic at Fairfax Hospital

Provides eye care services for indigent individuals as determined by the Fairfax County Health Department family assistance workers. Referrals from area county health departments and doctors. Any Lions Club in District 24-A can refer individuals to the Lions Eye Clinic for treatment or surgery. Local Lions Clubs can provide financial assistance for eye glasses surgeries and treatments needed.

National Eye Care Project

American Academy of Ophthalmology
655 Beach Street
San Francisco CA 94109
PO Box 7424
San Francisco CA 94120-7424
415-561-8500

FAX 415-561-8575

email: public_services@aao.org

website: <http://www.eyenet.org>

Helpline 1-800-222-EYES(3937)

A nationwide outreach program to provide medical eye care to disadvantaged senior citizens. Referrals are available for those who are 65 or older, US citizens or legal residents, and not currently under the care of an ophthalmologist. Within one week of contacting the Helpline, eligible callers will be mailed the name of a volunteer doctor in their area with instructions for making an appointment. Doctors provide a comprehensive examination and treatment for an condition diagnosed at the time of the visit.

VisionUSA Program

American Optometric Association

243 North Lindbergh Blvd.

St. Louis MO 63141

314-991-4100, ext. 261

800-365-2219

FAX 314-991-4101

website <http://www.aaoanet.org>

e-mail: AmOptVUSA@aol.com

contact person: Mrs. Carol Glick, VISION USA National Coordinator

Volunteers in Service to our Nation (VISION) USA provides basic eye health and vision care services without charge to working people and their families in the US who have low incomes and no vision insurance. Over 7,500 optometrists volunteer time through this program. To be eligible, the person seeking care must have a job or live in a household where there is one working member, have no vision insurance, have an income below an established level based on household size, and not have had an eye exam within two years. Services provided include a comprehensive eye examination; diagnosis of eye health and/or vision problems; provision of a prescription for eyeglasses when needed; and referral to other health care professionals when appropriate. Provision of eyewear varies from state to state. Exams are limited in some areas and provided on a first-come first-served basis. Some states have additional eligibility criteria (Wisconsin and Colorado provide services to children only). Call to find out the application process in your state; some states receive applications through Salvation Army's Lions programs, or other agencies other than AOA directly. Written applications can be obtained from the address and/or fax number above, and an application is available online at the AOA website. Call or visit the AOA website for a list of state coordinators.

Optometric Supplies

The following companies are suppliers of clinical eye care supplies. Call for catalogs. Other companies also sell eye care supplies: no endorsement from MCN is implied.

Bernell

A Division of Vision Training Products Inc.

1-800-348-2225

FAX 219-259-2102

www.bernell.com

Wilson Ophthalmic Corp.

1-800-222-2020
FAX 1-800-329-9133
P.O. Box 496
Mustang, OK 73064

Websites

American Academy of Ophthalmology

<http://www.eyenet.org>

This site has a very comprehensive Eye Care Links component that is invaluable in finding eye care information. A good starting place You can find hundreds of links for Government, National Organizations and Societies Patient Information, Physician Resources, State Ophthalmic Societies and Universities and Hospitals. This site also provides good graphics showing urgent warning signs for children's eye problems as well as information on AAO's service and education programs (see listings above). A search engine lets you search the site for articles and information on specific eye-related concerns

American Association for Pediatric Ophthalmology and Strabismus

http://med_aapos.bu.edu/

Includes links to professional journals abstracts, citations and descriptions of ongoing research; audio and video archives and a pupil reflex photo collection; a public forum for questions relating to pediatric ophthalmology and strabismus, and support groups for parents A link to "Lea Hyvärinen's Homepage" shares teaching materials in low vision, vision screening, and occupational health.

American Optometric Association

<http://www.aonnet.org>

AOA information and services are outlined here. Educational information on eyes and eye care including a "just for kids" page with optical illusions and eye carquiz. A Teachers Center with reproducible activity sheets Information on AOA's Vision USA Program can be found under "Meet the OA."

Canadian Ophthalmological Society

<http://www.eyesite.com>

The public information pages of this site include lots of good basic information: who the different members of an eye care team are and what they do; eye conditions disorders and treatments; eye safety and eye facts; and links to other related sites

Dr. Koop's Community Resource Center

<http://www.drkoop.com/>

Former Surgeon General's site provides information on various health issues including eye care diabetes, current health news, and health website reviews.

healthfinder

<http://www.healthfinder.org> or <http://www.healthfinder.gov>

A gateway consumer health and human services information website from the United States government. Can help lead you to selected online publications clearing houses databases, websites agencies and not-for-profit organizations, and support and self-help groups A place to look for information on health topics including eye care.

Lions Clubs International

<http://www10.lionsclubs.org/Lion>

Information on Lions Clubs and their "Focus On Sight" activities all over the world. Text of Helen Keller's 1925 speech challenging Lions' service for the blind and visually impaired. Includes link to "The Virtual Reader," which allows the visually impaired to access audio versions of newspapers, magazines and other literary resources.

Migrant Clinicians Network (MCN)

<http://www.migrantclinician.org>

Information about MCN, including more information on eye care initiatives and services available.

National Institutes of Health (NIH)

<http://www.nih.gov/health>

Overview of NIH health information resources.

Strabismus Web Book

<http://www.smbs.buffalo.edu/oph/webbook.htm>

An online textbook. Not illustrated: a reference for practitioners.

World Health Organization (WHO)

<http://www.who.org/>

Descriptions of WHO's programs and policy initiatives around the world, including many related to eye care. The WHO Programme for the Prevention of Blindness develops technical guidelines of specific disease control and/or for management and standards of eye care. This site includes descriptions of common eye-related public health problems and potential solutions. Contacts are available for programs in Spanish-speaking and Caribbean countries that may be resources to migrant health professionals. Printable fact sheets on a variety of health subjects including "Blindness and Visual Disability."

YourHealth.com

<http://www.yourhealth.com>

A web newsletter on health, the search engine can be queried on any health topic. A search on eye care gives about 100 fact pages/articles that can be accessed on all sorts of eye care issues including diseases, safety, etc. Some have audio components.



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