International Core Curriculum for **Refractive Error**

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Presented by:

The Uncorrected Refractive Errors Task Force

of

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and

IJCAHPO

INTERNATIONAL JOINT COMMISSION ON ALLIED HEALTH PERSONNEL IN OPHTHALMOLOGY

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INTERNATIONAL CORE CURRICULUM FOR REFRACTIVE ERRORS

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Introduction

Uncorrected refractive error is the single most critical eye care issue around the world and the most easily addressed cause of vision loss. One effective way to eliminate this leading cause of vision loss is to improve the delivery of refractive eye care and provide spectacles to those in significant need. To achieve the goal of eliminating or reducing uncorrected refractive error, we must be able to mobilize resources and provide the appropriate training of eye care professionals. Mohammed Babar Qureshi, BMBCh, DOMS, MSc, Comprehensive Health and Education Forum (CHEF) International, outlines a 4-step plan for implementation to support the human resource needs of a refractive error training program:

1. Estimate the need for services
2. Analyze existing resources and services
3. Determine the tasks, skills, and human resources needed for refractive error services
4. Devise a training plan[1]

The International Council of Ophthalmology (ICO) recognized the essential need for training to eliminate unrefractive error worldwide and established a Task Force on Uncorrected Refractive Errors. One goal of this Task Force was to develop and implement a refractive error core curriculum that can be used worldwide in establishing training programs for eye care professionals. Concurrently, the strategic initiatives for curriculum development of the International Joint Commission on Allied Health Personnel in Ophthalmology, Inc. (IJCAHPO®) included the development of a basic curriculum guide on refractive error. ICO and IJCAHPO collaborated on this project, both in content and in worldwide input, to create a comprehensive refractive error curriculum.

The target audience for training using this curriculum is refractionists, ophthalmic medical personnel, or new eye care team members who have little or no eye care training. The curriculum is designed to provide training on the basic knowledge and skills needed to perform the necessary tasks for the correction of refractive error in clinics, practices, or hospital settings. The curriculum is designed for the trainer's easy use in the "customization" of training on the correction of refractive error.

This international curriculum has been designed as part of a continuum of education and training to help ensure that eye care professionals worldwide have qualified staff trained consistently within an appropriate timeframe. We gratefully acknowledge the many individuals and organizations that have given their support to this important project.

Core Curriculum Principles and Guidelines

With the comprehensive analysis and input from content experts and educators from around the world, this core curriculum is well designed, clearly defined, and carefully organized. It employs a system that can be used internationally by educators and eye care professionals in academic institutions or for on-the-job training of staff in practices or clinics. The core curriculum is designed to be compatible with local practice and regulations, and to be consistent with "best practices" in eye care and patient care across the globe. The curriculum is designed to provide learners with content domains or categories and the appropriate performance objectives to perform their eye care job tasks.

The knowledge, skills, and interpersonal behaviors required are focused on the following three core competencies:

- **Patient care**
- **Community and health services**
- **Medical and refractive knowledge**

These competencies are organized into the following five sections with corresponding performance objectives:

- **Optics**
- **Vision Assessment**
- **Refraction and Instrumentation**
- **Optical Dispensing and Contact Lenses**
- **Patient Education**

The recommended implementation of the curriculum design by educators, trainers, and learners is to cover all curriculum content by starting with the Optics section and progressing through Visual Assessment, Refraction and Instrumentation, Optical Dispensing and Contact Lenses to the Patient Education section. Each section contains domains with detailed learning content that can be used as training modules (or topics). The recommended sequence for teaching the topics is shown by the order listed in the core curriculum; however, the curriculum is designed in modular format for maximum customization. The teaching sequence of the modules can be changed or additional categories added. It was the intent that all sections be addressed at some level to ensure that the learner has a comprehensive understanding of Uncorrected Refractive Error. No section or content should be deleted from the training, only the focus or time spent on a topic may be reduced.

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History of Uncorrected Refractive Error Task Force and Curriculum

The ICO Uncorrected Refractive Error Task Force was established under the leadership of Mohammed Babar Qureshi, BMBCh, DOMS, MSc (Pakistan) in 2007. One goal of the Task Force was to develop a harmonized core curriculum in refractive error that could be used to train eye care professionals worldwide. Simultaneously, the ICO Allied Health Task Force chaired by William F. Astle, MD, FRCS(C), Dipl. ABO (Canada) was working on a core curriculum for ophthalmic assistants which included overlapping content domains with the refractive error curriculum. In addition, IJCAHPO was developing standardized curricula for eye care professionals.

IJCAHPO and ICO joined in collaborative efforts to research and develop a comprehensive curriculum to address uncorrected refractive error. The result of this collaborative process was the creation of the International Core Curriculum on Refractive Error, a curriculum that will meet the needs of eye care professions and professionals worldwide.

Curriculum Development Process

Under Drs. Qureshi's and Astle's leadership, IJCAHPO and the ICO Task Force began an 18-month process of research, drafting, and publication of a core curriculum designed specifically for the correction of refractive error. An IJCAHPO Curriculum Task Force conducted an extensive review and analysis of the previously published curricula and other resources to identify content gaps, augment the curricula framework, and assemble one core curriculum for training. These resources included an international job task analysis by IJCAHPO; refractive error curricula and competencies published by the International Centre for Eyecare Education (ICEE) and key textbooks on refractive error.[2,3]

In August 2010, Drs. Qureshi and Ehlers met with "thought leaders" during the World Congress on Uncorrected Refractive Error in Durban, South Africa. An in-depth, half-day session was held to discuss the need for a harmonized curriculum on uncorrected refractive error and review a working draft of the harmonized curriculum. Based on this meeting's input, the International Refractive Error Core Curriculum was revised and additional input and reviews were gathered through an electronic review process.

Closing

It is well recognized that there is a global need for eye care professionals to provide refractive services. All countries and regions, regardless of their economic situations, have a need for well-trained eye care professionals who can detect, measure, and provide vision correction to people of all ages and socio-economic status. It is the goal of the ICO and IJCAHPO to harmonize the curriculum so that trained eye care professionals can provide consistent, sustainable refractive services efficiently. Harmonized training of eye care professionals has a leading role in helping to achieve the goal of the elimination of blindness on a global level.

Acknowledgements

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1. Qureshi MB. Training to meet the need for refractive error services. International Centre for Eye Health Community Eye Health Journal. 20(63); September 2007.
2. Kierath J, de Souza N, Jackofsky S, Cronjé S, Wilson D. International centre for eyecare education (ICEE) refractive error training package student manual. 2009; 1.
3. Joint Commission on Allied Health Personnel in Ophthalmology (JCAHPO). Job task analysis report: a study on the tasks performed by ophthalmic allied health personnel. 2004.

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CURRICULUM

Purpose:
To provide an on-the-job tool for training eye care professionals who perform refractive error procedures.

Core Curriculum Instruction:
Instruction is based on the defined core content. Teaching revolves around imparting the predetermined body of knowledge.

Variables:
Timing, teaching sequence, and topics may vary dependent upon practice needs, resources, and trainee knowledge and skills acquisition.

Three Core Competencies:
The foundation of the knowledge, skills, and interpersonal behaviors required of refractive error correction are the following three core competencies:

- Patient care
- Community and health services
- Medical and refractive knowledge

These competencies are supported in the core curriculum and are organized into the following five sections with corresponding performance objectives:

- Optics
- Vision Assessment
- Refraction and Instrumentation
- Optical Dispensing and Contact Lenses
- Patient Education

Refractive Error Curriculum and Learning Objectives

Domain	Content	Performance Objective
Basic Optics	Properties of Light	• Define light • Understand the electromagnetic spectrum and the visible portion of the spectrum • Describe the properties of light • Understand how light travels and can be reflected, refracted, and absorbed • Explain wave and particle theories of light
	Vergence of Light	• Describe the concept of the vergence of light • Understand how the vergence of light can be changed • Discuss the change in vergence that occurs within optical systems including the eye
	Lenses and Prisms	• Describe how light behaves at optical interfaces • Understand the properties of a prism and its effects on light rays • Describe image displacement due to prisms and the prismatic effect of lenses • Understand the properties of a lens and the factors that determine its effect on the vergence of light rays • Define plano, concave, convex, and spherocylindrical lenses • Understand Snell's law and discuss parameters that effect the power of a lens • Describe various optical media and how index of refraction effects their properties • Define "diopter" • Calculate the focal length of a lens, understand the relationship of lens power and focal length • Perform ray tracing diagrams with single and multiple rays of light • Describe the uses of lenses to correct refractive errors • Perform transposition of spectacle prescriptions • Understand the use of lenses in optical instruments

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Physiologic Optics	The Eye as an Optical System	• Identify ocular structures • Understand optical components of the human eye • Describe the requirements for clear vision
	Cornea	• Understand corneal curvature and its effect on the refractive state of the eye • Identify corneal parameters associated with various refractive errors • Discuss corneal contributions to regular and irregular astigmatism
	Lens	• Describe the contribution of the lens to the optical system of the eye • Discuss the mechanism of accommodation • Understand the relationship of accommodation and age • Understand cataract formation and its effect on vision
Refractive States of the Eye	General Principles	• Define Emmetropia, myopia, and hyperopia • Understand “near point” and “far point” • Understand astigmatism including regular and irregular astigmatism • Understand presbyopia and the ocular changes associated with it • Understand anisometropia and its impact on visual function • Understand amblyopia and its causes • Be familiar with common causes of decreased vision at various ages including refractive errors, cataracts, and macular degeneration • Understand the importance of referral for patients who have ocular pathology or an unexplained decrease in vision
	Emmetropia	• Define emmetropia • Describe the visual characteristics of emmetropia • Identify patients with emmetropia
	Myopia	• Define myopia • Understand the characteristics of the myopic eye • Understand the visual characteristics of myopia • Identify patients with myopia • Discuss options for the corrections of myopia
	Hyperopia	• Define hyperopia • Understand the characteristics of the hyperopic eye • Understand characteristics of hyperopia • Identify patients with hyperopia • Discuss options for the correction of hyperopia
	Astigmatism	• Define astigmatism • Understand the causes of astigmatism and characteristics of the astigmatic eye • Identify patients with astigmatism • Differentiate between simple and compound astigmatism • Understand the Conoid of Sturm and the circle of least confusion • Understand the difference between regular and irregular astigmatism • Discuss options for the correction of astigmatism • Calculate spherical equivalence of a spherocylindrical lens
	Presbyopia	• Define presbyopia • Understand the relation of presbyopia to accommodation and age • Identify patients with presbyopia • Discuss options for the correction of presbyopia

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Assessing Visual Function	Visual Acuity	• Define visual acuity and the importance of proper measurement • Select appropriate chart(s) for testing (Snellen, Allen Figures, Tumbling E, Lanholt C) • Test and record visual acuity: - Monocularly, without correction (distance and near) - Monocularly, with best correction (distance and near) • Test and record visual acuity on preliterate, illiterate, nonverbal, or foreign language patients • Understand variations in acuity measurement on various patient populations and strategies for correction • Test and record visual acuity for low vision patients • Convert recorded visual acuity from Snellen notation to metric or decimal system notation, and vice versa • Understand the concept of “far point” and how various refractive errors affect the patient’s far point • Understand the concept of “near point” and how various refractive errors affect the patient’s near point • Understand how the near point changes with age
	Vision Screening	• Describe various techniques for vision screening • Understand goals of vision screening • Identify screening results that require referral for definitive care
	Pinhole Acuity	• Test and record visual acuity using the pinhole occluder • Understand the mechanism by which a pinhole improves visual acuity and its limitations
	Binocular Vision Testing	• Measure and record visual acuity binocularly with appropriate chart(s), with and without correction (distance and near)
	Accommodation	• Describe the process of accommodation • Understand the near response (convergence, constriction of pupils, and focusing of the lens) • Measure and record the near point for both eyes with distance correction in place • Calculate the range of accommodation • Measure and understand the difference between “near point of accommodation” and “near point of convergence”
	Pupillary Distance	• Measure and record the pupillary distance with a millimeter ruler and a pupillary distance gauge
	Color Vision	• Measure and record color vision with appropriate tests (Ishihara plates, Hardy-Rand-Rittler, Farnsworth D-15 and D-100)
	Stereopsis	• Measure and record stereoacuity with the Titmus test
	Contrast Sensitivity Testing	• Measure and record contrast sensitivity of each eye with contrast sensitivity chart(s)
	Glare Testing	• Measure and record visual acuity with appropriate chart(s), with best correction under glare conditions (Brightness Acuity Testing)
	Visual Fields	• Measure and record visual fields • Confrontation • Tangent Screen • Goldmann Perimeter • Automated Perimeters

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Instrumentation	Lensmeter (Focimeter)	• Understand the use of the lensmeter and its controls • Measure spectacle lenses for sphere, cylinder, axis, bifocal add, and the presence of prism • Know how to mark the optical center of a lens and the relationship of optical center and pupillary distance
	Keratometer	• Be familiar with the keratometer and its importance in identifying regular and irregular astigmatism • Measure corneal curvature with a keratometer • Understand the importance of kerotometric readings for contact lens fitting
	Transposition	• Transpose spectacle prescriptions from plus to minus cylinder format, and vice versa
	Geneva Clock	• Use the Geneva lens clock to measure the power of a lens
	Trial Frame and Lenses	• Understand the use of the trial lens set and appropriate patients who require trial lens refinement
	Phoropter (Plus and Minus Cylinder)	• Identify controls and adjustments on the phoropter • Use the phoropter to perform subjective refinement • Understand and use both plus and minus cylinder phoropters
	Autorefractors	• Measure refractive error with an automated refractor
	Retinoscope (Plus and Minus Cylinder)	• Identify controls and adjustments on a retinoscope • Perform retinoscopy in both plus and minus cylinder formats • Understand the significance of working distance and working lens • Describe techniques to control accommodation during retinoscopy • Understand enhancement techniques
Refractometry		
Retinoscopy	Sphere	• Demonstrate proper use of a retinoscope including adjustments and controls • Describe “with” and “against” motion and the significance of each • Describe the neutral point • Understand the use of a “working lens” and “working distance” • Perform and record static and dynamic retinoscopy • Neutralize spherical refractive error
	Cylinder (Power and Axis)	• Neutralize cylinder axis and power by retinoscopy with plus or minus cylinder technique • Discuss streak enhancement techniques • Record results for cylinder • Calculate net refractive error
Refinement	General Principles	• Explain the difference between subjective and objective refractometry • Determine starting settings for refinement (retinoscopy, autorefractor results, current spectacle correction) • Perform and record transposition • Calculate and record spherical equivalence • Measure vertex distance
	Sphere	• Determine spherical refractive error • Select appropriate technique for patients with special needs • Understand techniques for controlling accommodation

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Refinement (Continued)	Cylinder (Power and Axis)	• Determine cylinder power and axis • Understand the use of the Jackson cross cylinder in phoropter and trial lens refractions • Understand plus and minus cylinder techniques
	Reading Add	• Estimate near add based on age • Describe the measurement of reading add for presbyopic patients • Determine near add (bifocal, trifocals, progressive)
	Balance	• Understand the process of balancing a spectacle correction under binocular conditions
	Cycloplegic Refraction	• Describe the difference between cycloplegic and manifest refraction • Identify patients who require cycloplegic refraction • Select the appropriate cycloplegic agent
Special Problems	Anisometropia	• Define anisometropia (myopic, hyperopic, astigmatic, mixed) • Discuss strategies for visual correction for patients with anisometropia • Neutralize spherical refractive error
	Amblyopia	• Define aphakia • Understand vision correction options for aphakic patients • Understand limitations of aphakic correction
	Aphakia	• Explain the difference between subjective and objective refractometry • Determine starting settings for refinement (retinoscopy, autorefractor results, current spectacle correction) • Perform and record transposition • Calculate and record spherical equivalence • Measure vertex distance
	Pseudophakia	• Define pseudophakia • Understand the role of monofocal and specialty intraocular lenses (IOLs) in routine cataract surgery and special refractive problems • Discuss strategies for correcting patients with monocular or binocular pseudophakia
	Low Vision	• Define low vision, including the World Health Organization's standards for orientation and mobility needs • Discuss strategies for testing and optimizing vision for patients with low vision • Understand use of magnifying lenses for near • Understand use of telescopic lenses for distance • Understand use of other devices for low vision (closed circuit readers, etc.) • Understand the role of home modifications for low vision patients
	High Myopia	• Define high myopia • Understand the optical needs of patients with high myopia • Discuss vision correction options for patients with high myopia
	Latent Hyperopia	• Define latent hyperopia • Determine when latent hyperopia requires correction • Discuss strategies for correcting patients with latent hyperopia
	Intermediate Vision Needs	• Define intermediate vision needs • Identify patients with strong intermediate needs • Discuss options for intermediate vision correction

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Special Problems (Continued)	Strabismus	• Define strabismus • Understand the relationship of refractive error, accommodation, and strabismus • Discuss strategies for spectacle correction of patients with strabismus
	Irregular Astigmatism	• Define irregular astigmatism • Understand vision correction options for patients with irregular astigmatism • Discuss strategies for correcting patients with irregular astigmatism
Special Techniques	Patient Needs	• Identify patients who require special techniques for optimal vision correction • Understand the role of refractive surgery for cosmetic and functional refractive disorders
	Prisms	• Understand image displacement due to the prismatic effect of lenses • Understand the use of prisms in patients with strabismus and diplopia • Understand the use of prisms in balancing the binocular corrections
	Fogging	• Describe the process of fogging to aid in the determination of refractive error • Describe the effect of fogging on a patient's accommodation • Use the fogging technique to confirm a patient's refractive error
	Duochrome Test	• Understand the optical principles of the duochrome test • Identify patients who require relaxation of accommodation • Perform the duochrome test and adjustment refraction based on the results
	Stenopeic Slit	• Understand the optical principles of the Stenopeic slit • Use the Stenopeic slit to identify the major axes of astigmatism
	Astigmatic Clock	• Use the astigmatic clock to determine the major and minor axis of astigmatism • Understand the use of spherical lenses with the astigmatic clock to determine refractive error
	Non-Verbal Patients	• Describe techniques for determining visual acuity in non-verbal patients • Understand the preferred looking test • Discuss the role of retinoscopy in non-verbal patients
	Pediatric Techniques	• Describe the role of cycloplegia in pediatric refraction • Understand special considerations for refraction and pediatric patients with strabismus • Discuss amblyopia and the role of refraction, cycloplegia and patching • Understand predictable changes in refraction as children mature (i.e. myopic shift)
	Vertex Distance	• Identify patient who require vertex distance measurement • Measure vertex distance with calipers • Measure vertex distance at the phoropter • Understand use of conversion wheel or chart • Understand the importance of vertex distance measurement and conversion in contact lens fitting
	Pupillary Distance	• Measure pupillary distance with a millimeter rule • Measure pupillary distance with a pupillary distance gauge • Understand the importance of pupillary distance in assuring proper vision with spectacles

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Optical Dispensing	Lens Materials	• Understand the advantages and disadvantages of various lens materials (glass, plastic, high index plastic) • Counsel patients on appropriate selection of lens materials
	Single Vision Lenses	• Understand the correct fitting of single vision spectacles • Discuss appropriate lenses for individuals with special considerations (ie, high myopia)
	Bifocals and Progressive Add Lenses	• Discuss the advantages and disadvantages of bifocal, trifocal, and progressive add lenses (PALs) • Understand the correct fitting of the various spectacle lenses for the correction of presbyopia
	Photochromic Lenses	• Understand photochromic lenses • Discuss uses and limitations of photochromic lenses
	Safety Lenses	• Understand appropriate uses of safety lenses for patients with special occupational or recreational needs • Discuss applicable laws and regulations regarding requirements for safety lenses
	Lens Coatings	• Discuss lens coatings such as scratch resistant coating, antireflective coating, tints, and polarization
	Frames	• Understand frame fitting • Discuss frames for special uses such as safety glasses or dry eye patients • Counsel patients regarding frame selection • Understand the importance of proper spectacle fitting and adjustments needed to improve fit
Contact Lenses	Contact Lens Basics	• Understand available contact lenses and the advantages and disadvantages of each type • Understand the optical properties of contact lenses • Understand the interaction of contact lenses, the tear film, and the ocular surface • Understand contact lens types and wearing schedules • Understand and explain the difference between wearing schedule and replacement schedule • Understand contraindications to contact lens wear
	Basic Soft Contact Lens Fitting	• Identify patients who are appropriate candidates for soft contact lenses • Understand the steps of lens fitting • Obtain necessary measurements for lens selection • Perform visual assessment and overrefraction to obtain best possible vision for contact lens wearers • Understand the use of the slit lamp biomicroscope to assess lens fit • Understand the adjustment of lens parameters based on lens fit and vision
	RGP (Rigid Gas Permeable) Lens Fitting	• Identify patients who are appropriate candidates for RGP contact lenses • Understand the steps of RGP lens fitting • Obtain necessary measurements for lens selection • Understand the adjustment of lens parameters based on lens fit and vision

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Refractive Error Curriculum and Learning Objectives (Continued)

Domain	Content	Performance Objective
Contact Lenses (Continued)	Toric RGP Lens Fitting	• Identify patients who are appropriate candidates for toric RGP contact lenses • Understand the steps of toric RGP lens fitting • Obtain necessary measurements for lens selection • Understand the role of back and front surface toric RGP lenses, and identify appropriate patients for these lenses • Assess fit and vision and adjust lens parameters to achieve optimal fit and vision
	Soft Toric Contact Lenses	• Identify patients who require toric contact lenses • Obtain necessary measurements for lens selection • Understand the adjustment of lens parameters
	Contact Lenses for Presbyopia	• Identify patients who are appropriate candidates for presbyopic lens fitting • Explain options for presbyopic lens wearers including reading glasses, monovision lenses, and multifocal lenses • Understand the advantages and disadvantages of the various presbyopic choices for lens wearers • Obtain necessary measurements for lens selection • Understand the adjustment of lens parameters based on lens fit, orientation, and vision
	Contact Lenses for Special Needs	• Understand contact lenses for special circumstances • Irregular corneas (posttransplant, keratoconus) • Cosmetic lenses and prosthetics • Bandage lenses • Special tints
	Lens Care	• Instruct the patient on the insertion and removal of lenses • Explain care systems • Explain the need for scheduled follow-up visits
Patient Education	Spectacles	• Counsel patients regarding frame selection and care of glasses
	Contact Lenses	• Discuss the risks and benefits of contact lenses • Counsel patients on risk factors for contact lens-related complications • Instruct the patient on the insertion and removal of lenses • Explain lens care systems • Explain the need for regularly scheduled follow-up visits
	Low Vision	• Discuss available resources for low vision patients • Educate low vision patients on the proper use of optical aids • Discuss nonoptical aids to improve visual function
	Presbyopia	• Understand the relationship of presbyopia and age • Discuss the visual characteristics of various presbyopia correction modalities including single vision glasses, bifocals, trifocals, progressive add lenses, monovision contact lenses, and multifocal contact lenses • Explain the need for periodic changes in presbyopic correction
	Eye Safety	• Understand the importance of patient education on eye safety • Counsel patients regarding protective eye wear for sports, home, and workplace needs

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