



# World Health Organization

## VISION 2020 priority eye diseases

### Overview

The VISION 2020 Global Initiative put on its agenda several priority diseases which are among the leading causes of blindness worldwide and can be either prevented or treated. The five major eye conditions on which the global VISION 2020 agenda focuses are:

- [Cataract](#)
- [Trachoma](#)
- [Onchocerciasis \(river blindness\)](#)
- [Some eye conditions in children](#)
- [Refractive error and low vision](#)

Some of these diseases, such as trachoma and river blindness, are mostly prevalent in the poorest areas of the world.

Additionally, in many middle income and industrialized countries, two other eye conditions have emerged as potential threats to the status of sight of their populations. The increase of diabetes among many population groups has caused [diabetic retinopathy](#) to be added to the priority list, while [glaucoma](#), an eye disease known for centuries, remains on the agenda due to difficulties in its early diagnosis and frequent necessity of life long treatment.

### Cataract

#### Definition

Cataract is clouding of the lens of the eye which obstructs the passage of light. Although most cases of cataract are related to the ageing process, occasionally children can be born with the condition, or a cataract may develop after eye injuries, inflammation, and some other eye diseases.

#### Magnitude

As of 1995 and later assessments, age related cataract is responsible for 50% of world blindness, which represents about 25 million people. Although cataracts can be surgically removed, in many countries surgical services are inadequate, and cataract remains the leading cause of blindness. As people in the world live longer, the number of people with cataract is growing. Cataract is also an important cause of low vision in both developed and developing countries. Even where surgical services are available, low vision associated with cataract may still be prevalent, as a result of the long period spent waiting for operations and barriers to surgical uptake, such as cost, lack of information, and transportation problems.

#### Prevention and treatment

Comprehensive prevention of cataract development is not known yet. Reduction of cigarette smoking, ultraviolet light exposure, and alcohol consumption may prevent or rather delay the development of cataract. Diabetes mellitus, hypertension and high body mass index are identified as additional risk factors, however, they are potentially remediable. The treatment of cataract is an operation, which is very successful in restoring sight. The opaque lens is removed and replaced by an artificial intraocular lens. In many remote parts of the developing world, people remain blind from cataract, due to a lack of access to quality eye care at an affordable cost.

## **VISION 2020 role**

VISION 2020 through its member organisations facilitates provision of affordable and available cataract surgical services. In countries of Africa and Asia cataract accounts for at least half of all blindness, despite the known technology that can restore vision at an extremely low cost. Reducing the backlog of cataract-blind mainly requires training ophthalmic personnel, strengthening the existing health care infrastructure and the provision of surgical supplies.

## **Trachoma**

### **Definition**

Trachoma is one of the oldest infectious diseases known to mankind. It is caused by *Chlamydia trachomatis* – a microorganism which spreads through contact with eye discharge from the infected person (on towels, handkerchiefs, fingers, etc.) and through transmission by eye-seeking flies. After years of repeated infection, the inside of the eyelid may be scarred so severely that the eyelid turns inward and the lashes rub on the eyeball, scarring the cornea (the front of the eye). If untreated, this condition leads to the formation of irreversible corneal opacities and blindness.

### **Magnitude**

Trachoma affects hundreds of millions people of whom about 3 million are blind. It was once endemic in most countries. It is responsible, at present, for about 10% of the world's blindness but the number keeps changing due to the effect of all current control programmes for this disease. In spite of this, trachoma continues to be hyperendemic in many of the poorest and most remote poor rural areas of Africa, Asia, Central and South America, Australia and the Middle East. The sequelae of active trachoma appear in young adulthood and in middle-aged persons. In hyperendemic areas active disease is most common in pre-school children with prevalence rates as high as 60-90%. It often strikes the most vulnerable members of communities--women and children. Adult women are at much greater risk of developing the blinding complication of trachoma than are adult men. This increased risk has been explained by the fact that women generally spend a greater time in close contact with small children, who are the main reservoir of infection. Historically, trachoma was once endemic in most countries. Famous eye care institutions such as Massachusetts Eye and Ear Infirmary (USA) and Moorfields Eye Hospital (UK) were originally established to treat trachoma. Trachoma is an ancient disease and there is evidence of its existence in China as early as the 27th century B.C. Depilation devices, used for removing inward-turning eyelashes, a consequence of trachoma, were present in Egyptian tombs as early as the 19th century B.C. Ancient Greek physicians wrote descriptions of treating trachoma and the chronic sequel of infections. Trachoma spread to Europe in the early 19th century following the Napoleonic wars between England, France and Turkey for control of Egypt.

### **Prevention and treatment**

Environmental risk factors are water shortage, flies, the presence of cattle pens, poor hygiene conditions, and crowded households. A prolonged exposure to infection throughout childhood and young adulthood appears to be necessary to produce the complications seen in later life. A single episode of acute Chlamydial conjunctivitis is not considered sight threatening because if treated, there is virtually no risk of prolonged inflammation or blinding complications.

### **VISION 2020 role**

A global initiative to eliminate trachoma as a blinding disease entitled GET 2020 (Global Elimination of Trachoma), was launched under WHO's leadership in 1997. Evidence-based strategies are being applied through primary health care approaches that follow the "SAFE" strategy. This consists of lid surgery (S), antibiotics to treat the community pool of infection (A), facial cleanliness (F); and environmental changes (E). In line with the VISION 2020 Initiative, WHO recommends the use of the "SAFE" strategy for countries implementing a trachoma control programme.

## **Onchocerciasis (river blindness)**

### **Definition**

Onchocerciasis is an insect-borne disease caused by a nematode worm *Onchocerca volvulus* and transmitted by black flies of the genus *Simulium*. Onchocerciasis is often called "river blindness" because the black fly which transmits the disease abounds in fertile riverside areas, which frequently remain uninhabited for fear of infection. *O. volvulus* is almost exclusively a parasite of man. Live adult worms live in nodules in a human body where the female worms produce high numbers of first-stage larvae known as microfilariae. They migrate from the nodules to the sub-epidermal layer of the skin where they can be ingested by black flies. They further develop in the body of the insect from which more people can be infected. Eye lesions in humans are caused by microfilariae. They can be found in all internal tissues of the eye except the lens where they cause eye inflammation, bleeding, and other complications that ultimately lead to blindness.

### **Magnitude**

Onchocerciasis is a major cause of blindness in many African countries. As a public health problem, the disease is most closely associated with West and Central Africa, but it is also prevalent in Yemen and six countries in Latin America. Onchocerciasis has in the past greatly reduced the economic productivity in infected areas and left vast tracts of arable land abandoned. It is estimated that there are about half a million blind people due to river blindness.

### **Prevention and treatment**

Much progress has been made in fighting the disease in several countries through control of the black fly, however, the disease can now also be treated with an annual dose of the drug ivermectine, Mectizan®, which also relieves the severe skin itching caused by the disease.

### **VISION 2020 role**

Although river blindness was put on the priority disease list of VISION 2020, global initiatives had already been taken for the purpose of onchocerciasis control. Beginning in 1974, effective vector control was implemented in West Africa through the Onchocerciasis Control Programme (OCP). Since

1996 mass ivermectin treatment control programmes have been introduced by the African Programme for Oncho Control (APOC) in many other African countries and by the Oncho Elimination Programme in the Americas (OEPA) in the affected Latin American Countries. Onchocerciasis control is not only a success story in terms of disease control but also demonstrates, on the one hand, the value of the synergy that comes from working together in partnership, and on the other hand, in terms of the economic return and social development through investments made in a disease control programme.

## MORE INFORMATION

- [Onchocerciasis programmes](#)

## Childhood blindness

### Definition

Visual impairment and blindness in children can be caused by various diseases depending on the actual geographical area and the socio-economic status of the population. In developing countries blindness in children is usually caused by conditions which result in scarring of the cornea (the front of the eye) such as vitamin A deficiency, measles infection, conjunctivitis of the newborn and harmful traditional eye medicines. Elsewhere, the main causes are cataract, retinopathy of prematurity, genetic diseases and congenital abnormalities.

### Magnitude

WHO estimates that there are 1.5 million blind children worldwide, mainly in Africa and Asia. Vitamin A deficiency - blinding malnutrition (xerophthalmia) - is the major cause of blindness in children. An estimated 127 million pre-school children are vitamin A deficient, and each year 350,000 children go blind and 2 million children die from lack of vitamin A.

### Prevention and treatment

Prevention and treatment of childhood blindness is disease specific. For Vitamin A deficiency, at a cost of only 5 US cents a dose, vitamin A supplements reduce child mortality by up to 34% in areas where Vitamin A deficiency is a public health problem. As Vitamin A deficiency manifests often during an outbreak of measles, properly planned and implemented national vaccination programmes against measles has reduced the prevalence of eye complications. In middle income countries, retinopathy of prematurity (ROP) is among the leading causes of blindness the incidence of which can be reduced through availability and affordability of screening and curative services.

### VISION 2020 role

Through its partners, millions of vitamin A capsules have been directly distributed to those in need on an annual basis. Prevention of childhood blindness is high on the agenda when countries develop a national VISION 2020 Action Plan. The causes of childhood blindness, amenable to prevention and treatment receive attention, not least because there are interventions available to handle these conditions, but also devastating consequences if not dealt with. Success in these interventions would bring a life long benefit to the hundreds of thousands of children currently blind or at risk of suffering visual loss.

## **Refractive error and low vision**

### **Definition**

Refractive errors include myopia (short-sightedness), and hypermetropia (long-sightedness) with or without astigmatism (when the eye can sharply image a straight line lying only in one meridian). Low vision generally refers to the inability to perform everyday tasks, such as recognizing faces and reading. Low vision can not be corrected by wearing conventional spectacles or with medical or surgical treatment.

### **Magnitude**

Recent studies have confirmed the existence of a large burden of uncorrected refractive errors, although the interventions required are significantly cost effective, and with an important impact on economic development and quality of life. There are an estimated 135 million in the world with low vision of whom about 35 million would benefit from low vision services. It is estimated there are about 5 million blind people due to uncorrected severe refractive errors.

### **Prevention and treatment**

Refractive errors can be corrected with appropriate optical correction while people with low vision may be helped with low vision devices.

### **VISION 2020 role**

A large number of persons, including schoolchildren, require correction of refractive errors such as short sightedness and long sightedness. VISION 2020 partners provide optical correction and low vision aids to persons in need worldwide, specifically those from poor urban and rural areas with limited available services. VISION 2020 partners assist persons to access corrective spectacles at affordable costs. The provision of these services helps to ensure a better future for visually impaired children and adults. This, for instance, allows children to prevent developing amblyopia, achieve better performance at school, and for those with low vision to be integrated into regular schools rather than be taught in special schools for the blind. Appropriate optical correction in adults is a prerequisite for successful fulfilment of their job tasks and development of their knowledge and skills.

## **Diabetic retinopathy**

### **Definition**

Diabetic retinopathy is composed of a characteristic group of lesions found in the retina, or fundus, of individuals having had diabetes mellitus for several years. The abnormalities that characterise diabetic retinopathy occur in predictable progression with minor variations in the order of their appearance. Diabetic retinopathy is considered to be the result of vascular changes in the retinal circulation. In the early stages vascular occlusion and dilations occur. It progresses into a proliferative retinopathy with the growth of new blood vessels. Macular oedema (the thickening of the central part of the retina) can significantly decrease visual acuity.

### **Magnitude**

There are important differences over the past few decades in diagnosis, medical care, socioeconomic factors and other risk factors that influence the prevalence and geographic distribution of diabetes and retinopathy as well. As the incidence of diabetes gradually increases, there is the possibility that more individuals will suffer from eye complications which, if not properly managed, may lead to permanent eye damage.

### **Prevention and treatment**

Risk factors for diabetic retinopathy include duration of diabetes, level of glycemia, presence of high blood pressure, dependence on insulin, pregnancy, levels of selected serum lipids, nutritional and genetic factors. Medical interventions can decrease some of the risk to vision caused by diabetic retinopathy. The control of glycemia decreases the risk of the incidence and the progression of the retinopathy. If proliferative retinopathy is present, timely laser photocoagulation of the retina decreases the risk of a subsequent severe visual lesion.

### **VISION 2020 role**

Diabetic retinopathy is on the priority list of eye conditions which can be partly prevented and treated. It is recommended to incorporate eye care services for diabetic patients into strategic VISION 2020 national plans. In diabetic patients, regular examination of the fundus is essential, followed by appropriate laser treatment if required. Well tested international guidelines for management of diabetic retinopathy should be followed.

## **Glaucoma**

### **Definition**

Glaucoma can be regarded as a group of diseases that have as a common end point a characteristic optic neuropathy which is determined by both structural change and functional deficit. The medical understanding of the nature of glaucoma has changed profoundly in the past few years and a precise comprehensive definition and diagnostic criteria are yet to be finalised. There are several types of glaucoma, however, the majority of cases in most populations is primary open angle glaucoma (POAG).

### **Magnitude**

The number of persons estimated to be blind as a result of primary glaucoma is 6.7 million, accounting for more than ten per cent of all global blindness. Risk factors are those limited to the onset of disease and those associated with progressive worsening in already established disease. The primary risk factors that are linked to the individual and the onset of the disease are age, ethnicity and genetic predisposition. The incidence of POAG rises with age and is more frequent in people of African origin. There is already genetic predisposition and higher risk of disease manifestation if there are more causes in the family.

### **Prevention and treatment**

There is little known about primary prevention of glaucoma, however, there are effective methods of medical and surgical treatment if the disease is diagnosed in its early stage. Through appropriate treatment sight may be maintained, otherwise the progression of the condition leads eventually to severe

restriction of the visual field and blindness.

### **VISION 2020 role**

As the majority of cases of glaucoma can be properly managed, it is desirable to include this condition in VISION 2020 national plans. It particularly applies in countries and regions where the above stated eye conditions are not a public health problem and more resources and attention can be dedicated to this eye disease.

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