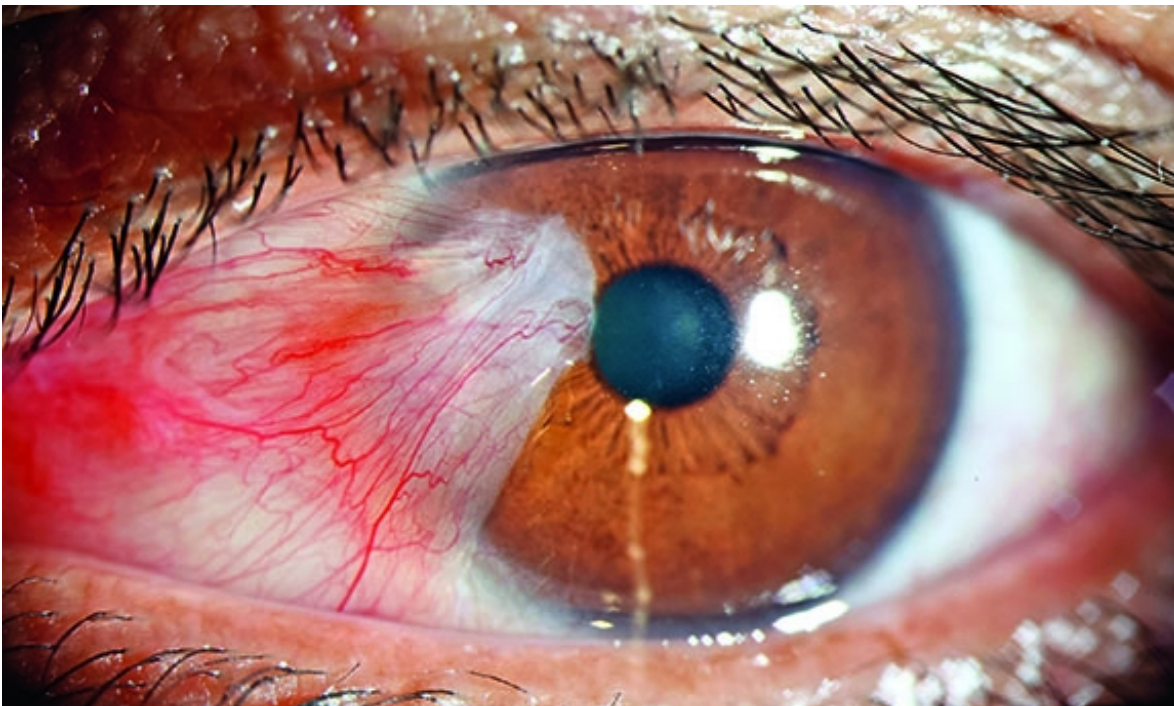




INTERNATIONAL  
REVIEW  
OF OPHTHALMIC  
OPTICS

# 123 PREVENTION OF OCULAR PATHOLOGIES IN OPHTHALMOLOGY

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In ophthalmology, the prevention of ocular diseases is gaining increasing prominence. Educational programmes, screening campaigns, early medical detection along with protective eyewear can all together reduce the incidence of ocular alterations and limit their social and financial implications. Eye phototoxicity (due to UV and blue-violet light) is one of modifiable risk factors and, as such, can be reduced by a photo-protective eyewear.

There is a saying in Portuguese that goes: *melhor prevenir que remediar*, which means “prevention is better than cure”. Originating from the Latin *praevenire* (*prae* = “before”, *venire* = “to come”), “prevention” literally means “to anticipate, to perceive in advance”. In medicine, the great challenge of the public health programmes is precisely to prevent diseases or to diagnose them as early as possible. With the ageing of the world population, it is vital to create programmes for the prevention of Chronic Non-communicable Diseases (NCDs), responsible for 63% of deaths in 2008. The majority of deaths from NCDs are attributed to diseases of the circulatory system, cancer, diabetes and chronic respiratory diseases. The principal causes of those diseases include modifiable risk factors such as smoking, harmful alcohol consumption, lack of physical

activity and inadequate diet. Therefore, programmes for the prevention of these diseases must focus their actions on these aspects. In addition to the scientific aspects, prevention and early diagnosis promote better economic-financial indicators in health budgets, with less expenditure and better use of resources.

## Ophthalmology and prevention programmes

In ophthalmology, the prevention of some diseases is gaining increasing prominence. An ophthalmological test carried out in pre-school children, in adults at around the age of 40 and in older people aged over 60, is capable of preventing changes such as refractive error amblyopia, diabetic retinopathy, glaucomatous optic neuropathy and age-related macular degeneration, amongst others [1].

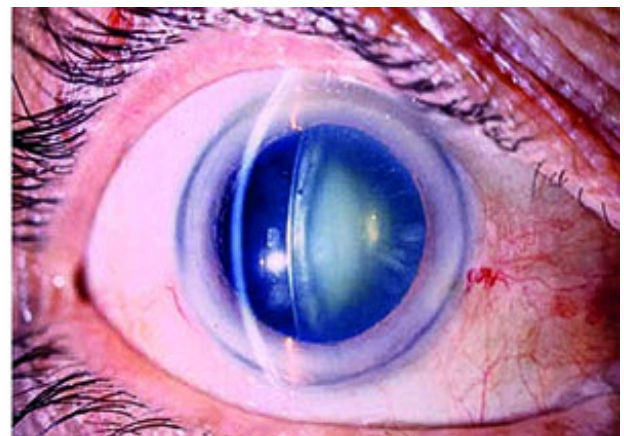
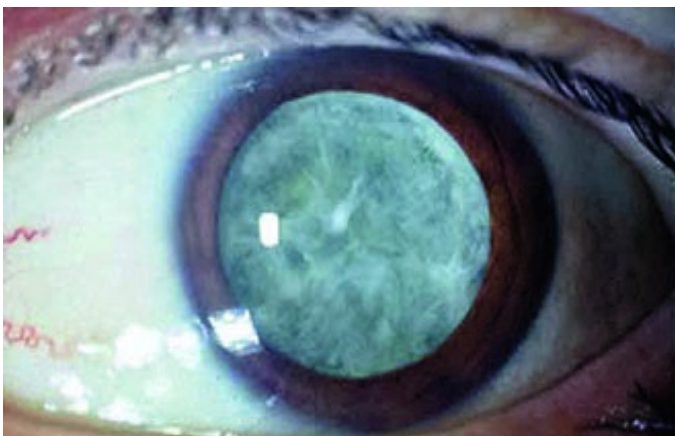
We know that the cost of treating glaucoma is much higher than investments to prevent it. The increase in cases of blindness, with its social and financial implications, shows that the right thing to do is to adopt major screening campaigns for early detection of suspected cases.[2], [3]

Educational programmes in terms of control of cardio-circulatory diseases would greatly reduce cases of retinal vascular occlusion, a major cause of diminished visual acuity in adults.

Several authors have already demonstrated the advantages of diabetic retinopathy control in telemedicine, with a reduction in the incidence of reduced visual acuity from diabetes. [4] The World Health Organisation recently launched an Ocular Health and Prevention of Blindness programme, one of the most important chapters of which is cataract surgery. [5]



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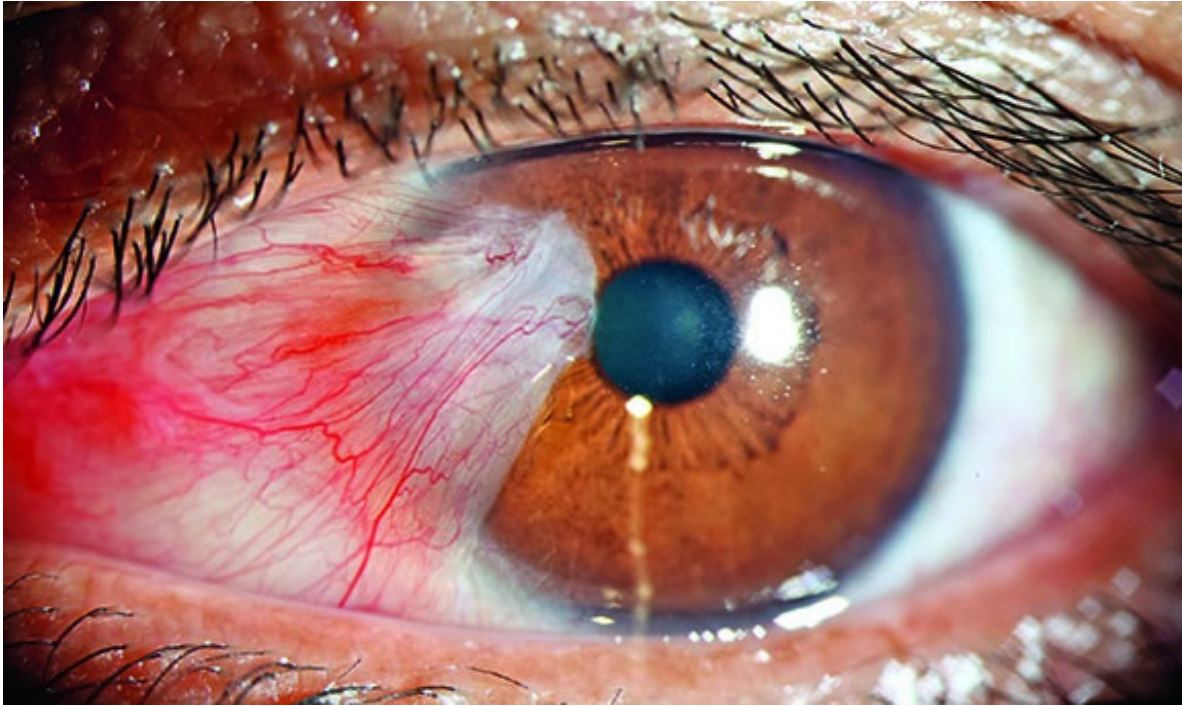
*Clinical aspect of cataract*

## Ocular phototoxicity

The biggest cause of avoidable blindness throughout the world, cataract is perhaps one of the major examples of ocular alterations due to phototoxicity. (Fig. 1) It is already a well-known fact that the earliest appearance of presbyopia occurs in geographic regions with the highest incidence of UV rays. In Brazil, the age at which it appears in the north of the country may be up to 5 years lower, with patients presenting symptoms at age 38, whereas in the south this occurs

at around 43 years. By clinical analogy, if UV rays are able to alter the flexibility of the lens and modify its accommodation capacity, continuity of that action would lead to the degeneration of its fibres and the onset of cataract. Continuing its intra-ocular pathway, part of the solar radiation reaches the retina and may be deleterious to the retinal tissue, causing age-related macular degeneration (AMD).

The incidence of pterygium is also known to be higher in populations with greater daily exposure to sunlight. [6] , [7] , [8] (Fig. 2) Another example of ocular phototoxicity is actinic keratitis in addition to peri-ocular cutaneous lesions.



*Clinical aspect of pterygium*

## Importance of ocular protection

All this clinical evidence has created awareness of the need for ocular protection against UV rays. Taking into account the fact that a clear eye lens lets more radiation through than a lens that is beginning to form a cataract, protection against UV rays is advisable from childhood. Long-term longitudinal population studies would be necessary to enable us to judge the reduction in ocular diseases caused by solar radiation in a population that used protective glasses from childhood, compared to a population without protection.

But it is not only UV rays that are dangerous for the eyes. Recent studies have shown that blue light also has harmful effects on the retina. Known for its importance in relation to chronobiology, the blue light of the visible spectrum has a part of wavelength range that is harmful for the cells of the retina; the other part is beneficial to cognitive and chronobiology functions. This shows us that the concept of “selective” ocular protection against solar radiation is a reality that needs to be observed. The use of ophthalmic lenses with selective photo-protective features is a major advance in ophthalmology.

## KEY TAKEAWAYS

- The phototoxicity of solar radiation may be deleterious to the ocular tissues.
- The higher daily exposure to sunlight, the higher incidence of photo-induced ocular damage (pterygium, actinic keratitis, cataract, age-related macular degeneration, etc.)



- UV rays are able to alter the flexibility of the lens and modify its accommodation capacity; continuity of that action would lead to the degeneration of its fibres and the onset of cataract.
  - A part of blue light (blue-violet portion) also has harmful effects on the retina.
  - Clinical evidence has created awareness of the need for ocular protection against UV rays and blue-violet light.
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