Submission

No 21

INQUIRY INTO TOBACCO SMOKING IN NEW SOUTH WALES

Organisation: Optometrists Association Australia

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Theme:

Summary

OPTOMETRISTS
ASSOCIATION AUSTRALIA
NEW SOUTH WALES

The Hon Richard Torbay, MLC
Chairperson
Tobacco Smoking Committee
Parliament House
Macquarie Street
Sydney NSW 2000

10 April 2006

Dear Mr Torbay,

The Optometrists Association Australia (NSW Division) takes pleasure in providing to you the Association's submission on the effects of tobacco smoking.

If there is any further information that the Association can provide or anything that we can do to assist the Committee we would be only too pleased to do so.

Sincerely,

Neil Craddock

NEIL CRADDOCK
President

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Optometrists Association Australia

(New South Wales Division)

Submission to the Tobacco Smoking Committee Inquiry into Tobacco Smoking in NSW

April 2006

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Executive summary

The Optometrists Association Australia (NSW Division) notes that:

- Environmental tobacco smoke causes ocular irritation;
- Contact lens wearers are at increased risk of ocular complications in smoke-affected environments, including if they smoke themselves; and
- Smoking has serious deleterious effects on visual health. Smoking is linked with a range of eye diseases including;
    - Age-related macular degeneration;
    - Cataract;
    - Glaucoma;
    - Graves ophthalmopathy (thyroid eye disease);
    - Toxic amblyopia;
    - Retinal vein occlusion; and
    - Esotropia (an inward turn of the eyes) among babies of mothers who smoke.
- The Optometrists Association supports the proposed ban on smoking in motor vehicles. The association notes that the harm caused by smoking and by smoke makes it important to ensure that places where there is limited opportunity to avoid smoke be made smoke-free.

Optometrists Association Australia (NSW Division)

The Optometrists Association Australia (NSW Division) is the peak professional body for optometrists in New South Wales. Optometrists conduct eye and vision examinations, prescribe spectacles and contact lenses, carry out treatment for eye disorders and undertake health promotion. Optometrists do not perform surgery, but NSW optometrists will soon be able to use drugs to treat eye diseases, joining their colleagues in Victoria and Tasmania in this regard. Optometrists must complete a four-year university degree course specifically on the eye and its care before they can be registered to practice (increasing to a five-year course from 2006). Optometrists may also dispense visual appliances, such as glasses and contact lenses. An increasing proportion of the work optometrists do relates to eye disease and problems which affect the way in which the eyes work together (binocular vision).

Optometrists provide approximately three quarters of all eye examinations given by eye care professionals in Australia. The education and training of optometrists emphasises the optometrist's role in diagnosing any disease which may affect their vision, and provides them with the knowledge and skills to detect ocular diseases. Optometrists also have the specialised equipment required for examining the eye.

Scope of the submission

The NSW Parliament has established a Joint Select Committee to inquire into the effects of Tobacco Smoking in NSW.

The Optometrists Association submission provides details of the dangers of smoking and environmental smoke to visual health and provides recommendations to the Committee for further reforms.

Smoking: effects of environmental tobacco smoke

The data on the effects of environmental tobacco smoke on visual health is not well developed, but there are data that demonstrate the harms caused by environmental tobacco smoke. The literature does not provide strong evidence that environmental tobacco smoke has a causal effect on ocular diseases such as AMD and cataract, as most population-based studies examined only categorise people as current smokers, past smokers or non-smokers. However, there is consistent evidence that ocular irritation is a common effect of environmental tobacco smoke.

Cigarette smoking is highly irritating to the conjunctival mucosa (the film covering the white of the eye), also affecting the eyes of non-smokers by passive exposure (second-hand smoke). Eye irritation is the most common complaint from environmental tobacco smoke in many studies; followed by cough, nose irritation and headache (Solberg et al 1998, Brownson et al 1997). Among people with asthma, eye irritation ranked second (with 46 per cent of respondents complaining) to chest complaints (Eisner and Blanc 2002).

In the controlled environment of an aeroplane, Cunningham (2003) demonstrates that environmental tobacco smoke causes five times as much ocular irritation — including dryness, itching, redness, soreness, burning and swollen eyelids — as non-smoking flights.

Photochemical oxidants (components present in tobacco smoke) have been shown to increase the risk of eye irritation. These chemicals induce lacrimation (tearing) and mild conjunctival redness. Smoke also stimulates nerve endings, evoking stinging, burning or prickling sensations — producing significant discomfort for the passive smoker. Irritation and reflex blinking increased with smoke concentration (Marumatsu et al 1983 cited in Solberg et al 1998).

Smokers also experience ocular irritation from tobacco. Chronic smoking has a negative effect on the ocular surface and affects some tear characteristics. The chronic ocular irritative effects of cigarette smoking may lead to defects in ocular surface defence (Satici et al 2003).

Smokers are 82 per cent more likely to suffer from dry eye than non-smokers (Moss et al 2000), and even past smokers have 22 per cent higher incidence of dry eye than non-smokers (Moss et al 2000).

Cumming and Mitchell (1997) found that pipe smoking was more strongly associated with cataract than cigarette smoking. Pipe smokers are more likely to produce sidestream smoke.

The researchers *'wonder whether it is this excess smoke that has a harmful effect on the lens of the eye, either by direct entry of tobacco products into the eye or by raising the temperature of the lens'* (Cumming and Mitchell 1997, p. 1298).

One interesting effect of environmental tobacco smoke is a link to brown staining of artificial lenses (inserted during a cataract operation). Hicks et al (2004) identify brown stained artificial lenses in case studies, in one particular case with a person cohabiting with two heavy smokers. Hicks notes that patients and cohabiters need to be made aware of the strong probability of optic deposition unless smoking ceases (Hicks et al 2004).

While it is difficult to identify studies that investigated the effects of environmental tobacco smoke on eye disease, there is evidence that smoke affects the vascular system of non-smokers exposed to environmental tobacco smoke (WHO 2000). The vascular effects of tobacco smoke are linked to a range of eye diseases.

Smoking: effects on contact lenses

When dispensed and worn properly, contact lenses are very safe for the eyes. New technology in lens materials means properly fitting contact lenses are very comfortable to wear. Easy lens care systems make cleaning quick and straightforward. A variety of lens sizes and shapes means that many people can now be fitted with these more convenient and safer lenses.

Complications of contact lens wear are not common, but the consequences are serious. Inappropriate wear and use of contact lenses increases the risk of an eye infection. The front of the eye (the cornea) is a delicate environment. Small pieces of dust or lint on the lens can compromise the surface of the cornea, increasing the risk of eye infection, in particular contact-lens-related microbial keratitis. In the absence of appropriate treatment, eye infection may cause corneal scarring and permanent loss of vision.

Cutter et al (1996) assessed the clinical presentation, prevalence, and risk factors of focal corneal infiltrates (localized inflammation of the cornea) in soft contact lens wearers. They measured the relative risks of extended wear, lens modality, and smoking in a general practice population. Smoking was associated with an increased prevalence of corneal infiltrates.

Several authors have identified smoking as a significant factor for contact lens-related microbial keratitis (Stapleton 2003, Liesegang 1997) and corneal infiltrative (inflammatory) events (McNally et al 2003, Cutter et al 1996). Smoking and young age combined was specifically identified as a risk factor for corneal inflammatory events (McNally et al 2003). Both microbial keratitis and corneal infiltrates can lead to scarring and possible loss of vision. Careful counselling of contact lens wearers who smoke is advised (McNally et al 2003).

Smoking: effects on visual health

Smoking is related to scores of poor health outcomes and is Australia's leading form of preventable death (Ministerial Council on Drug Strategy 1999). However, the effects of smoking on vision are often overlooked. There is evidence linking smoking to:

- Age-related macular degeneration;
- Cataract;
- Glaucoma;
- Graves ophthalmopathy (thyroid eye disease);
- Toxic amblyopia;
- Retinal vein occlusion; and
- Esotropia (an inward turn of the eyes) among babies of mothers who smoke.

Tobacco smoke is composed of up to 4,000 active compounds, many of which are toxic with either acute or long-term exposure. Several of these toxins are also poisonous to ocular tissues, affecting the eye, including ischemic (reducing the blood supply) or oxidative mechanisms (Solberg et al 1998).

Age-related macular degeneration (AMD) is the leading cause of blindness in Australia for people over 40 years of age, accounting for 48 per cent of blindness in this age group. Cataract accounts for a further 12 per cent of blindness. Ten per cent of visual impairment is caused by AMD and a further 14 per cent by cataract (Access Economics 2004). The incidence of other visual conditions with a link to smoking is smaller, but significant for the community and the individual.

A recent report by Access Economics has estimated the direct and indirect costs of vision disorders in the community at over $9 billion per annum. This includes direct costs of treatment, indirect costs and the suffering and premature death associated with vision impairment (Access Economics 2004). The direct costs of AMD were estimated at $19.4 million per annum and cataract at $326.6 million (Access Economics 2004). Access Economics did not attribute indirect or costs of suffering and premature deaths by condition.

Age-related macular degeneration (AMD)

The most common cause of smoking-related blindness is age-related macular degeneration (AMD). AMD is a major cause of irreversible vision loss in the western world, particularly in the elderly. More recent epidemiologic studies have identified three groups of potential risk factors: cardiovascular disease, environmental factors, and racial and ethnic factors. Tobacco smoking has been demonstrated to be associated with AMD consistently across many studies of different design, carried out within different populations. The available evidence supports at least a doubling of risk of late AMD associated with long-term smoking (Hawkins et al 1999).

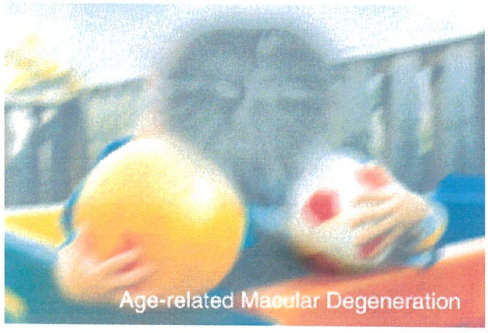
AMD tends to become more prevalent with age. The retina, which is the light sensitive film at the back of the eye, transmits the images that we see to the brain. The retina has two main parts — the macula and the peripheral retina. The macula is the part of the retina that is responsible for seeing fine detail, such as reading, seeing facial features and interpreting different colours. AMD affects the central part of the vision, leaving peripheral vision intact.

There are two major types of AMD:

- **Atrophic (dry) AMD.** This is the more common form of AMD and affects almost 80 per cent of those with the condition. The onset of this condition tends to be slow, causing a gradual reduction in central vision by a progressive degeneration of the retinal pigment epithelium in the macula. This tends to affect the ability to read and to see fine detail.

- **Exudative (wet) AMD.** Exudative macular degeneration is less common but tends to have a more severe and rapid effect on the central area of vision. Blood vessels from one layer at the back of the eye grow in an abnormal fashion into the macular area. These blood vessels may leak or bleed, causing a rapid and significant reduction in central vision. This tends to affect one eye at a time but there is a risk of AMD developing in the other eye over the following months. The first symptoms of exudative AMD may be distortion of vision (known as metamorphopsia). This often has the effect of making straight lines appear curved or tilted.

For a person with AMD, vision deteriorates and eventually the central vision may be completely lost, leaving a dark central area of poor vision (known as a central scotoma). This is simulated in the figure to the right.



Treatments for AMD are limited, although improving with new technologies. Among these newer treatments, new pharmaceuticals, vitamins and antioxidants show some potential and laser treatment is available for some patients. Laser treatment can reduce vision loss, but cannot improve vision.

Both current smoking and a history of smoking are associated with a higher risk of AMD. Smoking is known to depress antioxidants and to alter choroidal blood flow. It has been hypothesised that smoking may alter the metabolism of the retinal pigment epithelium.

Pooled findings from three continents have shown consistently similar results in the association between smoking and AMD. Apart from age, tobacco smoking was the only risk factor consistently associated with any form of AMD in all sites. These combined data from racially similar communities across three continents provide strong and consistent evidence that tobacco smoking is the principal known preventable exposure associated with any form of AMD (Smith et al 2001, Tomany et al 2004). These results are confirmed by Australian evidence through the Blue Mountains Eye Study (Mitchell et al 2002) and the Melbourne Visual Impairment Project (Taylor 2001).

Delcourt et al (1998) also showed that current and former smokers showed an increased prevalence of late AMD. Further, they showed that once a smoker breaks the habit, the risk of late AMD remained increased until 20 years after cessation of smoking.

Cataract

Several studies have shown an increased risk of cataract development with smoking (Solberg et al 1998). Cataracts are a clouding of the lens inside the eye. Everyone will develop cataracts if they live long enough, but smoking and high UV exposure increase the risk of cataracts. If these factors were addressed, it would halve the need for cataract surgery (Taylor 2001).

Oxidative damage plays a major role in cataract formation. Smoking imposes an additional oxidative challenge as well as contributing to the depletion of antioxidants naturally present in the lens (Solberg et al 1998). This is the probable means by which smoking affects the human lens. Toxicity of heavy metals present in tobacco smoke, such as cadmium, lead and copper could also be responsible, as the materials appear to accumulate in the lens (Cekic 1998).

The association between cataracts and smoking appear strongest with nuclear sclerosis (general opacification of the middle portion of the lens) (Solberg et al 1998, Klein et al 2003) and posterior sub-capsular cataracts (discrete opacity in posterior aspect of the lens usually along the visual axis causing significant vision disruption) (Delcourt et al 2003, Solberg et al 1998).

In the Beaver Dam Study, a major American vision study, a significant correlation was found between smoking and cataract formation. The levels of severe nuclear sclerosis appeared to increase with the number of pack-years smoked (Solberg et al 1998). Australian evidence also finds a correlation between smoking and cataracts, with the Blue Mountains Eye Study finding a 30 per cent greater likelihood of nuclear cataract among smokers, and a 50 per cent greater likelihood of posterior subcapsular cataract among smokers (Cumming and Mitchell 1997).

Other eye conditions

Glaucoma

Glaucoma is a degenerative disease of the optic nerve. Glaucoma is typically caused by an increase in pressure in the eyeball. In most cases, the intraocular pressure increases gradually and cannot be detected. Glaucoma has been described as the sneak thief of sight (Glaucoma Australia 2004), as it causes tunnel vision and, if left untreated, blindness.

Glaucoma accounts for three per cent of visual impairment in Australia and 14 per cent of blindness (Access 2004). Glaucoma can be treated by medications, surgery and/or monitoring. Early detection is vital, as once sight is lost, it can never be regained.

There may be some association between smoking and glaucoma. A recent study has found a slight but statistically significant increase in intraocular pressure in current smokers compared to non-smokers (Lee et al 2003).

Graves ophthalmopathy

Graves ophthalmopathy (thyroid eye disease), is the ocular manifestation of Graves thyroidopathy (hyperthyroidism) and results in a protruding appearance of the eyes. In severe cases it can cause dry eye due to exposure and difficulties or pain on eye movement, as well as double vision.

The cause of Graves ophthalmopathy is still unknown, but smoking has been implicated as one of the factors capable of inducing Graves disease in a genetically predisposed individual (Solberg et al 1998). In a survey (Shine et al 1990) of patients with Graves disease, subjects were divided into those that had developed ocular manifestations and those who had not. It was found that there were significantly more smokers in the group with ocular complications. The patients with severe ocular complications were found to smoke more than those who suffered from milder signs.

Tobacco – alcohol induced amblyopia

Tobacco – alcohol induced amblyopia (lazy eye) is a disease that mainly affects middle-aged men. It is characterised by a distinct bilateral visual disturbance, symptomatic scotomas (localised vision loss), acquired colour vision disturbance and a drop in visual acuity. The condition is probably a result of toxic optic nerve damage. It appears to be primarily a condition of malnutrition and is worsened by smoking (Solberg et al 1998).

Retinal vein occlusion

Retinal vein occlusion is a common retinal vascular disease, where the vein providing the outflow of blood from the eye becomes blocked. The retinal arteries and retinal veins are very fine and may become blocked by a blood clot or fatty deposit. Risk factors for retinal vein occlusion include age, hypertension, vascular disease and diabetes. Smoking has also been identified as a risk factor in a range of studies (for example, Klein et al 2000, Di Crecchio et al 2004). Symptoms vary, but can include blindness in part or all of one eye, or blurring and clouding of vision caused by blood spilling inside the eye.

Esotropia in unborn children

Esotropia is an inward turn of the eye or eyes and is also referred to as strabismus. It is a common problem for children, requiring intervention through glasses, patching, exercises or, in some cases, surgery. Studies have observed that smoking throughout the pregnancy was associated with esotropia in children (Hakim and Teilsh 1992 cited in Solberg et al 1998).

Summary

Smoke is harmful to visual health regardless of where the smoking occurs. In workplaces and in any structure, there is limited opportunity to escape smoke when a person in that environment is smoking. Thus, the Optometrists Association endorses strict limits on places where a person may smoke.

The association also recommends that the inquiry address smoking near doorways and access points to public buildings, along the lines of that in section 67B(1)(e) of the *Public Health Act 1997* (Tasmania), under which any area "within 3 metres of an entrance to or exit from any non-domestic building or multiple-use building" is a smoke-free area.

The Optometrists Association supports the proposed ban on smoking in motor vehicles. Again, the association notes that the harm caused by smoking and by smoke, makes it important to ensure that places where there is limited opportunity to avoid smoke be made smoke-free.

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