

# Turn your back to the Solar Eclipse

*"Turn your back to the eclipse, protect your eyes and see, that in this short act of night, the awe is all things."*

On November 14 Cairns and Port Douglas will be visited for two minutes by a 175km wide total solar eclipse as it passes from Arnhem Land, across Cape York and moves out into the Pacific.

All parts of Australia and New Zealand including Cairns will experience partial eclipse phases lasting about two hours that pose greatest risk to the eyes.

It is the first total eclipse visible in Australia since 2002.

Up to 40,000 tourists are expected in Cairns to observe the Sun's corona in near night conditions while standing within this fleeting, umbra shadow of the Moon which is the total eclipse.

Looking directly at the sun at any time is never recommended because of the risk of retinal damage and the same applies during an eclipse.

## Risk of Exposure

The Sun's reduced radiance during an eclipse makes it far more dangerous than a transit of Venus where the sun's radiance is reduced by only one per cent.

During partial eclipse phases our normal "aversion response" to the bright sun is reduced risking prolonged, unprotected, direct viewing and eye damage.

It is important to recognise the dangers of looking directly at the eclipse.

There are risks associated with all forms of direct viewing; solar filters, unprotected viewing or viewing through optical instruments.

## Safe Viewing

Indirect viewing with the back turned to the eclipse or viewing live streams via the internet are the only safe methods endorsed by the Royal Australian and New Zealand College of Ophthalmologists (RANZCO).

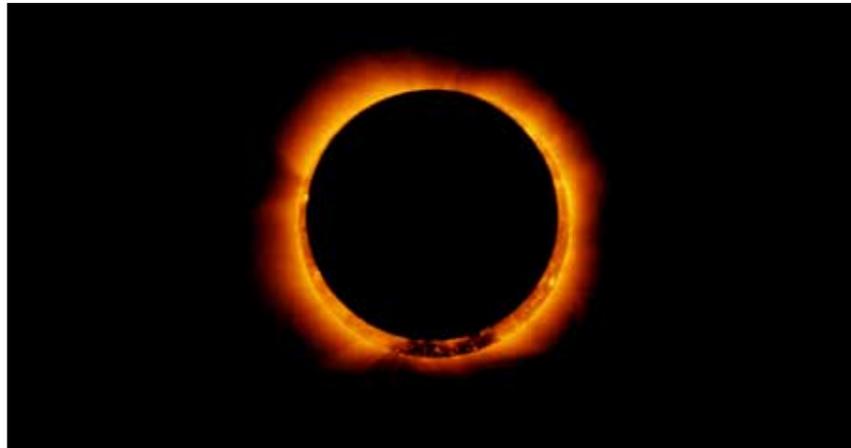


Photo by flickr/NASA Goddard Photo and Video

## Solar Retinopathy

Solar Retinopathy can be divided into two clinical entities.

There is no recognised treatment for either so prevention is paramount.

True retinal burns (thermal) occur when looking through an optical instrument concentrates the Sun's rays.

The father of modern astronomy, Galileo Galilei and laser retinal surgery pioneer Gerhard Meyer-Schwickerath both suffered lesions from solar viewing with a telescope.

Photoretinitis (phototoxic) from direct viewing of the sun represents the majority of cases, with 20 per cent reported to have a small central blind spot at seven months following the injury but less than 10 per cent are symptomatic after 21 months.

There is considerable variability in susceptibility between individuals which is not fully explained.

Such factors as age, pupil size, ocular pigmentation, photosensitising drugs, recreational drugs, alcohol, antioxidants and macular pigment density have been proposed.

A typical case would be the dominant eye of a teenager exposed for 30

seconds or more.

A yellow-white spot appears at the fovea within a week and OCT scanning shows full thickness hyper-reflectivity.

Less than 10 per cent become chronic with a small scotoma and vision of about 6/9 which causes patients some confusion with letters such as "i" and "Q", limiting some job options.

Clinically there is often a 150um red spot with a pale halo and the OCT shows a small defect in the photoreceptor layer.

Rarely is vision worse than this (6/12-6/60) but the mechanism of such loss is unknown.

## Children are at most risk

Children and teenagers are most vulnerable to solar retinopathy due to the transmission characteristics of their eyes, their lack of experience in using solar filters and incomplete understanding of the dangers.

Solar viewing is more insidious than welding flashes and while less painful is more dangerous to the retina.

Children need special protection from direct viewing and it is good general advice to use indirect viewing methods.

## Indirect viewing methods

Indirect viewing methods require the use of two cards one with a central pinhole less than 2mm held at least 2 metres above the second card which acts a screen for this pinhole camera. The image is larger the further the screen is away from the pinhole and the quality of the image deteriorates with a larger pinhole.

Optical instruments such as binoculars can also be used to project an image onto a piece of paper.

Under no circumstances should anyone use them to look directly at the eclipse so they are not recommended in the presence of children.

Binoculars provide a larger image and with your back to the eclipse can be aligned by looking at the shadow their optical tube makes on the screen.

Indirect viewing allows other features of the eclipse that can be missed when side vision is lost while wearing solar filters.

## What happens during an eclipse?

Watch the moon's shadow come in from the western horizon with a cool wind as the sky darkens with brighter stars and near night conditions.

Birds are confused into nesting, bats begin feeding and street lights come on before daylight gradually returns.

Both the Venus transit and Curiosity Mars landing attracted huge audiences via live streaming on CSIRO and NASA websites.

This is an excellent, safe way to view the eclipse and several agencies are expected to provide this service.

It provides a safe indoor environment for children while fostering an interest in science.

The ASO will post web links as the eclipse draws closer.

Although we strongly advise against any direct viewing of the eclipse, if you decide to view the sun directly use only "CE" marked standard solar filters and follow the manufacturer's instructions carefully.

The ASO recommends indoor live webcasts or indirect viewing using a pinhole camera projection system.

## Annular Eclipse 10 May 2013

The next solar eclipse is an annular eclipse, the first since 1999, passing from Tennant Creek to north of Cooktown six months later on May 10, 2013.

The umbra shadow does not touch Earth in an annular eclipse so a ring of the Sun will be visible around the moon representing a partial eclipse or penumbra shadow over all over of Australia and parts of New Zealand.

There is no safe time to look directly at this type of solar eclipse without protection.

## Author



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FRANZCO

## ASO Campaign

The ASO is running a public campaign proudly sponsored by Bayer to increase awareness of the risks of solar retinopathy during the upcoming total and annular solar eclipses.

The ASO is also working with state education departments to warn school children of vision damage which can result from looking directly at eclipses and is encouraging safe viewing options.

Dr Rowan Porter will conduct a presentation on Eclipse Retinopathy at Cairns Base Hospital Grand Rounds on Friday, 28 September. This presentation is open to all interested parties.

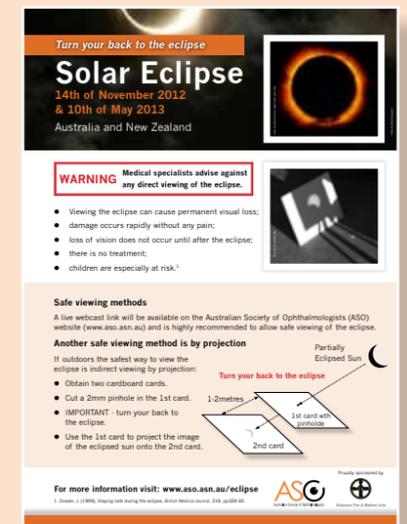
For more information or to discover how you can assist please contact Katrina Ronne on 07 3831 3006 or email [katrina@aso.asn.au](mailto:katrina@aso.asn.au).

Also enclosed in this bulletin is an A4 patient awareness poster / handout which can be either displayed in your practice or distributed to patients.



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