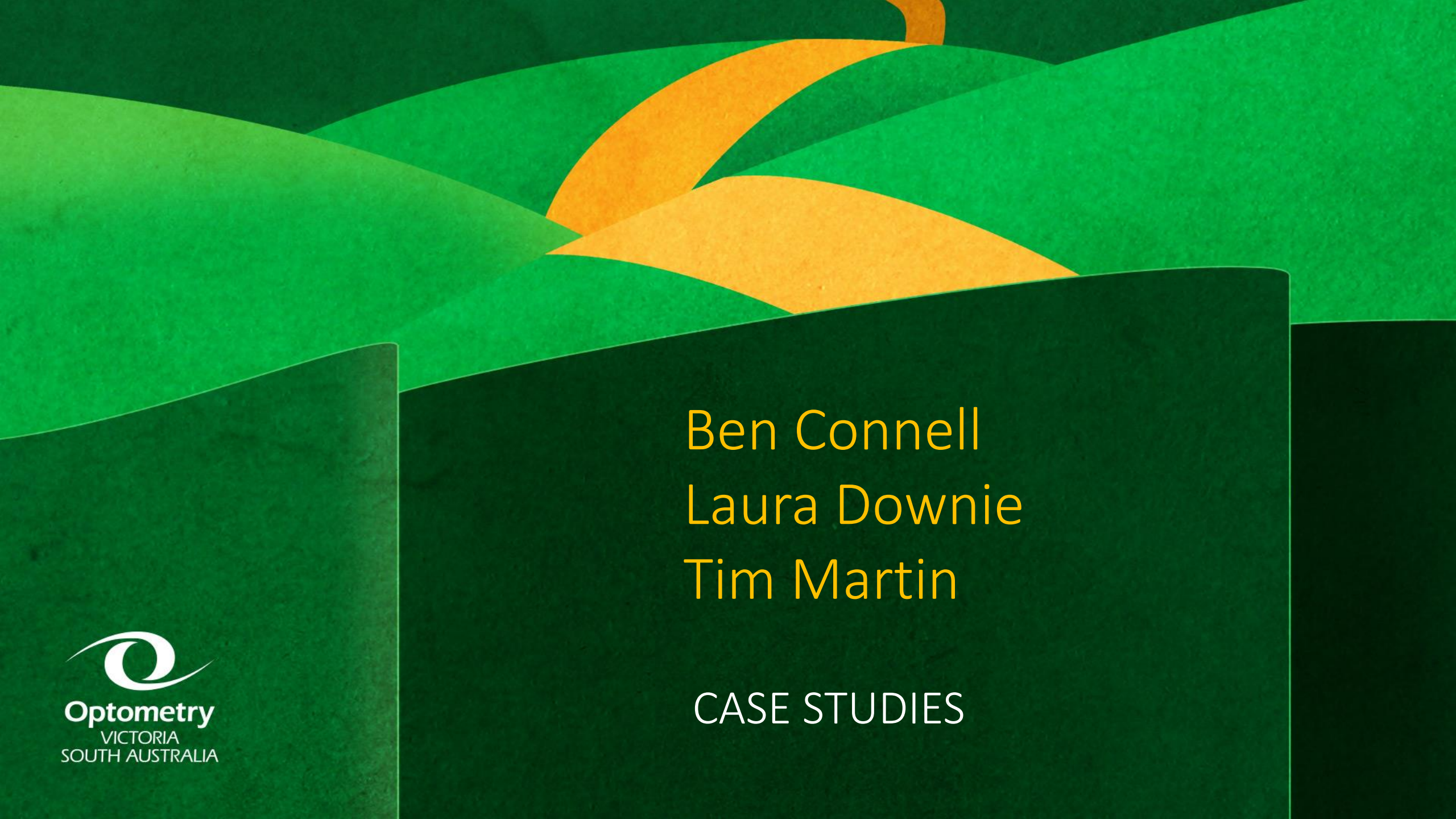


Ben Connell
Laura Downie
Tim Martin

CASE STUDIES

Optometry
VICTORIA
SOUTH AUSTRALIA

Ben Connell

Laura Downie

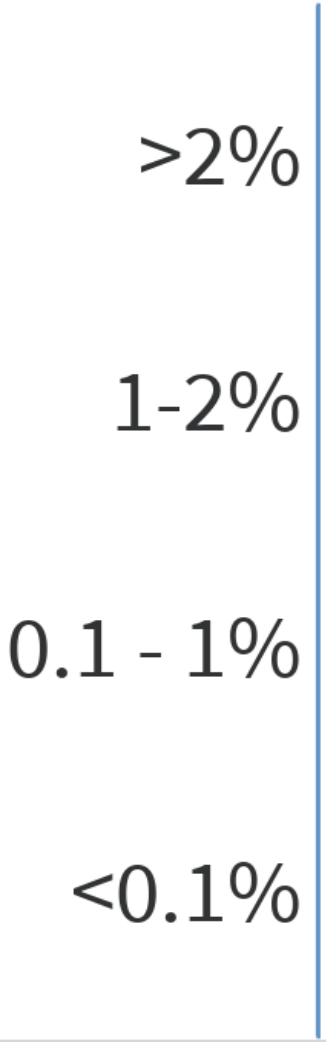
Tim Martin

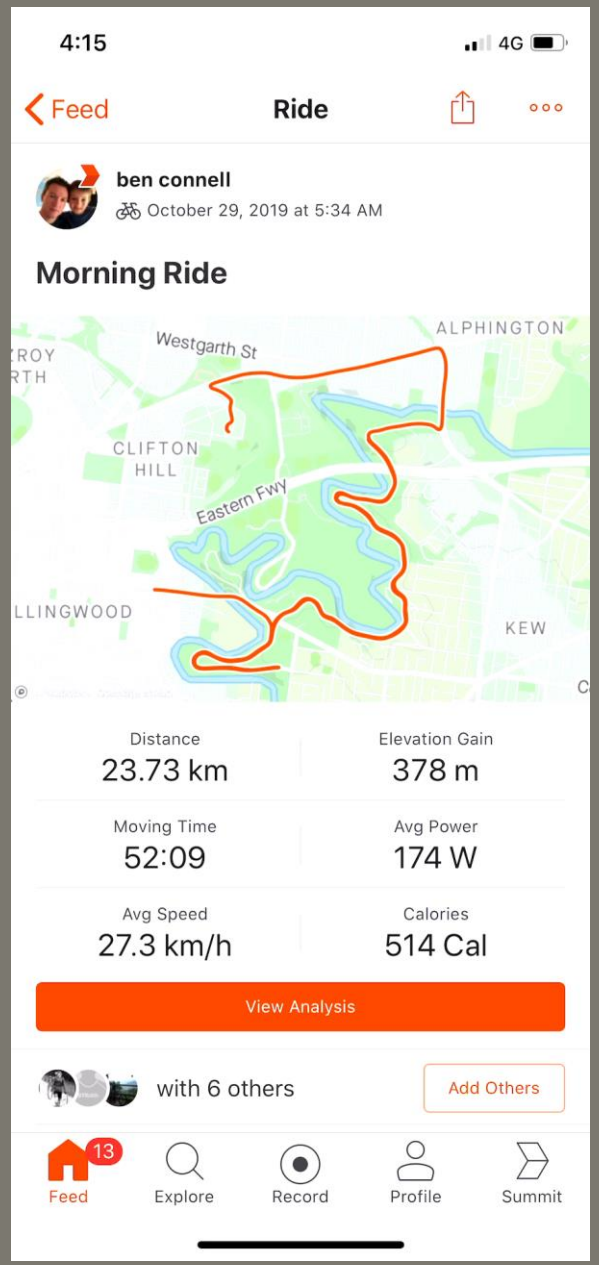
Learning objectives

- To appreciate the value of clinical audit
- To understand current clinical evidence relating to blue light-filtering products
- To be able to manage corneal infiltrates and keratitis more confidently

Clinical audit

Q1 - Cataract surgery: % of patients with 2 lines loss BCVA?





Problem

- Doctors don't know their results
  - Areas of inadequacy?
  - Improving?
  - Could perform better?

Vision

A culture where health professionals:

- Know their results/ outcomes
- Take pride in their accuracy
- Incentivised to do better by
  - Data obtained insights
  - Reflection and peer interaction

Different approaches:

1. Surgeon scorecard
2. Airline pilot model

Technique

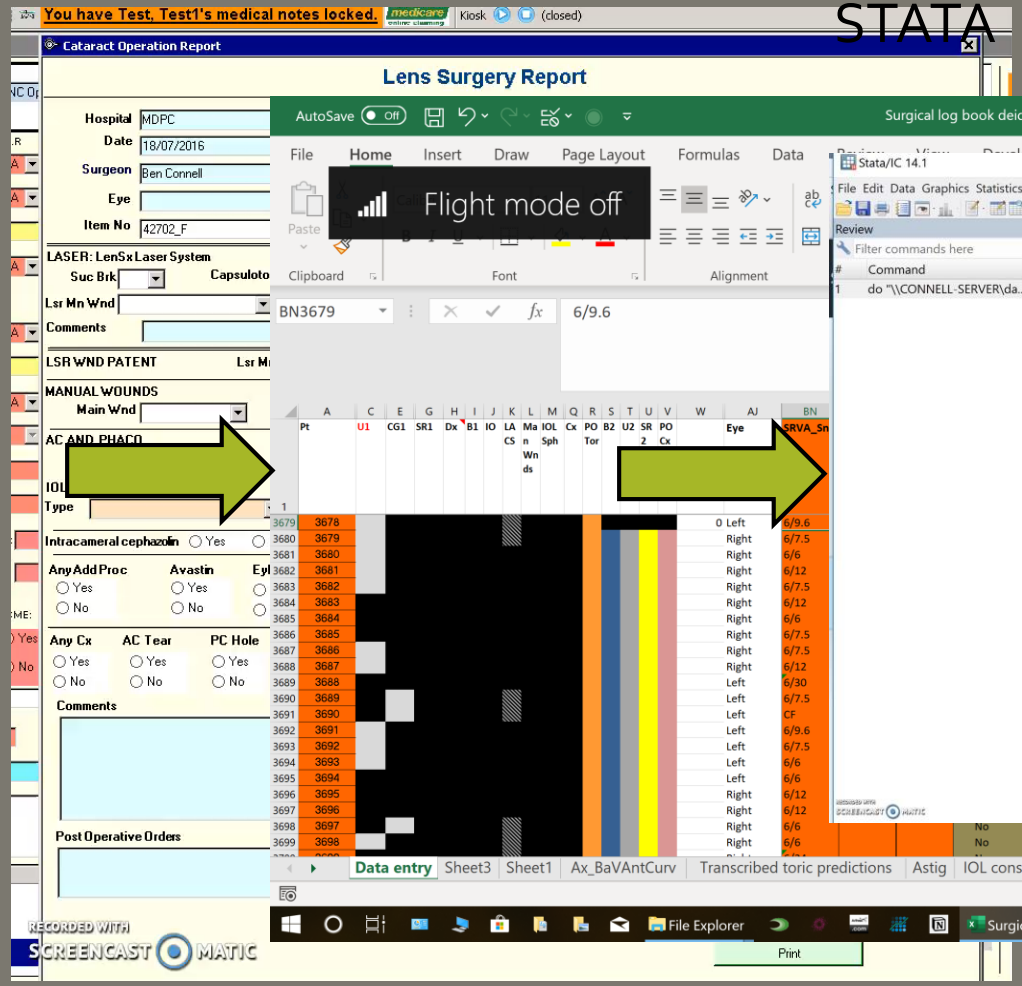
Data input/extraction from EMR (Best practice)

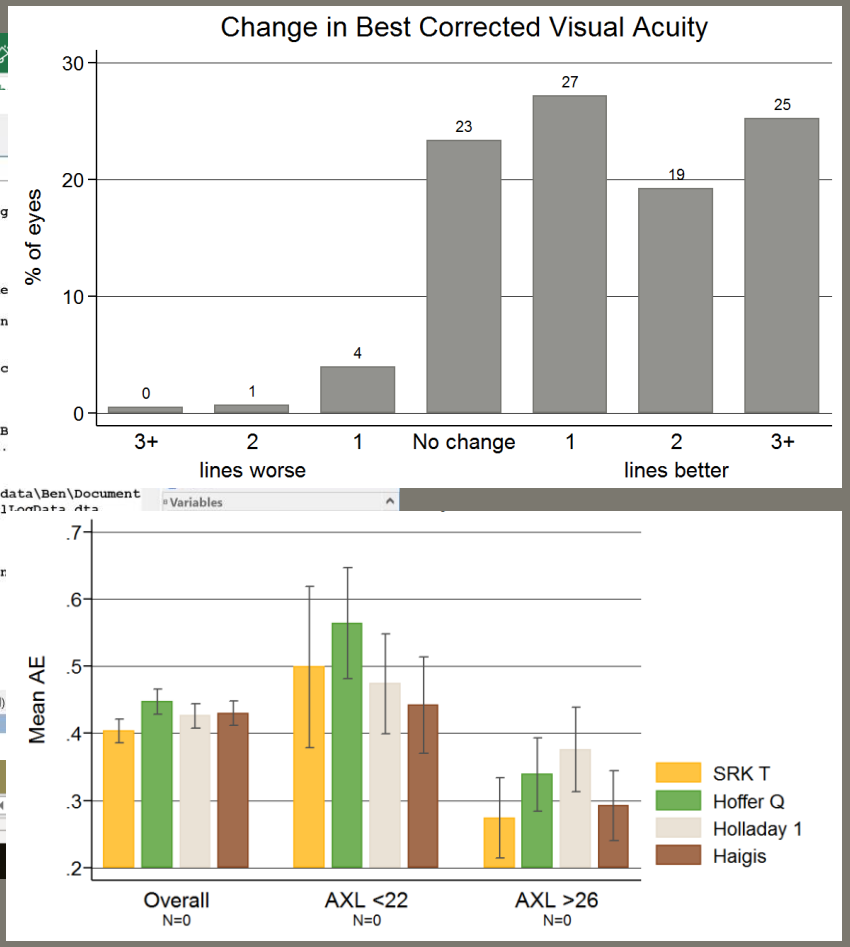
MS Excel

STATA

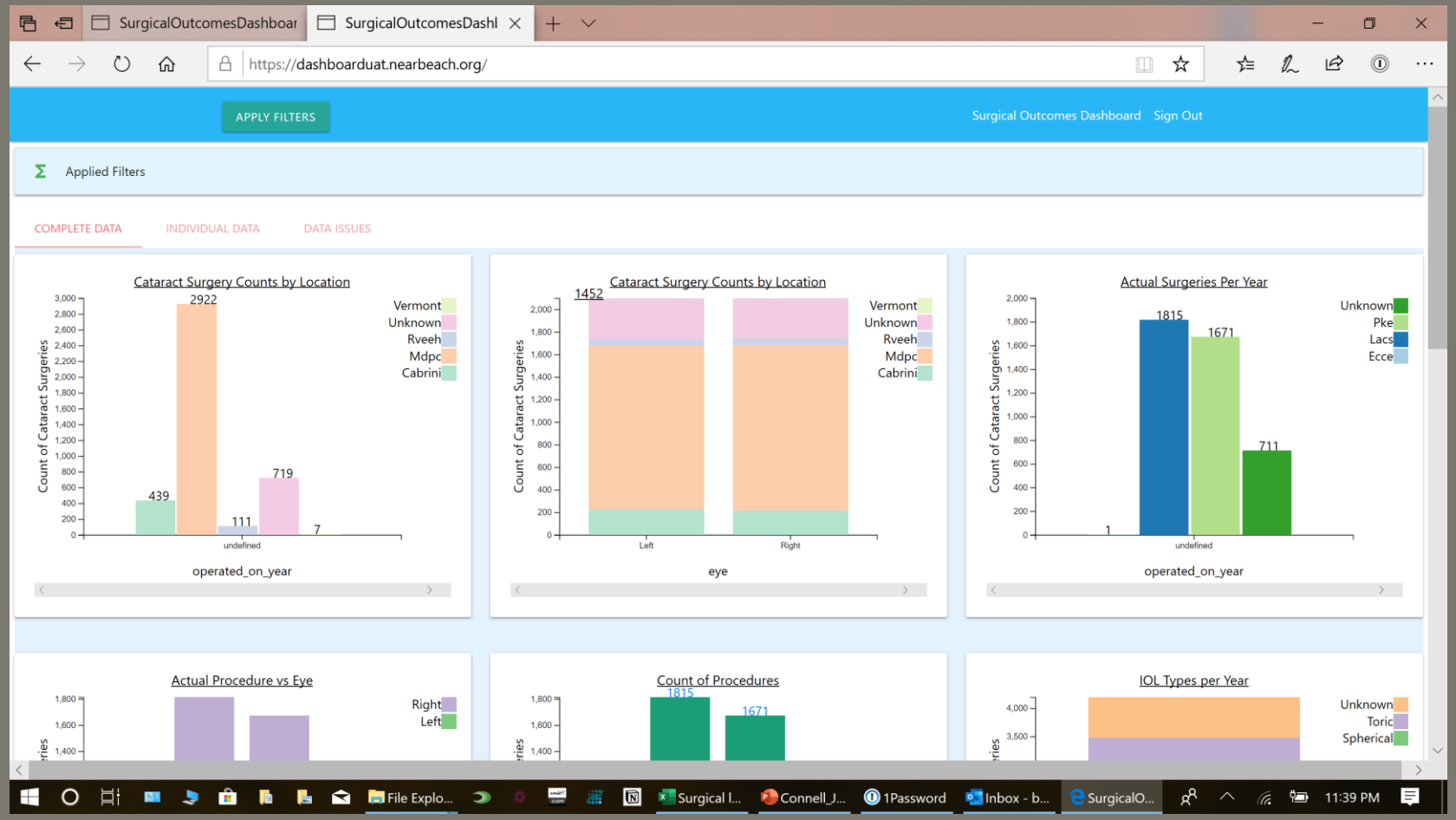
- 12 surgeon users
- ~7000 cases, 20 years

Results





Development



Some thoughts and questions

- Strong surgeon motivation
- Interesting insights
  - Patients with worse vison
  - Risk factors for worse vision
- Control for case mix/co-morbidities

Questions

1. Should surgeons have to audit their performance?
2. If so, which model:
   a) Results kept private
   b) Results kept public
3. Should optometrists have to audit their performance?
   a) Should *all* optometrists have to audit their performance (should their be exceptions)?
   b) Should their results be made public?

Blue-light filtering spectacle and intraocular lenses

Case scenario

Brian, a 40-year old accountant, attends for an eye test.

- Performs several hours of computer work daily
- Recently noticing increased levels of eye strain.

No significant ocular health findings. His mother has AMD.

You recommend a pair of SVN glasses.

Brian mentions that his work colleague recently bought some new glasses with a ‘blue-block coating’.

He asks whether you would recommend that he has this feature on his new glasses.

Would you recommend blue light-filtering spectacle lenses to Brian?

Which of the following statements BEST describes your overall position on blue light-filtering spectacle lenses?

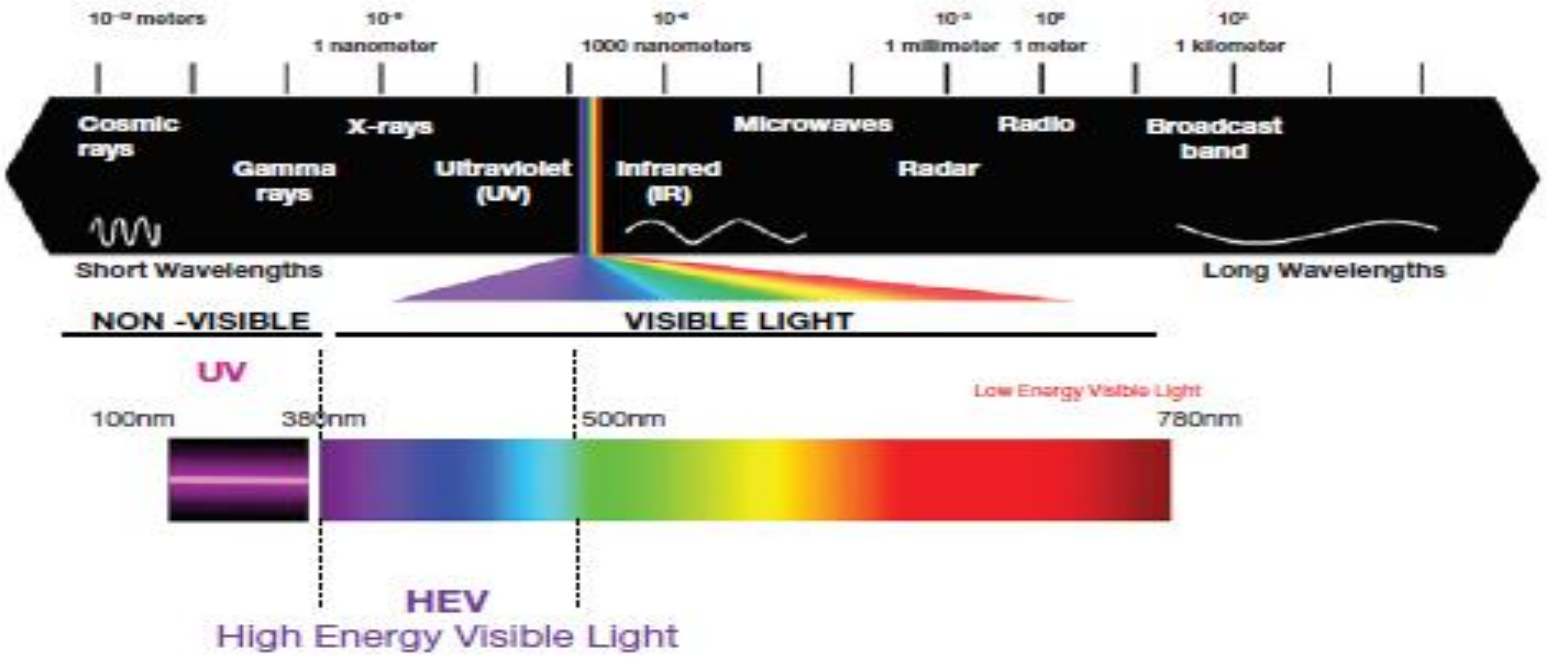
They act as a general safety measure to protect the eyes from the effects of blue light.

They are useful for reducing eye strain from digital device use.

They are not clinically justified.

I am not aware of these lenses.

Blue light



Adverse effects?

- Retinal damage[1-3]
- Digital eye strain[4]
- Alterations to sleep cycle[5]

1. Noell et al., Invest Ophthalmol (1966).
2. Ruffolo et al., Invest Ophthalmol (1978).
3. Tejedor et al., PLoS ONE (2018
4. American Academy of Optometry (1995)
5. Dijk et al., PLoS Biol (2009)

Smick et al. Report of a roundtable sponsored by Essilor of America(2013)

Sources emitting blue light

- **Sun**
- Incandescent light
- Fluorescent light
- Light emitting diode
- Liquid crystal display
- Mobile phones
- Tablets

Image sources: http://www.eyepromise.com/doctors/eye-health/bluelight-protection/

Eye (2016) 30, 230–233

www.nature.com/eye

Low-energy light bulbs, computers, tablets and the blue light hazard

Type of screens	Blue light weighted radiance, W m^{-2} sr^{-1}	Hazard ratio W lm^{-1}
Computer	0.08	8.17 x 10^{-4}
Laptop	0.11	8.16 x 10^{-4}
Tablet	0.13	8.73 x 10^{-4}
Smartphones	0.26	8.90 x 10^{-4}
Exposure limit for long term viewing (International standards)		100 W m^{-2} sr^{-1}

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blue light exposure and digital eye strain – the vision council

BLUE LIGHT EXPOSED

SHINE THE LIGHT ON BLUE LIGHT PROTECT YOUR VISION SURVEY ECP NEWS FRANÇAIS

#BLUELIGHTEXPOSED

We all know how important it is to protect our eyes from the sun's harmful UV rays; but what about the harmful effects of blue light rays?

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Digital eye strain: The impact of blue light on your eyes

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How Blue Light From Your Phone May Be Hurting Your Eyes (and What to Do About It)

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CLUB INSIDER

From the optometrist: Blue-light eye strain

By Dr. Gemie Pham

Everyday usage of modern technology can lead to varying degrees of fatigue and strain on your eyes.

HEALTH FOR ALL WOMEN

Articles Priva

Blue Light From Smartphones and Tablets Cause Headaches, Eye Strain, Insomnia

Excessive exposure to blue light is the top concern of eye doctors. Emitted from computers, tablets, smartphones, LED lights, and TVs, artificial blue light can be extremely harmful.

According to eye care provider, Dr. Gary Heiting: "Sunlight is the main source of blue light, and being outdoors during daylight is where most of us get most of our exposure to it. But there are also **many man-**

amazon

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Local News

Survey says blue light is leading cause of eye strain

SHAMBALLA EYEWEAR

Home » Dallas Eye Care Services » Blue Light and Digital Eye Strain

Blue Light and Digital Eye Strain

We are fortunate to live in an advanced technological age at the turn of the 21st century. Electronic devices are always with us in our world today and make our every day interactions with our environment easier and safe. Although there are many positive

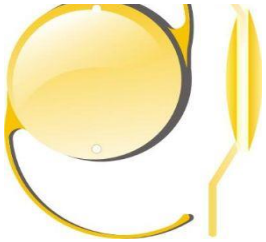
- Appointment Request
- Patients Register Online
- Read our Reviews
- New Arrivals
- Designer Frames

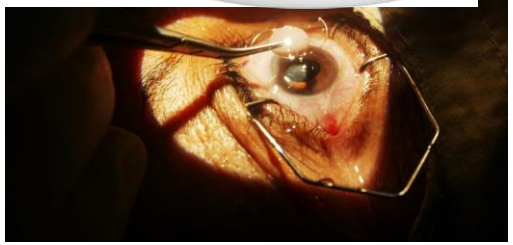
Blue light ‘protection’

DuraVision® BlueProtect by ZEISS

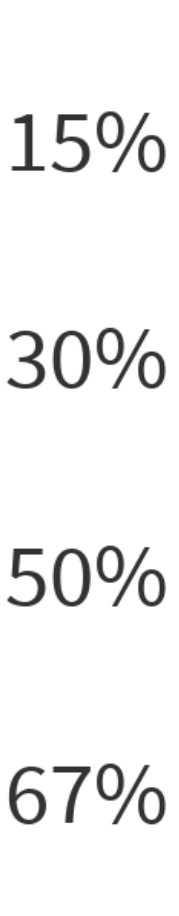
The ZEISS Blue-Violet Light Blocking Solutions.

DuraVision® BlueProtect by ZEISS is a coatin
who spend a lot of their time indoors and ar
LEDs as well as TV, computer or tablet scree

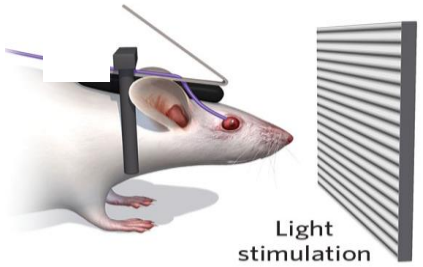


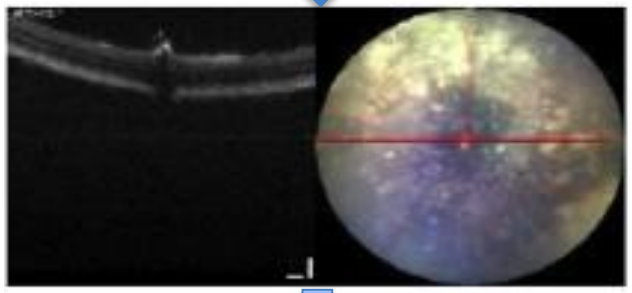


What percentage of blue light do you think blue-blocking spectacle lenses typically filter?



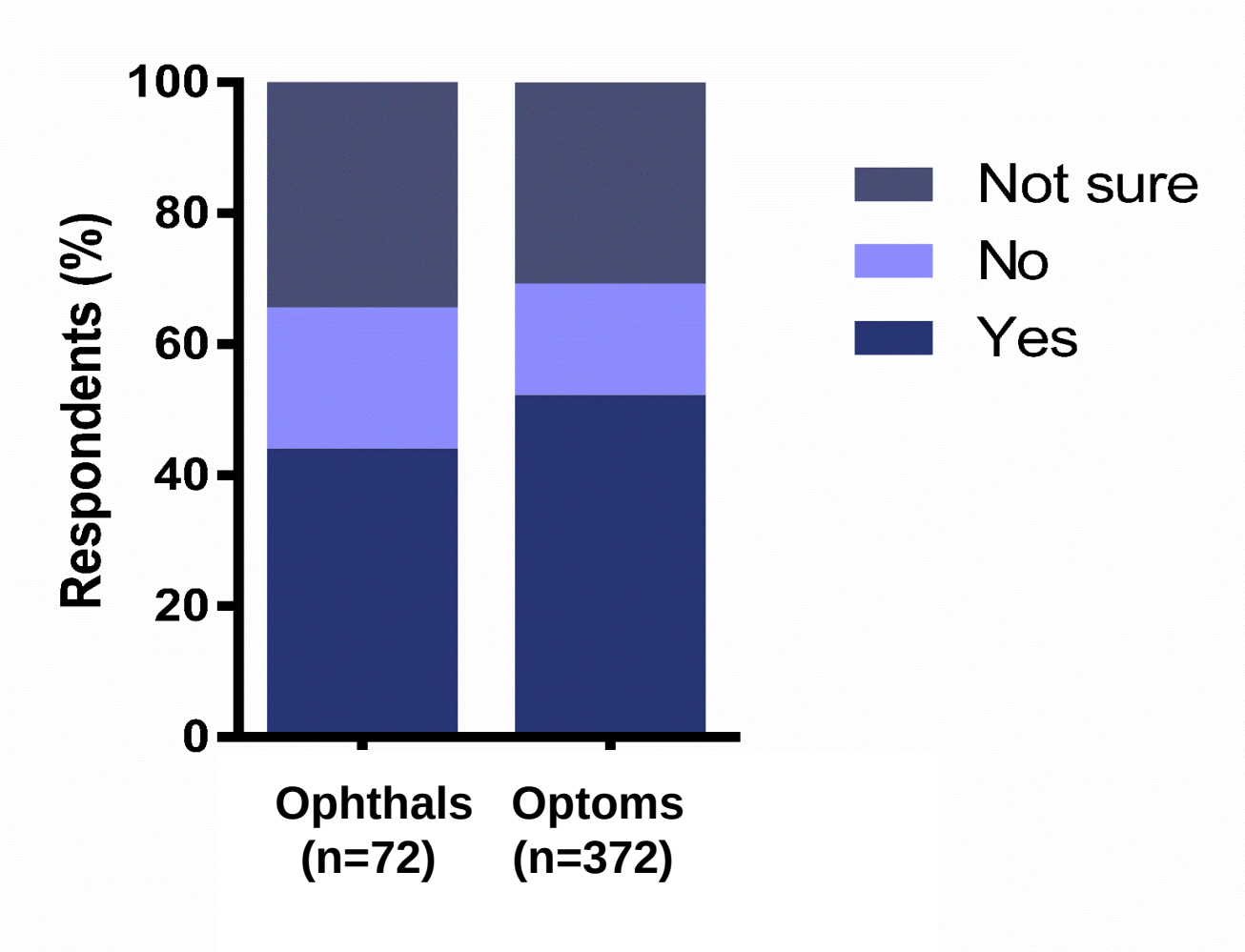
Link between blue light and retinal damage?





?

Do you think daily environmental exposure to blue light can cause retinal damage?



Clinical evidence

OPO OPHTHALMIC & PHYSIOLOGICAL OPTICS
THE JOURNAL OF THE COLLEGE OF OPTOMETRISTS

Ophthalmic & Physiological Optics ISSN 0275-5408

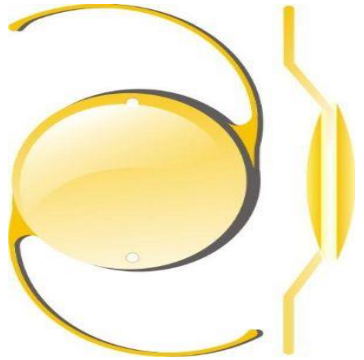
The effect of blue-light blocking spectacle lenses on visual performance, macular health and the sleep-wake cycle: a systematic review of the literature

John G Lawrenson[1], Christopher C Hull[1] and Laura E Downie[2]

[1]Centre for Applied Vision Research, Division of Optometry and Visual Science, City University of London, London, UK, and [2]Department of Optometry and Vision Sciences, The University of Melbourne, Melbourne, Victoria, Australia

Conclusions: We find a lack of high quality evidence to support using BB spectacle lenses for the general population to improve visual performance or sleep quality, alleviate eye fatigue or conserve macular health.

Clinical evidence



May 2018

Cochrane Library

Cochrane Database of Systematic Reviews

Blue-light filtering intraocular lenses (IOLs) for protecting macular health (Review)

Downie LE, Busija L, Keller PR

Jan 2019

JAMA Ophthalmology | Special Communication

Analysis of a Systematic Review About Blue Light-Filtering Intraocular Lenses for Retinal Protection
Understanding the Limitations of the Evidence

Laura E. Downie, BOptom, PhD(Melb); Richard Wormald, FRCS, FRCOphth; Jennifer Evans, MSc, PhD; Gianni Virgili, MD; Peter R. Keller, BAppSc(Optom), PhD; John G. Lawrenson, FCOptom, PhD; Tianjing Li, MD, MHS, PhD

Results:

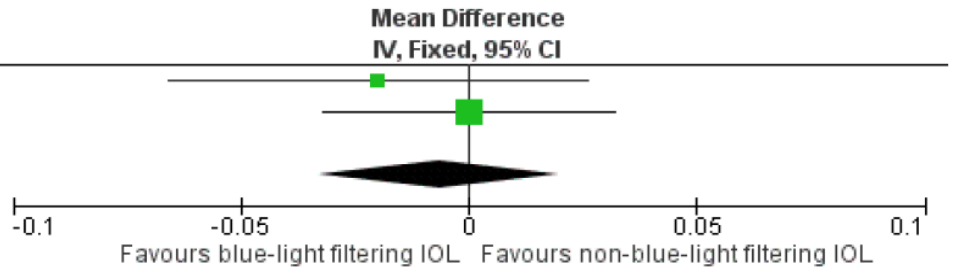
- 51 RCTs from 17 countries
- Clinical outcomes in >5000 eyes
- Follow-up: 1 month to 5 years (most studies: 3 months)

Major clinical finding - Primary outcome:

*"**Moderate certainty** for **no clinically meaningful difference** (MD -0.01 logMAR, 95% CI 0.03 lower to 0.02 higher; p=0.48) in **short-term BCVA** between the two IOL types."*

Study or Subgroup	Favours blue-light filtering IOL Mean	SD	Total	Non-blue-light filtering IOL Mean	SD	Total	Weight	Mean Difference IV, Fixed, 95% CI
Caporossi 2009 (1)	0.04	0.08	46	0.06	0.14	48	33.1%	-0.02 [-0.07, 0.03]
Vuori 2006 (2)	-0.01	0.05	19	-0.01	0.05	18	66.9%	0.00 [-0.03, 0.03]
Total (95% CI)			65			66	**100.0%**	**-0.01 [-0.03, 0.02]**

Heterogeneity: Chi² = 0.49, df = 1 (P = 0.48); I² = 0%
Test for overall effect: Z = 0.49 (P = 0.62)



Footnotes
(1) Reported at 12 months postoperatively, as the mean of right and left eyes, combining two groups with blue-light filtering IOLs (n=23/group) and two groups with non-blue-light filtering IOLs (n =...
(2) Reported at six months postoperatively

"... the use of blue-light filtering IOLs to impart benefits to macular health is not currently supported by the best-available evidence."

What, if any, do you consider the MOST important potential 'harm' of prescribing a blue-light filtering lens?

There aren’t any harms.

Cosmetic appearance of the lenses.

Additional cost to patients when there is evidence for no clinical benefit.

Effects on colour vision.

Contemporary Australian: UV filtering IOLs

- Alcon: dominant IOL
  - Exclusively blue blocking
- 2nd and 3rd leading manufactures: clear
  - Zeiss
  - Johnson and Johnson
- Smaller manufacturers
  - Offer both (Hoya, MBI)
- Surgeon choice driven by other factors
  - Company support
  - Toric rotational stability
  - Material marking
  - Cost
  - Plate haptic preference

Now, would you recommend blue light-filtering spectacle lenses to Brian?

Yes

No

BOOTS OPTICIANS FINED £40,000 OVER MISLEADING BLUE LIGHT ADVERTISING

The General Optical Council has sanctioned the multiple for unsubstantiated claims about blue light filtering lenses

26 May 2017 by Selina Powell

Category: High Street, Multiple, GOC, Professional conduct

The General Optical Council (GOC) has reprimanded Boots Opticians with a £40,000 fine for a "misleading" advertisement about Boots Protect Plus Blue (BPPB) lenses.

In a decision published today (26 May), the optical regulator found that there was potential for patients to be misled by the multiple overstating claims about blue light and the benefits of its BPPB lenses in an advertisement that was published in *The Times* in January 2015.

The Advertising Standards Authority (ASA) received complaints about the content of the advertisement, including claims that blue light from LED TVs, smartphones and energy saving light bulbs caused damage to retinal cells over time, and that BPPB lenses protected against blue light from these sources. The authority found that these claims were misleading and unsubstantiated.

A later BBC *Watchdog* investigation found that some Boots Opticians practices were continuing to make misleading claims about the lenses, including through in-store leaflets.

Panel discussion

Spectacle lenses

- @TM: Do you think placebo effects play a role in subjective responses to these lens products?
- @TM: How frequently are patients presenting with knowledge of these products and requesting them?

IOLs

- @BC: Is it typical to discuss the choice of IOL (i.e., blue-light filtering versus UV-filtering) with patients prior to surgery? Why/why not?

Corneal infiltrates

Case 1

23 yo F

2 weeks ago eye was red & irritated, improved. Continued wearing mini-scleral CLs.

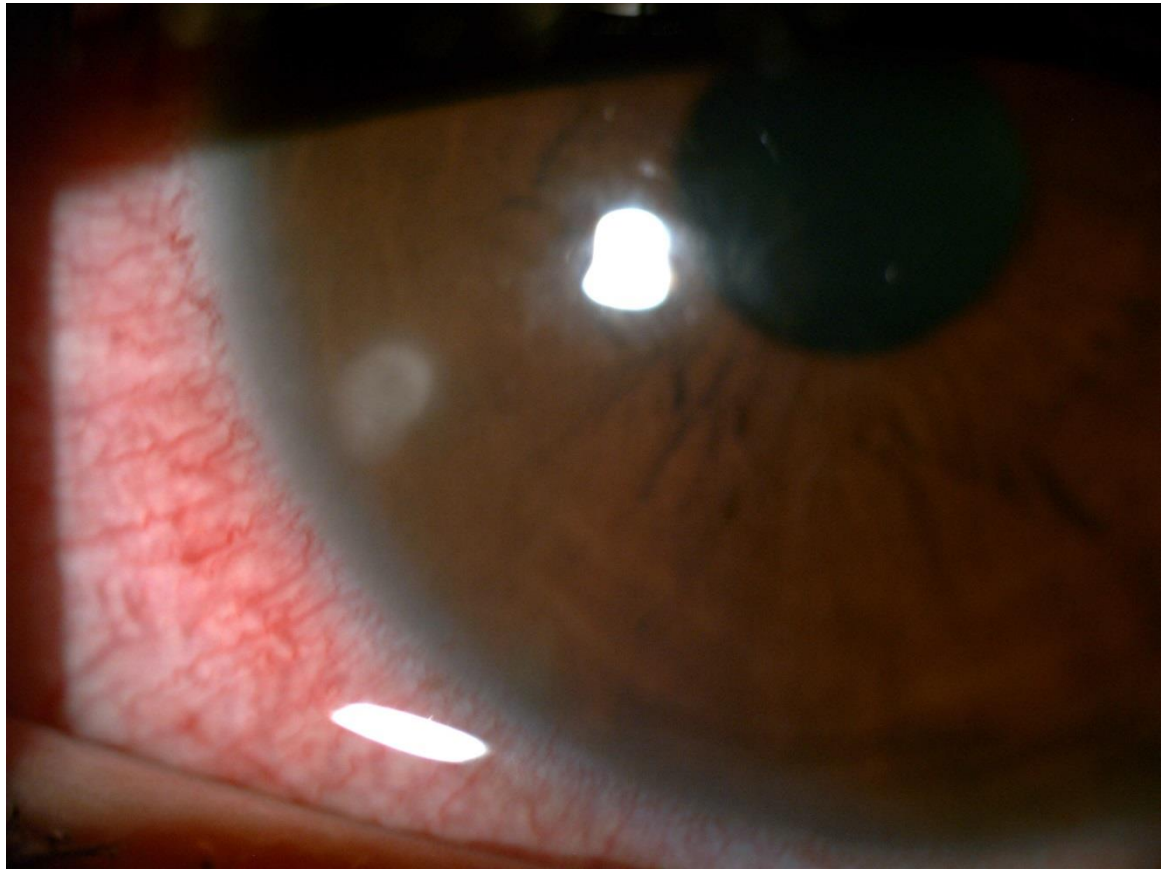
Mild yellow discharge on CL, nil noted otherwise

Pain “13/10”

POH:

- Mini-scleral CL wearer due to bilateral advanced KCN Dx 2016
- Bilateral CXL 2018
- History of not attending scheduled CL reviews

GH: Unremarkable apart from mild asthma & hay fever



Case 1

23 yo F

PC:

2 weeks ago eye was red & irritated, improved. Continued wearing mini-scleral CLs.

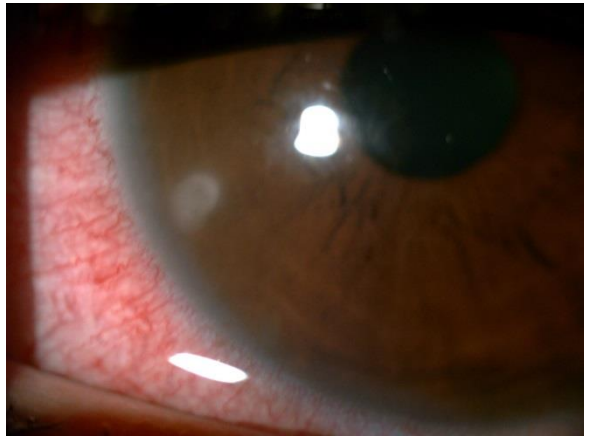
Trace yellow discharge on CL, nil noted otherwise

Pain 13/10

POH:

- Mini-scleral CL wearer due to bilateral advanced KCN Dx 2016
- Bilateral CXL 2018
- History of not attending scheduled CL reviews

GH: Unremarkable apart from mild asthma & hay fever



Pain	++++(+)
Epithelial defect	+
Discharge	+
Anterior chamber	-
Location	Peripheral
Size (above or below 2mm)	<2mm

How would you manage this?

Chlorsig qid & Flarex qid

Ciloxan q2h

Ciloxan q15mins for 6 hours, then q1h

Ciloxan q2h & Flarex qid

Refer to an ophthalmologist for assessment +/- corneal scrape

Incidence of CL related MK

Table 2 Annual incidence of contact lens-related bacterial, fungal, and protozoan keratitis

Lens type	Bacterial	Fungal	*Acanthamoeba*
Overall incidence	4[9]/10,000	~1/50,000[119,a]	1–33/million[35]
Soft lenses (daily wear)	1.9[9]–4.1[8]/10,000	NR	NR
Soft lenses (extended wear)	19.5[9]/10,000	NR	NR
Hydrogel	9.3[10]–20.9[8]/10,000	NR	NR
Silicone hydrogel	20.9[14]–25.4[9]/10,000	NR	NR
Gas-permeable (daily wear)	0.8[10]–4.0[8]/10,000	NR	NR
Orthokeratology	7.7[18]/10,000	NR	NR

Note: [a]Estimation calculated from Konda et al[119] which stated 5% of all contact lens microbial keratitis is fungal.
Abbreviation: NR, not reported.

What about mini-sclerals?

Zimmerman, A. B., Nixon, A. D., & Rueff, E. M. (2016). Contact lens associated microbial keratitis: practical considerations for the optometrist. *Clinical optometry*, *8*, 1.

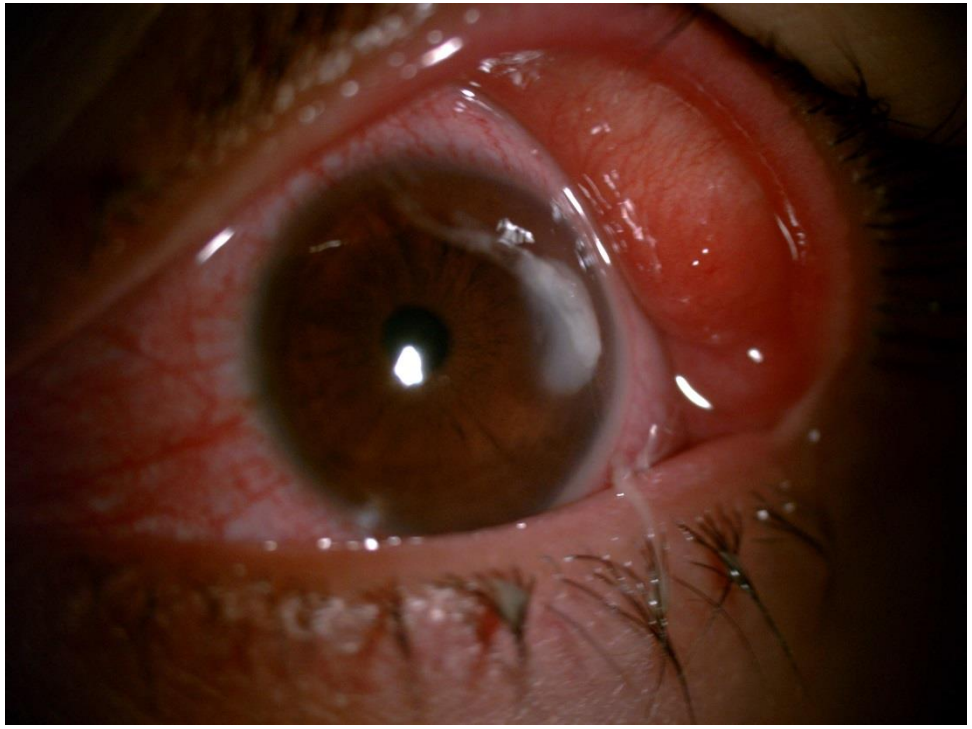
Case 2

20 yo F

L eye puffy/red for 3 days. Swollen superior lid. Can't open eye.

Was wearing CL's at time, has ceased since.

Pain 4/10 when closed, unable to judge when open. Tearing a lot.

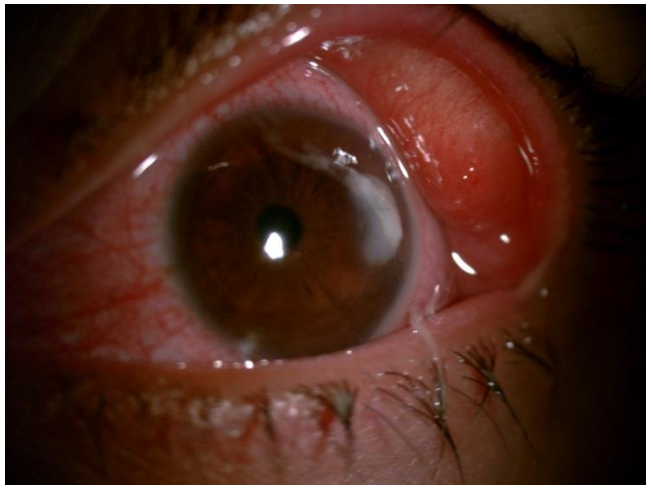


GH: Healthy

POH: CL - 2 weekly, unknown solution, cleans on removal, throws away at end of fortnight, no shower/swim/sleep.

VA R: 6/7.5 & L 6/9.5 (PH 6/7.5)

Case 2



20 yo F

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Pain 4/10 when closed, unable to judge when open. Tearing a lot.

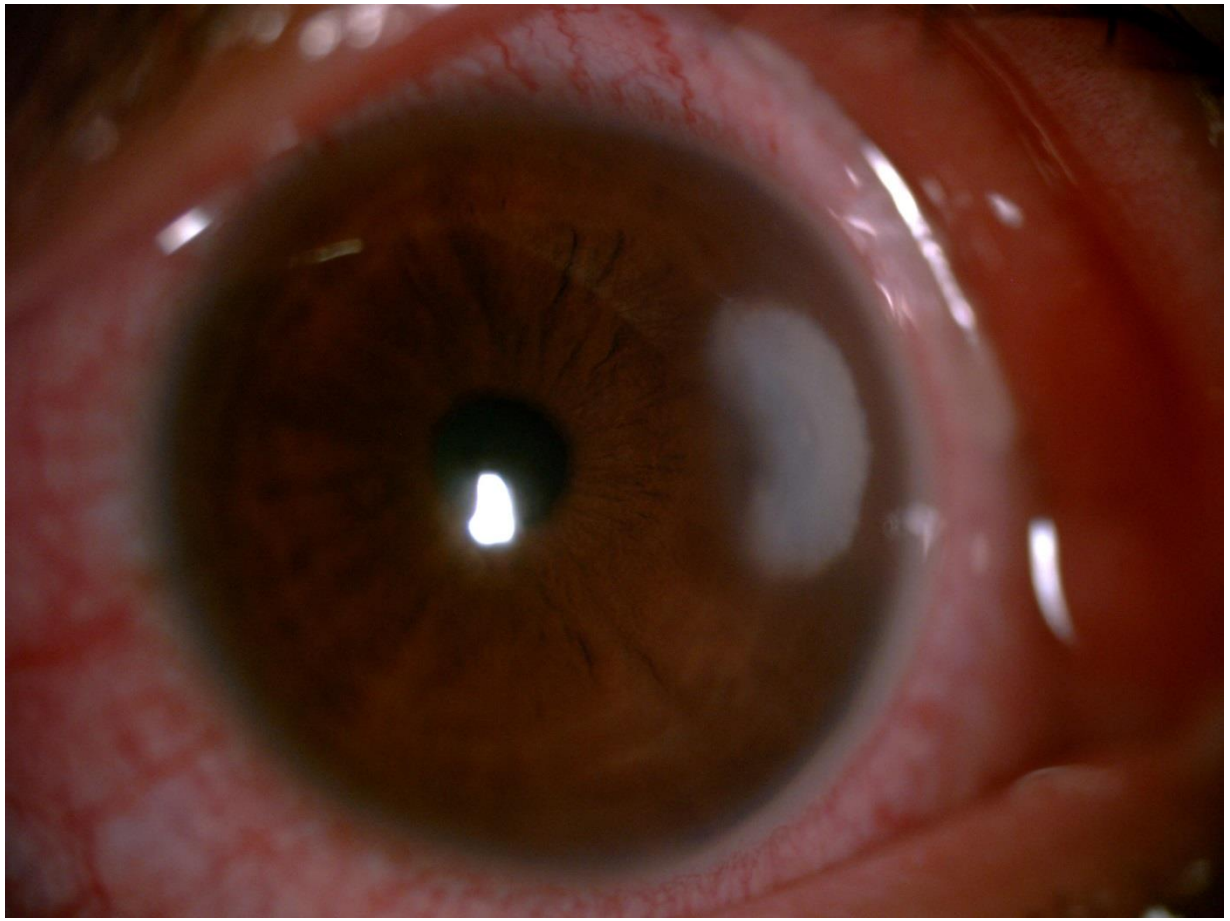
GH: Healthy

POH: CL - 2 weekly, unknown solution, cleans on removal, throws away at end of fortnight, no shower/swim/sleep.

- VA R: 6/7.5 & L 6/9.5 (PH 6/7.5)

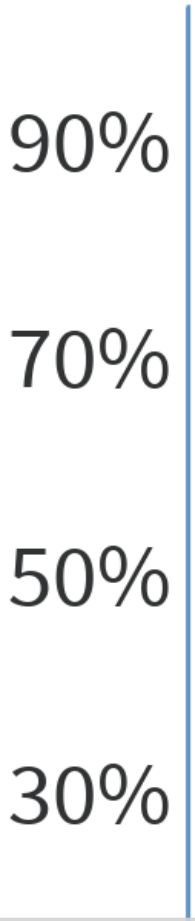
Pain	+++
Epithelial defect	+
Discharge	+++
Anterior chamber	-
Location	Peripheral
Size (above or below 2mm)	>2mm

4 hours later



Pain	+++
Epithelial defect	+
Discharge	+++
Anterior chamber	Faint hypopyon started to form
Location	Peripheral
Size (above or below 2mm)	>2mm

If a corneal culture is attempted, approximately how likely is a positive result?



To culture, or not to culture?

Am J Ophthalmol. 2007 June ; 143(6): 940–944.

The Clinical Diagnosis of Microbial Keratitis

Matthew A. Dahlgren, MD, **Ahila Lingappan, MD**, and **Kirk R. Wilhelmus, MD, PhD**
From the Department of Ophthalmology, Baylor College of Medicine, Houston, Texas. Dr. Dahlgren is currently with Milwaukee Eye Care Associates, Milwaukee, Wisconsin.

Abstract

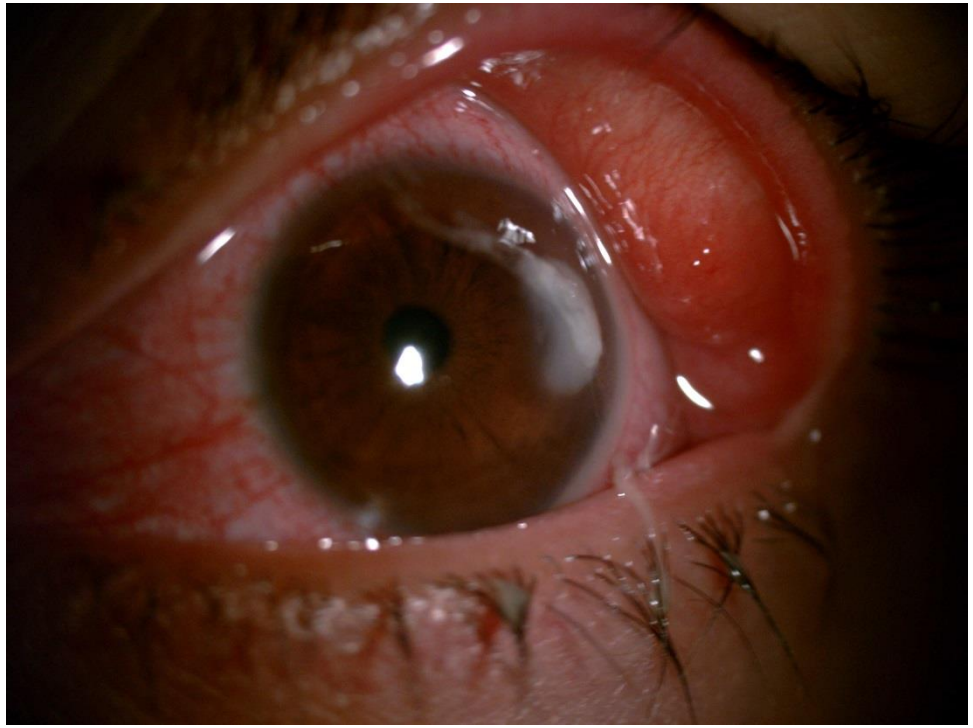
Purpose— To evaluate the ability of ophthalmologists to predict the laboratory results of presumed microbial keratitis and to explore which findings might influence diagnostic prognostication.

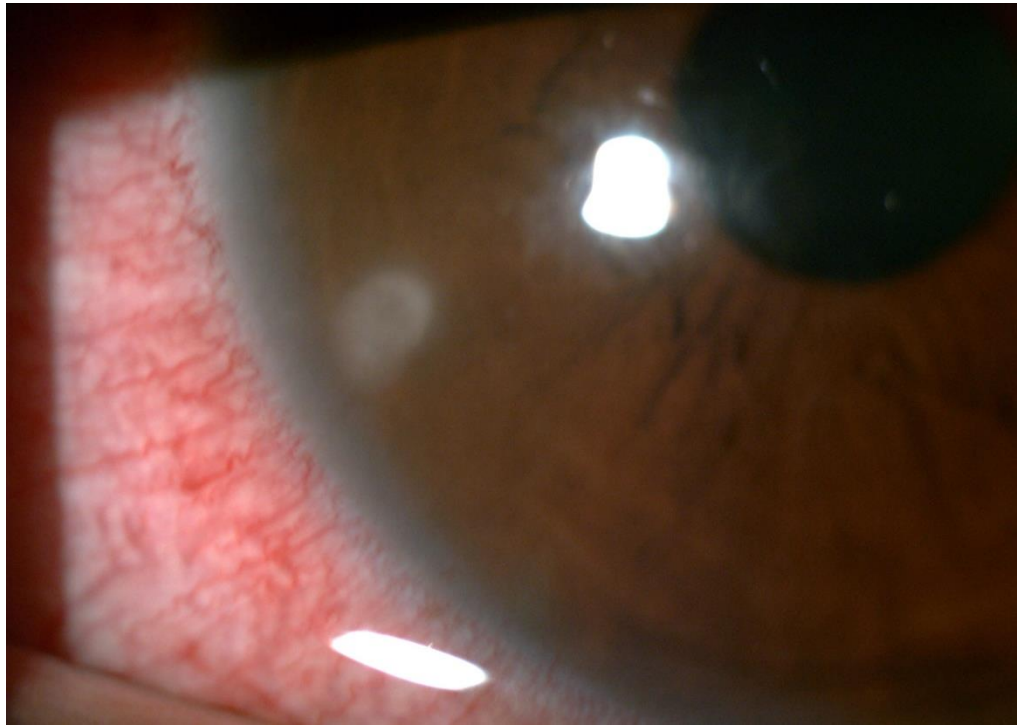
Design—Prospective cross-sectional study.

Methods— Fifteen ophthalmologists completed study forms at the initial presentation of patients with presumed microbial keratitis. After predicting the category of microbial recovery, clinicians submitted corneal scrapings for masked laboratory processing. The relative effects of ocular inflammatory signs on correct microbial diagnosis were explored with Poisson regression.

Results— Clinical examiners correctly predicted the presence or absence of microbial recovery in 79 (76%) of 104 ulcerative keratitis and successfully distinguished among bacterial, fungal, and amoebic keratitis for 54 (73%) of 74 culture-positive infections, although only 31 (42%) were properly subcategorized. The positive predictive value of clinical diagnosis was 65% (95% confidence interval (CI), 43%–84%) for 20 eyes with *Pseudomonas* keratitis, 48% (95% CI, 32%–63%) for 38 other bacterial keratitis, 45% (95% CI, 17%–77%) for 13 fungal keratitis, and 89% (95% CI, 52%–100%) for nine *Acanthamoeba* keratitis. The recognition of *Pseudomonas* keratitis was significantly improved by the occurrence of a larger infiltrate ($P = .02$), and correctly predicting *Acanthamoeba* keratitis was enhanced by observing a ring infiltrate ($P < .001$). Antimicrobial use before referral significantly attenuated clinical diagnosis ($P = 0.03$) and hampered microbial recovery ($P = 0.004$).

Panel discussion…





Panel discussion…

Case 1

Since increased use of mini-sclerals & Ortho K has there been an increase?

- Inflammatory events?
- MK?

How would you deal with the unreliable patient/serial no show? Does this change your management plan?

- @LD: Have you refused CL fitting to patients with poor track record?
- @BC & LD: Would you change your therapeutic care?

Case 2

Empirical treatment

- @BC: In your experience does prior empirical treatment lead to poorer outcomes?