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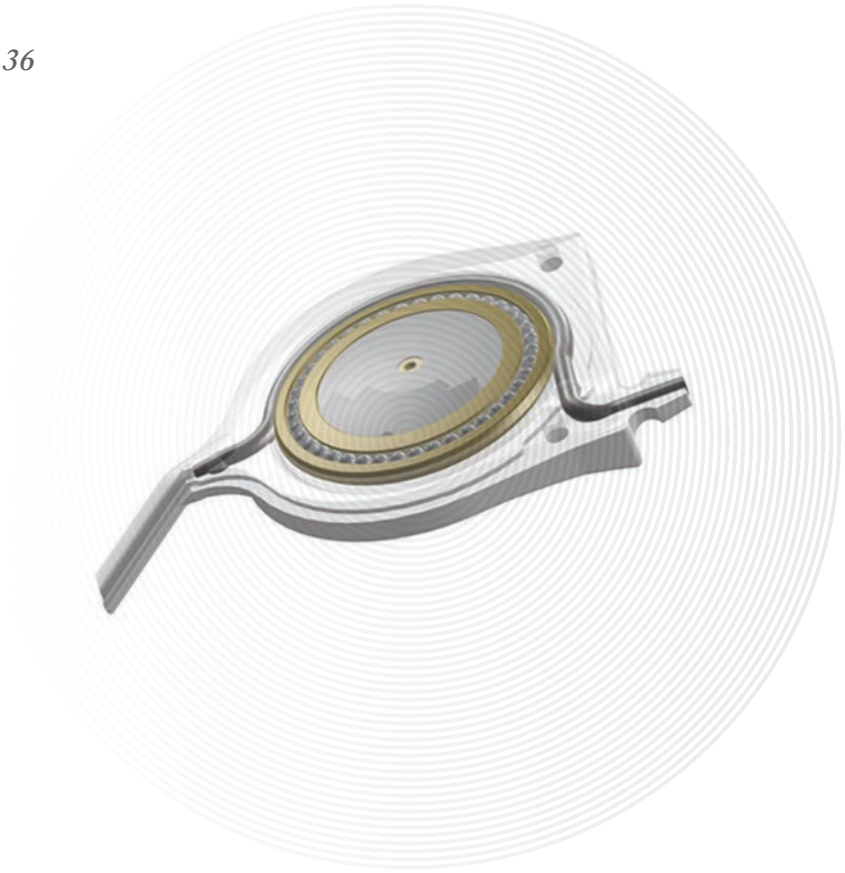
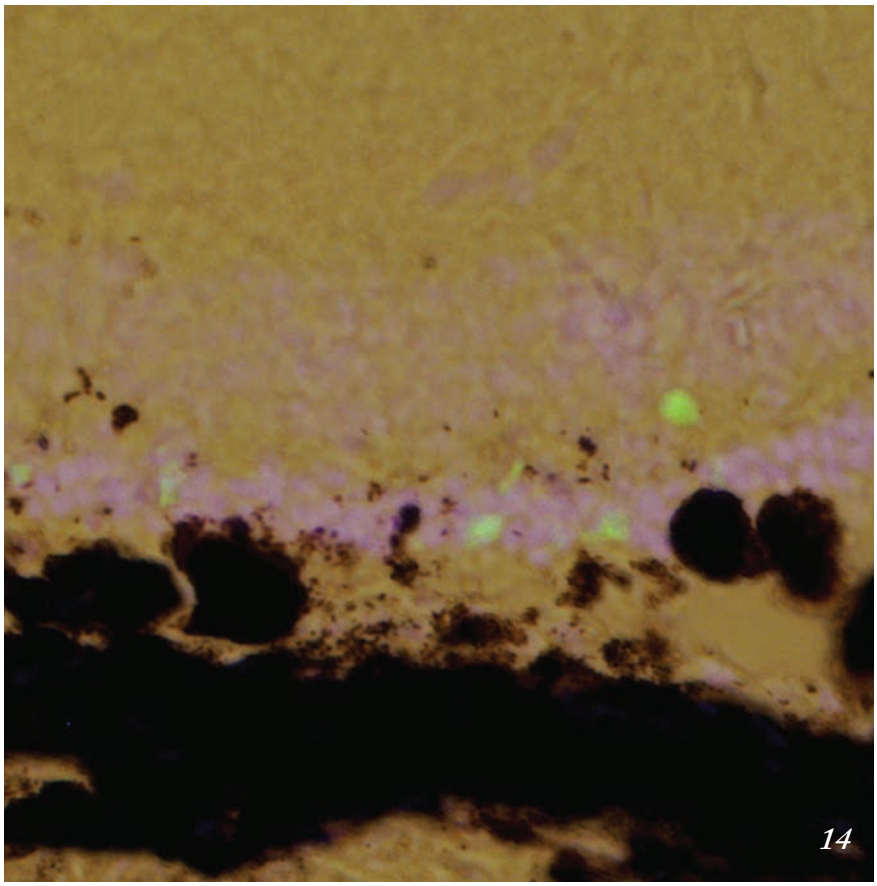


On The Cover

Power List pastiche of Sir Peter Blake's "Sgt. Pepper's Lonely Hearts Club Band" album cover (1967).

Upfront

Feature



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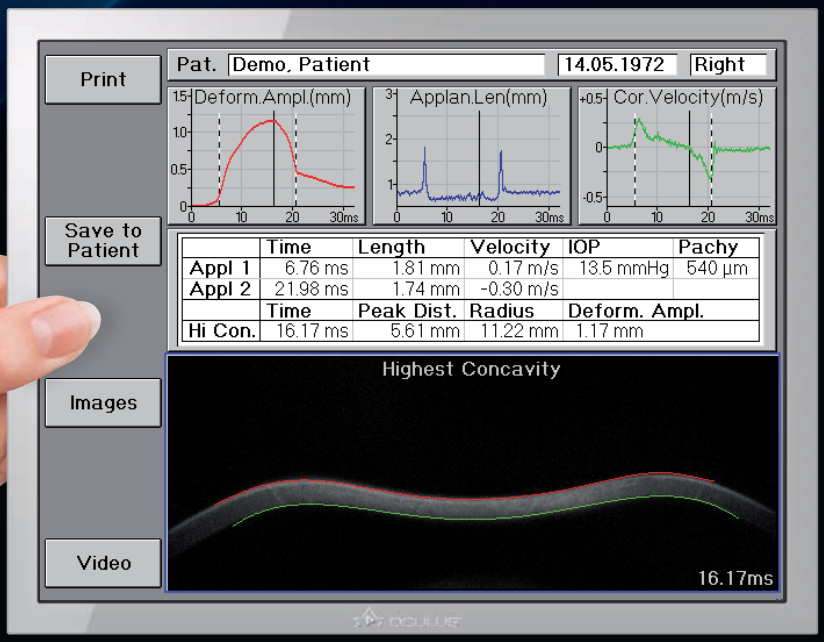

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The Power of the List

The Ophthalmologist Power List 2014 is this publication's catalog of the 100 most influential people in ophthalmology today.

Why generate a Top 100? Of the many reasons, the chief one is to catalog and celebrate progress. I believe that most ophthalmologists would agree that these are among the best of times for the profession; an age of wisdom rather than of foolishness. Your accomplishments include: the development of new surgical techniques, drugs and ophthalmic devices; breakthroughs in the understanding of biology, pathology and epidemiology; improvements (arguably) in health care administration and delivery, and the growth of an industry and infrastructure to meet the complex medical needs of patients.

This progress is driven by people, and those driving this progress deserve recognition. One great way of doing this is to highlight the achievements of ophthalmology's most influential contributors. And that's what the Power List is: a celebration, acknowledgement and offer of gratitude to some of the major contributors to ophthalmology today.

I don't claim that this is definitively the top 100 people in ophthalmology. It's a subjective list, initially compiled from our readers' contributions. If it has shocking omissions or inclusions – do let us know and help us by submitting nominations next year.

The list was developed in three stages. In stage 1, we invited readers to nominate people that they thought deserved recognition – only those nominated were considered. In stage 2, a jury of five noted ophthalmologists (who prefer to remain anonymous and were modest enough not to vote for themselves) selected their top 100 from the slate of nominees: the results were consolidated into a list of 100 names. In stage 3, the jury ranked the list from 1 through 100; the average scores provided the final Power List.

To resume the Dickens theme, the list does contain both the season of light and the season of darkness.

One dazzling feature of the list is its geographical scope. Within the Top 20, ten countries are represented, and within the Top 100 as a whole, there are representatives of 21 countries. Ophthalmologists from Asia, Africa, North America, South America, Europe, and Australia are included in the list. Who would have imagined that a list of 100 influential ophthalmologists would have been so broad? (For the record, the five judges came from five countries and three continents).

A darker aspect is the gender ratio: the entire list has just 13 women, and all of the Top 20 are men. That's a depressing statistic.

To those who participated, our thanks. To those who feel aggrieved, let us know and aim for satisfaction in 2015: the list will be an annual event. And to those named in The Ophthalmologist Power List 2014, our congratulations. More power to you!

Richard Gallagher
Editorial Director

Alain Saad

Alain Saad specializes in cornea, cataract and refractive surgery at the Rothschild Foundation in Paris. He is a proponent of Descemet membrane endothelial keratoplasty (DMEK) and is working to generalize the procedure for treatment of endothelial disease. Alain co-developed the SCORE analyzer for the pre-operative screening of corneas. He shares his strong interest in refining patient selection for refractive surgery page 34.

Nicole Kretz

The mother of two young children and wife of a prominent ophthalmologist, Nicole Kretz is determined to make the most of family time. That means that the family travels en masse to ophthalmology conferences, providing memorable travel and learning experiences as well as family fun. Nicole shares her top tips on how to do it with panache on page 48.

Isabelle Leach

Isabelle Leach is a medical doctor by training and a science writer with over twenty years of experience by choice. A francophone from childhood, Isabelle has managed to have a writing career in two languages, writing across medicine's many disciplines. On page 12, Isabelle writes about how the configuration of the vitreomacular interface impacts on the efficacy of anti-VEGF therapy.

Yourselves

The 2014 Ophthalmologist Power List would not exist without the input of our readers. It was your votes that decided who would, and wouldn't be in the Power List. It's a list from the community, for the community, and we thank everyone who took the trouble to nominate a worthy candidate. See the results of your handiwork starting on page 17.

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Upfront

Reporting on the innovations in medicine and surgery, the research policies and personalities that shape ophthalmology practice.

We welcome suggestions on anything that's impactful on ophthalmology; please email

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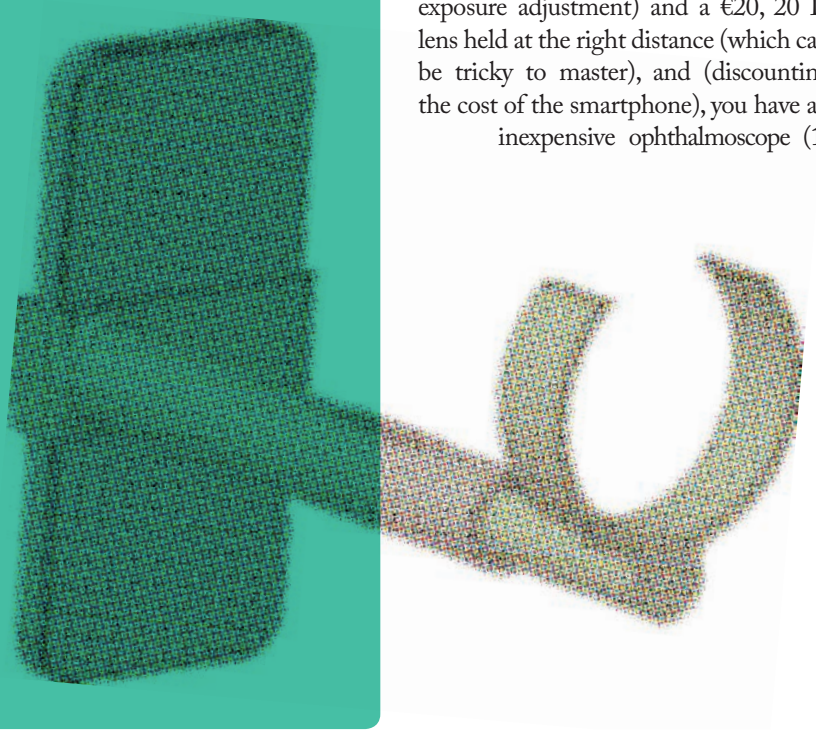


iPhone eye imaging

More money-saving combinations of smartphones and snap-on adapters that enable you to perform eye examinations on-the-go.

Smartphones hold much promise for ophthalmology outside of the clinic. Their cameras are continually improving in terms of sensor resolution, light sensitivity, and lens quality. The LED flashes provides a steady, illuminative light source, and the hefty processing power and high-resolution displays and high-speed network connections onboard mean that images can be acquired, analyzed, annotated, stored and shared in minutes on the same device. All that's needed is the right app (FiLMiC Pro, as it allows on-the-fly focus and exposure adjustment) and a €20, 20 D lens held at the right distance (which can be tricky to master), and (discounting the cost of the smartphone), you have an inexpensive ophthalmoscope (1) – and with it, inexpensive telemedicine. It just looks ugly!

Industry can help here; for example, Welch Allyn will let you pair its €540 PanOptic Ophthalmoscope with a professional-looking €65 iPhone adaptor. That's fairly frugal but only if you already have the ophthalmoscope – but certainly isn't if you don't. But now there's a middle way.

Robert Chan and David Myung of Stanford University have designed two cheap, smartphone accessories, and published them in the March issue of the Journal of Mobile Technology in Medicine. The first device can clip on to any smartphone and consists of a macro lens with a 2.5 cm focal length, attached onto a clip, and a "properly positioned" LED light source that illuminates the eye – and can be used as a substitute for a slit lamp (2). It is easy to use: switch on, hold with both hands; gently touch the patient's head with a couple of fingers so that you can rest the phone on those fingers (enabling you to hold the lens at the correct distance to image the eye) and operate the touchscreen buttons with a spare finger on the other hand. The team's second device, developed in conjunction with Mark Blumenkranz, is a 3D-printed iPhone attachment that contains a mount for an indirect ophthalmoscopy condensing lens. The mount is positioned at a prescribed (but adjustable) distance from the iPhone's camera lens, enabling focusing of the image onto the retina for fundus imaging. As before, FiLMiC Pro is being used as the image acquisition app.

These devices were designed to be inexpensive, with production costs being approximately €65 at the moment. "It took some time to figure out how to mount the lens and lighting elements to the phone in an efficient yet effective way," said Myung, who built the prototypes with inexpensive parts purchased almost exclusively online, including plastic caps,

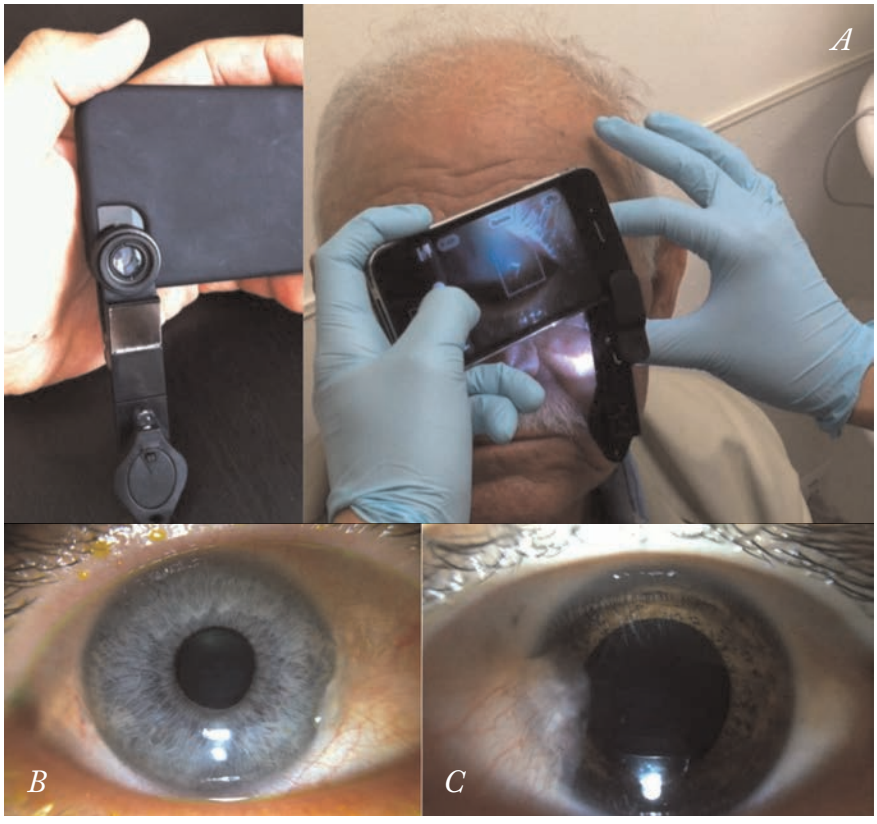
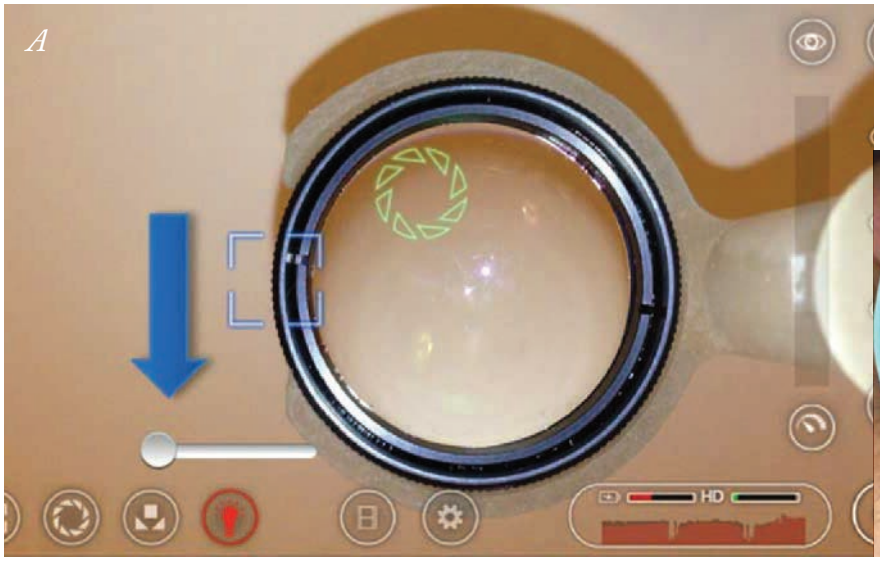
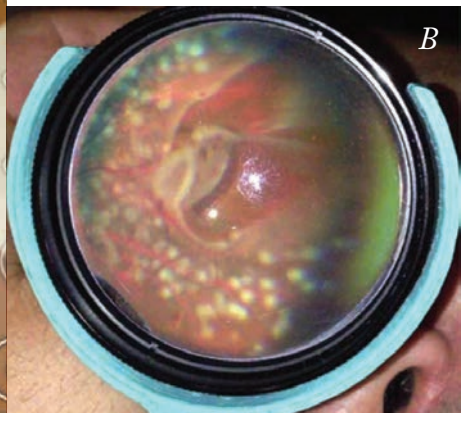


Figure 1. (a) Smartphone Clip-on device, being rested on the physician's fingers to take a photograph, and images of (b) a nasal pingueculum, and (c) a nasal pterygium.

Figure 2. (a) The FiLMiC Pro app in use with the 3D-printed lens mount, and (b) a superior horseshoe retinal tear imaged through the device and lens.





plastic spacers, LEDs, switches, universal mounts, macro lenses and even a handful of Lego blocks. The simplicity of the second device, however, allows it to be 3D-printed, which means that anyone with a 3D printer and enough plastic substrate can build their own. Such printers are popping up all over the world, from battlefield hospitals to aid agency centers in rural areas of developing countries. As the substrate is cheap powdered plastic, once the printer is in place, producing such instruments could be as simple as downloading the designs and pressing print. Perhaps we'll all be printing inexpensive iPhone indirect ophthalmoscope adapters sometime soon. *MH*

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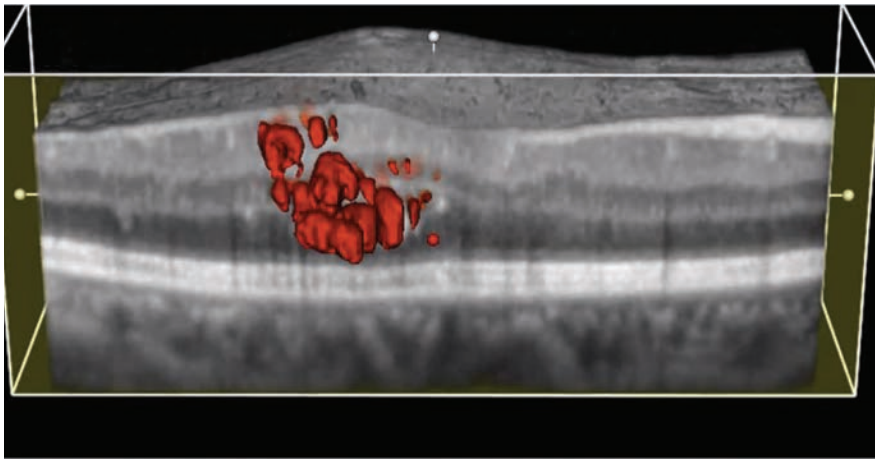

Image: Sebastian Waldstein

The Vitreomacular Interface Influences AMD Outcomes

Evidence is stacking up that the configuration of the VMI alters the functional and anatomic efficacy of anti-VEGF drugs.

By Isabelle Leach

While it is the undisputed gold standard for wet AMD treatment today, treatment outcomes with intravitreal administration of anti-VEGF agents vary from patient to patient. Many comorbidities have been identified as contributing to this variation (1). A new addition to that list is the configuration of the vitreomacular interface (VMI); three different reports have concluded that VMI disease (VMID) can have a clinically important effect on visual outcomes and need for retreatment.

Last year, Amy Green-Simms and colleagues at the Mayo Clinic in Rochester, MN, USA, performed a retrospective case series analysis of patients with AMD who received intravitreal anti-VEGF injections and who either did (n=32) or did not (n=146) have VMID (2). They found that eyes with VMID had similar best corrected visual acuity (BCVA) to VMID-free eyes, but that they required more anti-VEGF therapy to achieve it.

Those findings were confirmed by Ulrike Mayer-Sponer and colleagues at the Vienna Reading Center in Vienna, Austria, who performed a subanalysis of data from a phase III clinical trial that enrolled treatment-naïve patients with subfoveal choroidal neovascularization (3). The patients were randomized to receive ranibizumab therapy either every month or every three months. The team found that patients with VMID (in this case vitreomacular adhesion and release of vitreomacular contact) had to have the intensive, monthly treatment regimen to gain the full benefit of ranibizumab; patients receiving quarterly dosing experienced significantly poorer visual outcomes.

In March 2014, during the 66th Annual Wills Eye Conference, Samuel K. Houston III presented data from a retrospective consecutive case series that included patients with (n=51) and without VMA (n=153) (4). He reported that the groups had similar visual acuity (which improved over the two-year study period) and similar central retinal thicknesses. Yet, he noted that more intensive treatment was necessary for patients with VMA. "The longest interval extension occurred in the non-VMA group and was statistically significant," Houston said, "The anatomic factors may contribute to individual treatment responses and should be evaluated and considered in treatment decisions for neovascular AMD."

Comorbidities like VMID have distinct effects on how regularly patients must be treated with ranibizumab. Few patients behave like the "average patient" of clinical trials, arguing that tailored anti-VEGF treatment regimens for AMD is required.

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Stats on stats

An advanced level of statistical knowledge is necessary to critically appraise most ophthalmology literature.

How much statistical expertise is required to comprehend the ophthalmology literature? To find out, a recently-published study (1) surveyed the statistical techniques used in all articles published in 2012 in Ophthalmology, the Am. J. Ophthalmol., and Arch. Ophthalmol. To get a handle on just how understandable the literature is, the authors "estimated the accumulated number and percentage of articles that a reader would be expected to be able to interpret depending on their statistical repertoire".

With little or no statistical knowledge, a reader could interpret the statistical methods presented in two in every ten (20.8 percent) articles. To understand more than half (51.4 percent) of the articles, familiarity with at least 15 different statistical methods is required, rising to 21 different categories of statistical methods to comprehend the content of 70.9 percent of articles, and to 29 statistical methods to comprehend fully over 90 percent of articles. When the authors looked at the subspecialties of ophthalmology, articles that pertained to retina and glaucoma tended to use more complex analysis than those from the corneal subspecialty.

The study raises some questions. Is the journals' readership sufficiently statistically numerate to be able to fully participate in scientific discourse? Are the reviewers? Do ophthalmologists receive adequately trained in statistical methods?

Adam Jacobs, statistician and director of the statistical consultancy firm, Dianthus Medical, has a different interpretation. "The research is framing the question in the wrong way," notes Jacobs. "I don't think it's necessary for an ophthalmologist – or any other clinician – to be an expert in a wide variety of statistical techniques", asking, "surely it's the job of the study author to ensure that tricky statistical techniques are explained clearly so that non-experts can still understand what's going on?" *MH*

Reference

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Interleukin for a better wet AMD therapy

Subcutaneously-administrated IL-18 works well to reverse choroidal neovascularization (in mice).

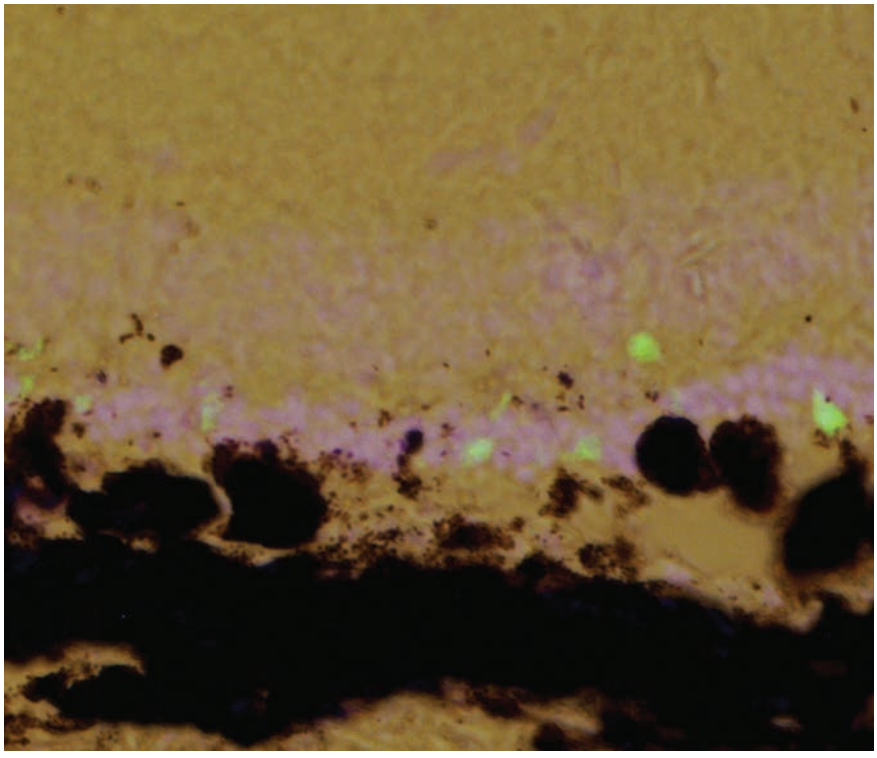

Image: Sarah Doyle

Figure 1. Mouse retinal pigment epithelial cells swelling following the introduction of adeno-associated virus over-expressing the immature form of interleukin-18, pro-IL-18 (green).

Interleukin-18 (IL-18) is a peculiar protein. It is pro-inflammatory, produced by macrophages, and plays a large role in cell-mediated immunity. But researchers at Trinity College, Dublin, Ireland, have demonstrated that rather than damage the retina, IL-18 has the potential to stop choroidal neovascularization (CNV) in its tracks (1). They were led to this surprising discovery by their earlier research that had demonstrated (in mice) that the absence of IL-18 resulted in excessive CNV (2), prompting them to examine whether IL-18 administration could put the brakes on laser-induced CNV progression. The study's first author, Sarah Doyle said that they "were initially concerned that IL-18 might cause damage to the sensitive cells of the retina, because it is typically linked to inflammation. But surprisingly, we found that low doses had no adverse effects on the retina and yet still suppressed abnormal blood vessel growth."

This was promising news, given that the chronic use of anti-VEGF agents risks the development of retinal pigment epithelium (RPE) atrophy. Overexpression of an immature (not fully processed) version of IL-18 – pro-IL-18 – also resulted in the same pathology (Figure 1), but the administration of therapeutic concentrations of IL-18 (the final mature form) did not. Furthermore, IL-18 worked as well as anti-VEGF agents in preventing the swelling that follows laser-induced CNV. Co-administration of both an anti-VEGF agent and IL-18 acted to attenuate CNV development further than either agent alone.

One great potential advantage that IL-18 has is that it can be administered intravitreally or subcutaneously – in mice the drug worked just as effectively by either route. Matthew Campbell said, "GlaxoSmithKline has already started examining subcutaneously-administered IL-18 for the treatment of various types of cancers across some clinical trials, and to date, this method of administration appears to be well tolerated, and IL-18 appears to have a good safety profile."

If the study results are as applicable to mice as they are to humans, this could mean that ophthalmologists would not necessarily have to administer every IL-18 dose, as is the case with intravitreally-injected anti-VEGF drugs today, helping to lighten their ever-increasing workloads.

Campbell concluded "While it is still early days yet, the fact that IL-18 has already been tested in human subjects and has a good safety profile both systemically and from an ophthalmology perspective, it looks like a promising candidate as we move forward." *MH*

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POAG predisposition

Predictors for primary open-angle glaucoma in a South Indian population.

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South Indian population

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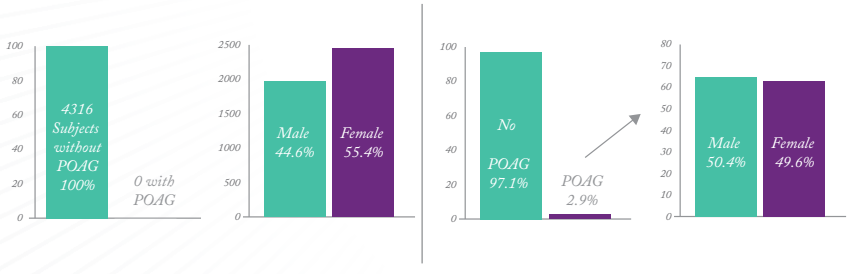
Baseline → *Year 6*



Age related incidence (relative to the 40–49 year age group)

0%
40–49 years

2.3%
50–59 years*

3.5%
60–69 years*

Urban residence
*↑ 1.6 X**

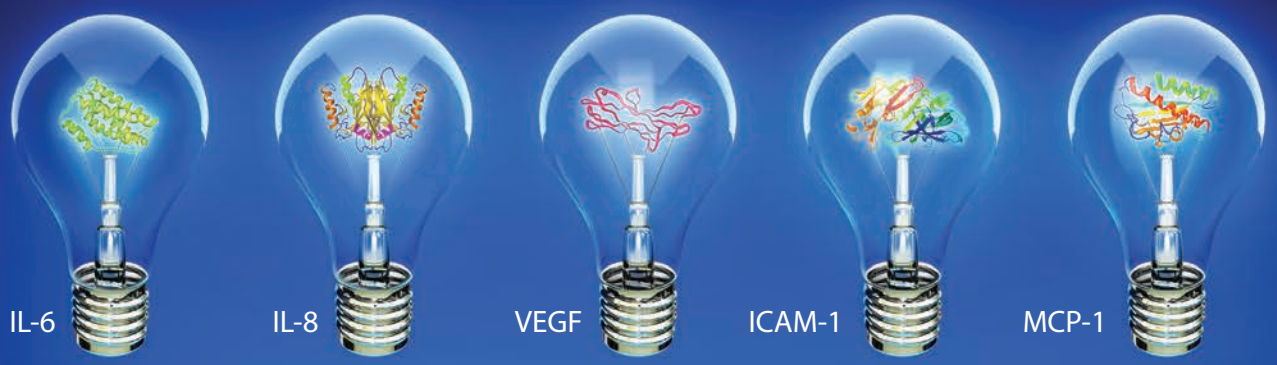
Each 10mmHg increase in IOP
*↑ 2.0 X***

*Myopia up 1.7 times and axial length ↑ 1.5 X per mm***

** P=0.01 ** P=0.001*

Reference
L. Vijaya et al. "Predictors for Incidence of Primary Open-Angle Glaucoma in a South Indian Population: The Chennai Eye Disease Incidence Study", Ophthalmology, (2014). Epub ahead of print.

TARGETING THE MEDIATORS OF INFLAMMATION[1]



Delivering efficacy in the clinical setting[2-5]

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OZURDEX® (Dexamethasone 700 micrograms intravitreal implant in applicator)

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Presentation: Intravitreal implant in applicator. One implant contains 700 micrograms of dexamethasone. Disposable injection device, containing a rod-shaped implant which is not visible. The implant is approximately 0.46 mm in diameter and 6 mm in length. **Indications:** Treatment of adult patients with macular oedema following either Branch Retinal Vein Occlusion (BRVO) or Central Retinal Vein Occlusion (CRVO). Treatment of adult patients with inflammation of the posterior segment of the eye presenting as non-infectious uveitis. **Dosage and Administration:** Please refer to the Summary of Product Characteristics before prescribing for full information. OZURDEX must be administered by a qualified ophthalmologist experienced in intravitreal injections. The recommended dose is one OZURDEX implant to be administered intravitreally to the affected eye. Administration to both eyes concurrently is not recommended. Repeat doses should be considered when a patient experiences a response to treatment followed subsequently by a loss in visual acuity and in the physician's opinion may benefit from retreatment without being exposed to significant risk. Patients who experience and retain improved vision should not be retreated. Patients who experience a deterioration in vision, which is not slowed by OZURDEX, should not be retreated. There is only very limited information on repeat dosing intervals less than 6 months. There is currently no experience of repeat administrations in posterior segment non-infectious uveitis or beyond 2 implants in Retinal Vein Occlusion. Patients should be monitored following the injection to permit early treatment if an infection or increased intraocular pressure occurs. Single-use intravitreal implant in applicator for intravitreal use only. The intravitreal injection procedure should be carried out under controlled aseptic conditions which include the use of sterile gloves, a sterile drape, and a sterile eyelid speculum (or equivalent). The patient should be instructed to self-administer broad spectrum antimicrobial drops daily for 3 days before and after each injection. Before the injection, the periocular skin, eyelid and ocular surface should be disinfected and adequate local anaesthesia should be administered. Remove the foil pouch from the carton and examine for damage. In a sterile field, open the foil pouch and gently place the applicator on a sterile tray. Carefully remove the cap from the applicator. Once the foil pouch is opened the applicator should be used immediately. Hold the applicator in one hand and pull the safety tab straight off the applicator. Do not twist or flex the tab. With the bevel of the needle up away from the sclera, advance the needle about 1 mm into the sclera then redirect toward the centre of the eye into the vitreous cavity until the silicone sleeve is against the conjunctiva. Slowly press the actuator button until an audible click is noted. Before withdrawing the applicator from the eye, make sure that the actuator button is fully pressed and has locked flush with the applicator surface. Remove the needle in the same direction as used to enter the vitreous. Immediately after injecting OZURDEX, use indirect ophthalmoscopy in the quadrant of injection to confirm successful implantation. Visualisation is possible in the large majority of cases. In cases in which the implant cannot be visualised, take a sterile cotton bud and lightly depress over the injection site to bring the implant into view. Following the intravitreal injection patients should continue to be treated with a broad spectrum antimicrobial. **Contraindications:** Hypersensitivity to the active substance or to any of the excipients. Active or suspected ocular or periocular infection including most viral diseases of the cornea and conjunctiva, including active epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, varicella, mycobacterial infections, and fungal diseases. Advanced glaucoma which cannot be adequately controlled by medicinal products alone. Aphakic eyes with rupture of the posterior lens capsule. Eyes with Anterior Chamber Intraocular Lens (ACIOL) and rupture of the posterior lens capsule. **Warnings/Precautions:** Intravitreous injections, including OZURDEX can be associated with endophthalmitis, intraocular inflammation, increased intraocular pressure and retinal detachment. Proper aseptic injection techniques must always be used. Patients should be monitored following the injection to permit early treatment if an infection or increased intraocular pressure occurs. Monitoring may consist of a check for perfusion of the optic nerve head immediately after the injection, tonometry within 30 minutes following the injection, and biomicroscopy between two and seven days following the injection. Patients must be instructed to report any symptoms suggestive of endophthalmitis or any of the above mentioned events without delay. All patients with posterior capsule tear, e.g. those with a posterior lens, and/or those who have an iris defect (e.g. due to iridectomy) with or without a history of vitrectomy, are at risk of implant migration into the anterior chamber. Other than those patients contraindicated where OZURDEX should not be used, OZURDEX should be used with caution and only following a careful risk benefit assessment. These patients should be closely monitored for any signs of implant migration. Corticosteroids should be used cautiously in patients with a history of *ocular herpes simplex* and not be used in active *ocular herpes simplex*. The safety and efficacy of OZURDEX administered to both eyes concurrently have not been studied and is not recommended. OZURDEX is not recommended in patients with macular oedema secondary to RVO with significant retinal ischemia. OZURDEX should be used with caution in patients taking anti-coagulant or anti-platelet medicinal products. **Interactions:** No interaction studies have been performed. Systemic absorption is minimal and no interactions are anticipated. **Pregnancy:** There are no adequate data from the use of intravitreally administered dexamethasone in pregnant women. OZURDEX is not recommended during pregnancy unless the potential benefit justifies the potential risk to the foetus. **Lactation:** Dexamethasone is excreted in breast milk. No effects on the child are anticipated due to the route of administration and the resulting systemic levels. However OZURDEX is not recommended during breast feeding unless clearly necessary. **Driving/Use of Machines:** Patients may experience temporarily reduced vision after receiving OZURDEX by intravitreal injection. They should not drive or use machines until this has resolved. **Adverse Effects:** *RVO* In clinical trials the most frequently reported adverse events were increased intraocular pressure (IOP) (24.0%) and conjunctival haemorrhage (14.7%). Increased IOP with OZURDEX peaked at day 60 and returned to baseline levels by day 180. Elevations of IOP either did not require treatment or were managed with the temporary use of topical IOP-lowering medicinal products. The following adverse events were reported: Very common (≥1/10): IOP increased, conjunctival haemorrhage* Common (≥1/100 to <1/10): Ocular hypertension, vitreous detachment, cataract, subcapsular cataract, vitreous haemorrhage*, visual disturbance, vitreous opacities* (including vitreous floaters), eye pain*, photopsia*, conjunctival oedema*, anterior chamber cell*, conjunctival hyperaemia*, headache Uncommon (≥1/1,000 to <1/100): Retinal tear*, anterior chamber flare* Headache. *Uveitis* In clinical trials the most frequently reported adverse events in the study eye were conjunctival haemorrhage (30.3%), increased IOP (25.0%) and cataract (11.8%). The following adverse events were reported: Very common: Increased IOP, cataract, conjunctival haemorrhage* Common: Retinal detachment, Myodesopsia, vitreous opacities, blepharitis, sclera hyperaemia*, visual impairment, abnormal sensation in the eye*, eyelid pruritis, migraine. (*Adverse reactions considered to be related to the intravitreous injection procedure rather than the dexamethasone implant). Please refer to Summary of Product Characteristics for full information on side effects. **Basic NHS Price:** £870 (ex VAT) per pack containing 1 implant. **Marketing Authorisation number:** EU/1/10/638/001 **Marketing Authorisation Holder:** Allergan Pharmaceuticals Ireland, Castlebar Road, Westport, Co. Mayo, Ireland. **Legal Category:** POM. **Date of Preparation:** May 2013.

Adverse events should be reported.
Reporting forms and information can be found at www.mhra.gov.uk/yellowcard.
Adverse events should also be reported to Allergan Ltd. UK_Medinfo@allergan.com or 01628 494026.

References: 1. Nehme A & Edelman J. Invest Ophthalmol Vis Sci. 2008;49(5):2030-2038. 2. Pommier S & Meyer F. Realites Ophthlamologuiques 2012; 195. 3. Augustin A. *et al.* Poster presented at EVER 2012, October 10-13; Nice, France. 4. Querques L. *et al.* Ophthalmol. 2013;229:21-25. 5. Rostron E. *et al.* Poster presented at North of England Ophthalmological Society (NEOS) Summer Meeting 2013, June 12; Chester, UK.

Date of Preparation: March 2014 UK/0062/2014

ALLERGAN ophthalmology

the Ophthalmologist

Power List 2014

Who are the 100 most influential people in ophthalmology? That's the question we posed to ourselves – and then to you – over two months ago, ahead of open nominations and a painstaking judging process. Here, without further ado, we celebrate the answer.

100–21
(in alphabetical order)

Richard Abbott

A former AAO President and recipient of the AAO Lifetime Achievement Award in 2006, Richard Abbott specializes in corneal and external diseases. He currently chairs the AAO Task Force for LASIK Quality of Life Outcomes and is the principal investigator of the proposed FDA study researching LASIK patient outcomes.

Rand Allingham

Rand Allingham leads a large NIH funded project that has the goal of identifying specific gene(s) responsible for glaucoma. He was previously responsible for an investigation into cerebrospinal fluid pressure as a glaucoma risk factor and he has an ongoing interest in clinical management of the disease.

David Abramson

David Abramson's treatments for retinoblastoma have been adopted worldwide. These include the delivery of chemotherapeutics around the eye to prevent systemic toxicity of intravenous medication and the use of high concentration - but low dose - chemotherapy delivered directly into the eye via a catheter placed in the groin, administered on an outpatient basis.

Eduardo Alfonso

Eduardo Alfonso is an internationally known expert on ocular infectious diseases. In 2006, he documented an increase in the incidence of an aggressive form of fungal corneal infection that was related to soft contact lens use. His findings drew considerable media attention throughout the world and significantly reduced the number of new infections.

Tin Aung

A clinician-scientist, Tin Aung leads a glaucoma research group in addition to his managerial responsibilities. His research interests include angle closure glaucoma and the molecular genetics of eye diseases; he is also active in clinical research, having conducted studies on therapeutics, imaging, screening, clinical course and surgical outcomes of glaucoma.

Anthony Adamis

Anthony Adamis has had two careers in ophthalmology: as a clinician and as an industry executive. One of the discoverers of the role that VEGF plays in retinal angiogenesis and leakage, Adamis also participated in the development and launch of pegaptanib, the first anti-VEGF agent for use in ophthalmology.

Jorge Alió

A leading authority in the field of refractive surgery, Jorge Alió is at the forefront of much of research in the field. He is the medical director of Vissum, Europe's largest eye institute and research facility, an ESCRS board member and founder of an eponymous blindness prevention foundation.

Bill Aylward

Bill Aylward is a senior vitreoretnial surgeon who chairs the Informatics and Audit Committee of the UK's Royal College of Ophthalmologists. He is vice president of the Club Jules Gonin and was president of ESCRS from 2009-2011. Aylward leads the development of the open-source, ophthalmology-tailored OpenEyes electronic patient record management system.

Peter Barry

Peter Barry has been an ESCRS board member for more than 25 years, holding the position of treasurer, and most recently, President. Barry led the ESCRS Endophthalmitis Study, which recommended the adoption of intracameral cefuroxime following cataract surgery with IOL implantation – something that has saved thousands of eyes from potential blindness.

Roberto Bellucci

Roberto Bellucci is the current ESCRS President, and has a wealth of experience in cataract, implant and refractive surgeries, having performed more than 20,000 procedures. Bellucci has previously developed surgical instruments to help with IOL implantation and performed important studies of pre-, peri- and post-procedural antibiotics and topical anesthetics.

Susanne Binder

Susanne Binder, a retina expert whose principal interests are AMD and retinal surgery, has published over 200 original articles and is the editor of two books. She is considered to be one of the great translators of clinical research into clinical practice, and her work in stem cells has recently drawn praise.

Neil Bressler

Neil Bressler's main research interests are collaborative efforts in clinical trials of common retinal diseases, including age-related macular degeneration and diabetic retinopathy. He is currently chair of Submacular Surgery Trials, DRCR.net, the Data and Safety Monitoring Committee for the NEI's intramural clinical trials and the FDA's Ophthalmic Devices Panel.

Claude Burgoyne

An optic nerve head imaging legend, Claude Burgoyne currently investigates the effects of aging and experimental glaucoma on the load-bearing connective tissues of the primate optic nerve head within SD-OCT 3D histormophometric reconstructions. He also aims to model how an individual human optic nerve head will respond to a given level of IOP.

Jean Bennett

Jean Bennett's laboratory focuses on the molecular genetics of inherited retinal degeneration, such as retinitis pigmentosa and AMD, with the objective of developing therapeutic interventions. She used viral vectors to deliver transgenes to specific retinal cells, providing proof-of-principle for ocular gene therapy. Her colleague and husband Albert Maguire is also on the list.

Emilio Campos

Emilio Campos' research interests include strabismus and amblyopia. He is a co-author of the definitive textbook on strabismus, "Binocular Vision and Ocular Motility: Theory and Management of Strabismus." Campos is former president of the Italian Ophthalmological Society, and is currently a member of the board of directors of the International Council of Ophthalmology.

Usha Chakravarthy

A retinal surgeon by training, Usha Chakravarthy has been involved in many of the major international clinical trials, including the IVAN, INTREPID, EUREYE, INDEYE, and V.I.S.I.O.N. studies, as well as co-authoring Cochrane Review articles and guidelines for the Royal College of Ophthalmologists' on the treatment of AMD.

Stanley Chang

Stanley Chang is a specialist in vitreoretinal disorders and surgery, whose techniques are used widely. He established perfluoropropane gas to prevent scar tissue proliferation on the retina and applied perfluorocarbon for flattening retinal detachment, along with related techniques for vitreoretinal surgery. With Avi Grinblat, he developed a panoramic viewing system for retinal surgery.

Emily Chew

Emily Chew is chair of the AREDS2 study and participates in the Actions to Control Cardiovascular Risk in Diabetes trial. She is a medical retinal specialist with extensive experience in the design and implementation of clinical trials across all phases. Her principal research interests are diabetic- and age-related eye diseases.

Hannah Faal

An eye-care program consultant to SightSavers International, Hannah Faal is former president of the International Agency of Prevention of Blindness and chaired the IAPB/WHO Task Force for VISION 2020. She initiated the national eye care program in The Gambia and has helped to develop eye care policies throughout West Africa.

Napoleone Ferrara

Napoleone Ferrara was involved in the isolation and cloning of VEGF and demonstrated its role in angiogenesis. His work helped lead to the development of bevacizumab, and the clinical development of ranibizumab. Today, his lab investigates non-VEGF-related angiogenesis mechanisms, which may lead to therapies effective in anti-VEGF non-responders.

Oliver Findl

With research interests in the field of optical biometry, PCO and post-surgical visual quality assessment, Oliver Findl is a prolific author, having published over 200 peer-reviewed articles in international journals. He is an editorial board member of the Journal of Cataract and Refractive Surgery and is the Secretary of the ESCRS.

Allen Foster

Allen Foster's interests encompass the control of blinding diseases; cost-effectiveness and quality of life studies; the implementation of VISION 2020, and health service research for children and adults with disabilities. He is co-director of the International Centre for Evidence in Disability and co-director of the International Centre for Eye Health.

Paul Foster

Paul Foster published the first high-quality reports of glaucoma prevalence and risk factors in East Asia, being the first to identify the large burden of angle-closure glaucoma cases in China. He also pioneered population screening and preventive laser surgery for angle-closure glaucoma, performing the first randomized trial of the technique in rural Asia.

James Fujimoto

James Fujimoto's primary research focus is biomedical imaging with OCT and advanced laser technologies. His research team was responsible for the invention and development of OCT, and today they push the boundaries of high-speed and high-resolution imaging, functional Doppler flow and angiography as well as polarization sensitive methods.

Greg Hageman

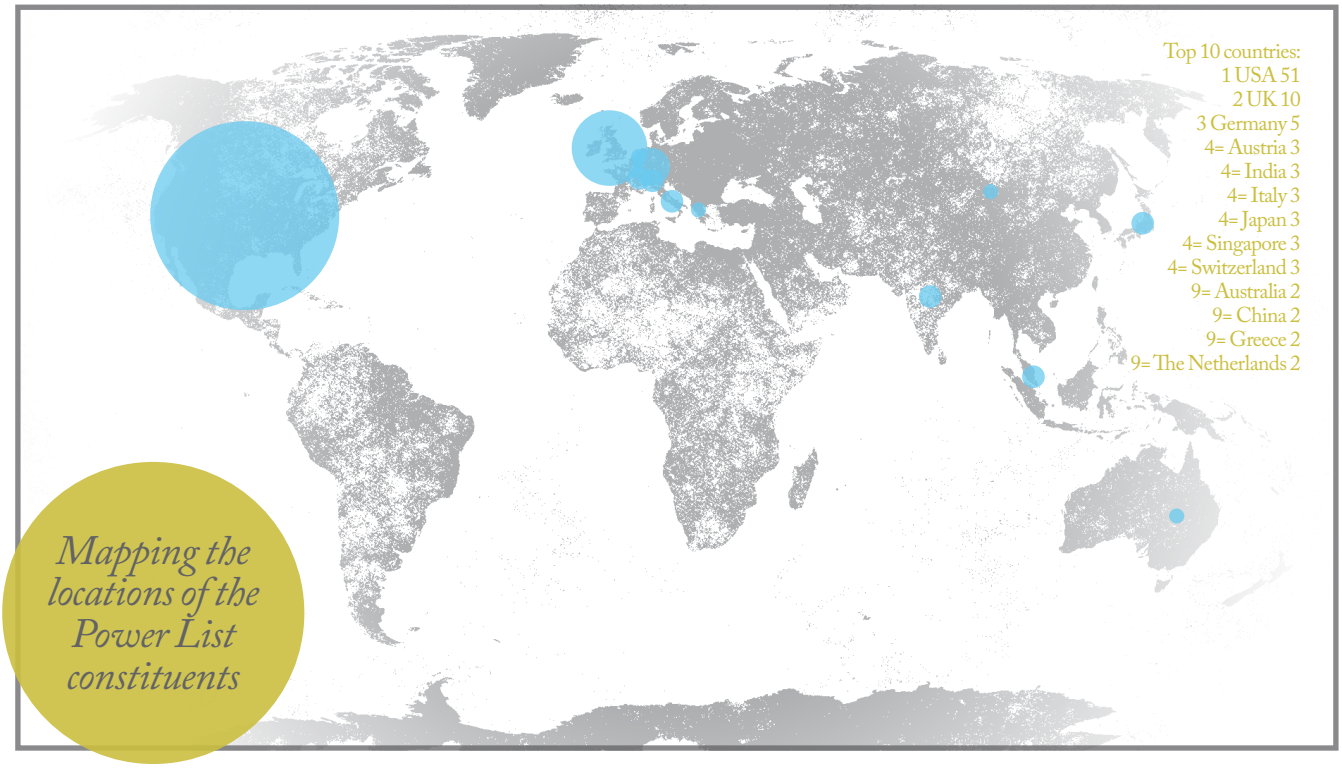
Over the past quarter-century, Hageman has examined the genetics and pathways involved in AMD, making major contributions to the understanding of the disease. He has briefed the US Congress on the subject three times, started two biotechnology companies and served on numerous national and international advisory boards, service panels and review committees.

Ted Garway-Heath

Research by Ted Garway-Heath has provided many new tools. These include the Moorfields Motion Displacement Test; The Moorfields Regression Analysis, a software program for imaging performance in tomography; and the Garway-Heath Map, used in research to establish the correlation between visual field and optic nerve hypoplasia changes.

Evangelos Gragoudas

A world authority on the diagnosis and management of intraocular tumors, Evangelos Gragoudas' pioneered the use of proton beam irradiation therapy in the treatment of ocular melanoma. Along with Joan Miller (qv) and Anthony Adamis, Gragoudas was one of the first to describe the role of VEGF in pathologic retinal neovascularization.



Roger Hitchings

Roger Hitchings' interests lie in optic nerve imaging, visual field progression assessment, glaucoma surgery and normal tension glaucoma. He established the Clinical Trials Unit and the associated Reading Centre at Moorfields Hospital, with the latter being one of the UK's key centers for evaluating outcomes in ophthalmic clinical trials.

Robert Grant

Robert Grant is CEO of Alphaeon, a "lifestyle healthcare" company, and has long been a key figure in technology and business development in the pharmaceutical, medical device, and healthcare markets. He was previously CEO and President of Bausch+Lomb Surgical and President of Allergan Medical, where he led the $3.2 billion acquisition of Inamed.

Farhad Hafezi

As a post-doc, Farhad Hafezi identified a gene that can completely inhibit light-induced retinal damage in mice. Today his clinical focus is on corneal and refractive laser surgery, and he is a pioneer of corneal collagen cross-linking (CXL). Hafezi was instrumental in building IROC in Zurich, where CXL technology underwent further clinical development.

Mark S Humayun

Mark Humayun is best known for his work on retinal implants. He participated in the first US clinical trial of the Argus II implant, placing it into the eyes of patients with end-stage retinitis pigmentosa. As a result, Argus II became the first retinal implant in the world to receive regulatory approval.

Martine Jager

A past president of ARVO, Martine Jager's research interests are immunology and the development of uveal melanoma and ocular surface disease. Following a PhD in immunology at the University of Leiden, Jager was ophthalmology resident at the University of Amsterdam and a clinical fellow at Miami's Bascom Palmer Eye Institute.

Paul Kaufman

Paul Kaufman is a researcher in glaucoma, in particular the mechanisms of aqueous humor formation and drainage, and age-related loss of near vision. He previously served as President and Executive Vice President of ARVO, and is a former president of the International Society for Eye Research.

Peng Khaw

Peng Khaw is a prominent glaucoma surgeon, having pioneered numerous techniques and anti-scarring regimens. His team's research led the introduction of intraoperative antimetabolites, and he introduced the Moorfields Safer Surgery System, dramatically reducing bleb-related complications. Khaw was knighted in the 2013 Queen's Birthday Honors list for services to ophthalmology.

Shigeru Kinoshita

Shigeru Kinoshita established, along with Richard Thoft, the concept of centripetal movement of corneal epithelium. This shed new light on the importance of the limbal epithelium and contributed to the development of corneal stem cell theory. Kinoshita's group recently established systems to transplant cultivated mucosal epithelial stem cells and cultivated corneal endothelium.

Dennis Lam

Dennis Lam has research interests that span the entire eye. He has contributed to studies from the cornea to the retina, and from epidemiological trials to genetic studies. Lam is the founder of the Project Vision Charitable Foundation, a charity that aims to try to eliminate cataract blindness in China.

Daniel Martin

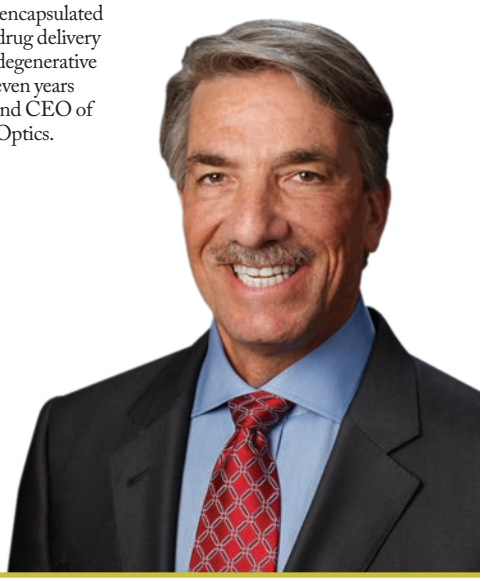
Daniel Martin was extensively involved in the development of the ganciclovir implant (and later valganciclovir) for the treatment of CMV retinitis, leading the clinical trials that resulted in FDA approval of both drugs. He also helped lead the CATT trial, which compared bevacizumab with ranibizumab for the treatment of wet AMD.

Albert Maguire

A pioneer of retinal gene therapy, Albert Maguire led a trial that inserted the RPE65 gene into the retinal pigment epithelium to treat Leber congenital amaurosis. He is a colleague (and husband) of Jean Bennett (qv). Recognized regularly by "Best Doctors in America", Maguire is also a noted educator.

Jim Mazzo

Jim Mazzo is chair and CEO of Versant portfolio company AcuFocus, which specializes in corneal inlays, and is Executive Chair at Neurotech Pharmaceuticals, which is pioneering encapsulated cell technology as a drug delivery platform for retinal degenerative diseases. He spent seven years as Chair, President and CEO of Advanced Medical Optics.



Charles McGhee

A senior ophthalmic surgeon, Charles McGhee is also Editor of the Journal of Clinical and Experimental Ophthalmology. He chairs the RANZCO special interest group in cornea, contact lenses, and cataract and refractive surgery and is one of the most experienced corneal surgeons in New Zealand, having performed over 500 corneal transplantation procedures.

Paul Mitchell

A retinal specialist, Paul Mitchell focuses on the management of AMD, diabetic and other vascular retinopathies, and investigations into how the eye is affected by systemic disease. Mitchell received the 2004 Association of International Glaucoma Societies award, and in 2007 he became trustee for the Clinical & Epidemiologic Research section of ARVO.

Joan Miller

A pioneer of photodynamic therapy using verteporfin, which was the first pharmacotherapy for wet AMD, Joan Miller also helped to define the importance of VEGF in intraocular vascular disease. Today she continues to investigate the molecular pathophysiology of vision loss and to develop improved therapies for retinal disease.

Michael Mrochen

Michael Mrochen is most recently known for his pioneering work on corneal collagen crosslinking, but this is not his first innovation. Mrochen's research with Theo Seiler (qv) led to the development of both wavefront-guided and wavefront-optimized LASIK, which has transformed outcomes, minimized errors and made LASIK a safer and more predictable procedure.

Robert Osher

Robert Osher, a cataract and implant surgeon, has designed many contemporary IOLs and surgical instruments, and has developed numerous new surgical techniques. Many of these have been captured in video, and Osher's surgical videos have won over 25 first-prize honors at congresses across the world, including three Grand Prizes at ASCRS and ESCRS.

Carmen Puliafito

One of the co-inventors of OCT, Carmen Puliafito is a pioneer of bevacizumab use in retinal disorders, and was the first to describe the use of semiconductor diode lasers for retinal photocoagulation. Puliafito was also one of the original basic science research leaders in excimer laser photoablation and optical breakdown and photodisruption.

David Parke

David Parke, Executive Vice President and CEO of AAO, has been a prominent and tireless worker for the organization for many years. His service on the board began in 2000, first as trustee-at-large and ultimately as president. Parke, practicing ophthalmologist with subspecialty focus in retina/vitreous, received the AAO's Senior Achievement Award in 1998.

Daniel Palanker

With forty patents to his name, Daniel Palanker is a crucial innovator for ophthalmology. His research led to the development of the Pulsed Electron Avalanche Knife, the Pattern Scanning Laser Photocoagulator, the CATALYS precision laser system, and most recently, an OCT-guided femtosecond laser system for cataract surgery.

David Pyott

David Pyott is credited with turning Allergan from a small eyecare business to a leading global specialty pharmaceutical and medical device company. This progress was driven by Pyott principally through significant investment in research and development, increasing the company's investment from under $100 million in 1998 to more than $1 billion in 2013.

Nag Rao

Nag Rao founded, the L.V. Prasad Eye Institute, in Hyderabad, India. A global centre of not just excellence in eyecare, research and rehabilitation, but also philanthropy: half of all patients pay nothing. Rao is a past President of the IAPB and devotes much of his time to the IAPB and the Vision 2020 initiative.

Harry Quigley

A founding member of the American Glaucoma Society, former CEO of ARVO and former Editor-in-Chief IOVS, Harry Quigley's research has enabled earlier glaucoma diagnosis and described the degree of optical nerve damage that had occurred before glaucoma is typically detected. His current research interests include gene and stem cell therapies.

Robert Ritch

Robert Ritch has devoted his career to two things: understanding the etiology and mechanisms of glaucoma, and innovation in the medical, laser, and surgical treatment of glaucoma. Ritch has held senior positions in many ophthalmology societies and has trained over 130 clinical and research fellows, many of whom occupy academic positions worldwide.

Cynthia Roberts

Cynthia Roberts trained as a biomedical engineer and today works as a cross-college bridge between Medicine and Engineering, with appointments in both camps. Roberts' research interests include corneal and ocular biomechanics in cornea, refractive surgery and glaucoma; in vivo measurement of corneal biomechanics and ophthalmic imaging applications.

Philip Rosenfeld

Philip Rosenfeld, a retina specialist with particular interest in the treatment and study of macular degeneration, has been instrumental in the clinical evaluations and introduction of AMD therapies. These include photodynamic therapy, as well as the introduction into ophthalmology of the VEGF-inhibitors, bevacizumab and ranibizumab.

Seang Mie Saw

The principal investigator of several important epidemiologic studies in Singapore, Mie's studies have encompassed myopia, strabismus, amblyopia and refractive errors in children. Highlights include elucidating genes and environmental factors involved in myopia and pathologic myopia, a major concern in East Asia.

Ursula Schmidt-Erfurth

Ursula Schmidt-Erfurth founded the Vienna Study and Vienna Reading Centers, which respectively run clinical trials and perform digital image analysis for such trials. In addition to leading one of the largest European academic institutions in ophthalmology, Schmidt-Erfurth has a keen interest in the development of novel diagnostic techniques treatment strategies, including intravitreal pharmacotherapy.

Sunil Shah

Sunil Shah, a cornea and cataract consultant, is an advisor to the UK National Institute for Health and Care Excellence where he represents the Royal College of Ophthalmologists. However, he is most well-known as the inventor of laser epithelial keratomileusis (LASEK) in 1996, and continues to be an active cornea researcher today.

Alan Scott

Alan Scott was first to apply tiny doses of botulinum toxin type A toxin to treat 'crossed eyes' (strabismus) and 'uncontrollable blinking' (blepharospasm), confirming his idea that weakening the muscles that pull crossed eyes inward would be an effective treatment. Allergan bought the rights to the drug and received FDA approval in 1989; it was renamed Botox.

Carol Shields

Carol Shields is an ocular oncologist. The oncology service that she runs with her husband Jerry and their associates manages 500 patients with uveal melanoma, 120 with retinoblastoma and numerous other intraocular, orbital and adnexal tumors, every year. In 2011 Shields was the recipient of the AAO's Life Achievement Honor Award.

Stefan Seregard

Stefan Seregard has devoted the bulk of his research career to examining how eye melanomas arise and spread in the body. Currently, he is trying to identify new therapeutic avenues for ocular melanoma, and to more clearly define the impact that current therapeutic interventions have on patients' quality of life.

Countries where most votes were cast

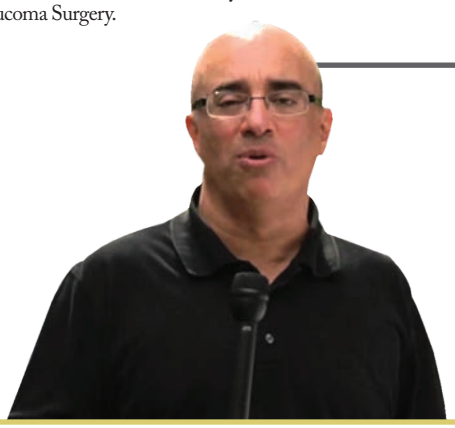
1 Germany
2 Australia
3 USA
4 China
5 Brazil
6 Italy
7 Nigeria
8 India
9= Japan
9= UK

Kuldev Singh

Kuldev Singh's research interests include glaucoma and cataract surgical trials, epidemiology, genetics and health care delivery in underserved communities. His clinical practice focuses on medical, laser and surgical management of glaucoma and cataract. Singh is president of the American Glaucoma Society and an advisor to the International Society of Glaucoma Surgery.

Paul Sieving

Paul Sieving was the founder of the Center for Retinal and Macular Degenerations at the University of Michigan, and spent almost sixteen years in Ann Arbor, before moving to Bethesda, MD, to become the Director of the National Eye Institute, a position that he holds today.



Alfred Sommer

Alfred (Al) Sommer is responsible for vitamin A supplementation, one of the most cost-effective health interventions. He demonstrated that vitamin A deficiency was far more common than previously recognized, and that even mild vitamin A deficiency dramatically increases childhood mortality rates. Dosing with vitamin A reduced child mortality and cut the incidence of measles-associated pediatric blindness.

Paul Sternberg

Paul Sternberg is a retinal specialist, having been at the forefront of many advances in surgical techniques. He maintains an active academic and research program, studying the pathogenesis of age-related macular degeneration, and has played key roles in many ophthalmology societies: in 2013, he served as the President of the AAO.

Hugh Taylor

Hugh Taylor has a long and distinguished career in research into the causes and prevention of blindness in both developed and developing countries, and has published extensively. His current work focuses on Aboriginal eye health and the elimination of trachoma. Taylor is the Treasurer of the ICO and Vice President of the IAPB.

George Spaeth

George Spaeth discovered the disease homocystinuria and published much of the early work on the condition, including the use of pyridoxine as successful treatment. His surgical text is used in many countries and a fourth edition is currently being prepared. He was a founding member and first president of the American Glaucoma Society.

Giovanni Staurenghi

Giovanni Staurenghi's principal interests are ocular imaging and the application of lasers to macular disease. His work extends to clinical trials and he is currently involved in more than 25 of them. A prolific author on both eye anatomy and disease, Staurenghi is a fellow of ARVO, AAO and EURETINA.

Bradley Straatsma

Bradley Straatsma is widely acclaimed as a pioneer in the study of peripheral retinal disease, investigations of tumors and research on ophthalmic conditions such as diabetic retinopathy and cataract. Straatsma was the last president of the American Academy of Ophthalmology and Otolaryngology, and led the formation of the AAO.

Robert Stamper

Robert Stamper specializes in glaucoma and cataract surgery. His research interests include early methods for the diagnosis of glaucoma and the evaluation of new surgical procedures for glaucoma. He has published analyses of glaucoma eyedrops, implants and surgical procedures. Stamper received an AAO Lifetime Achievement Award in 2008.

Marie-José Tassignon

With four patents that have been implemented in clinical practice, Marie-José Tassignon is a keen proponent of the need for ophthalmologists to understand physiology and the physics of optics. Tassignon developed the innovative bag-in-the-lens implantation technique that avoids PCO, the main complication of the traditional lens-in-the-bag implantation technique.

Mark Tso

Mark Tso's career has been built on research in experimental and human ophthalmic pathology. His studies on the benign form of retinoblastoma (fleurettes in retinoma), pathology and pathogenesis of papilledema, macula edema, retinal photic injury and photoreceptor degeneration have been described as "innovative, creative and original".

Boris Stanzel

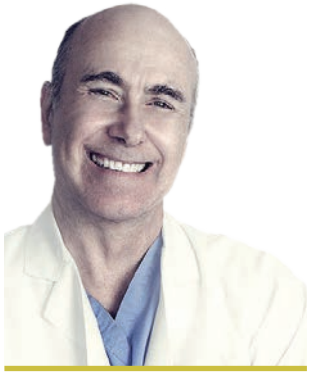
Boris Stanzel works on stem cell replacement for frequent age-related blindness. With his collaborators, Stanzel transplanted stem-cell-derived retinal pigment epithelium into the subretinal space of rabbits, a first in a large-eyed animal model. The transplants remained intact at four weeks, suggesting that many of the roadblocks to RPE monolayer transplantation have been overcome.

Kazuo Tsubota

Kazuo Tsubota's investigation and research interests include corneal regeneration, development of novel treatment modalities for Sjögren's syndrome and severe dry eye. He also focuses on treating age-related eye diseases such as macular degeneration, cataract and presbyopia. He has particular success treating near- and farsightedness as well as astigmatism.

George Waring III

In the 1970s, George Waring established northern California's first eye bank. He subsequently moved to Emory University, where he is Clinical Professor of Ophthalmology and, since 2003, he has practiced privately at the InView Center, Atlanta. Waring has performed more than 10,000 LASIK and other refractive procedures.



Xiulan Zhang

Xiulan Zhang has a prolific publication record in glaucoma, having performed imaging studies that have furthered the understanding of anatomical dysfunction in the glaucomatous eye, and what surgical interventions can do to improve matters. Zhang works at the Zhongshan Ophthalmic Center, which was voted China's most popular eye hospital for five consecutive years.

Eberhart Zrenner

A graduate in electronic engineering as well as in medicine, Eberhart Zrenner's career has merged his clinical and research interests. He founded the Institute for Ophthalmic Research where he runs a special clinic for patients with hereditary retinal degenerations. His research pursuits include retinal physiology and pathophysiology, ophthalmogenetics and retinal implants.

Ningli Wang

While serving as director and the vice president of one of the two largest eye centers in China, Ningli Wang is also devoted to ophthalmic practice, teaching, training, blindness prevention and academic research. His contributions include the trans-lamina cribrosa pressure difference theory of open-angle glaucoma.

Lawrence Yannuzzi

Lawrence Yannuzzi is a pioneer in angiography. He and his colleagues are credited with describing – and naming – idiopathic polypoidal choroidal vasculopathy, a type of hemorrhagic maculopathy. Yannuzzi has published more than 300 scientific papers and 11 textbooks, focused on diseases of the macula such as diabetic retinopathy and age-related macular degeneration.

Gerhard Zinser

The co-founder and a Managing Director of Heidelberg Engineering, Gerhard Zinser has contributed to many key advances in imaging technology, including confocal microscopy, scanning lasers and optics, OCT and software image analysis. The resulting diagnostic instruments have changed clinical practice for retinal disease, glaucoma and corneal pathologies.

Robert Weinreb

As a clinician, surgeon and scientist, Robert Weinreb maintains diverse medical and research interests. He is also a prolific educator; many of his (more than 100) postdoctoral fellows in glaucoma have gone on to hold department chairs and other distinguished academic positions in the United States and throughout the world.

Tetsuya Yamamoto

Tetsuya Yamamoto has been part of many great advances in knowledge in the field of glaucoma. From population analyses of bleb dysfunction, identification of genes associated with glaucoma, imaging studies and the use of antifibrosis agents in glaucoma surgery, his contributions have significantly advanced the field.

The Top 20

20 Harminder Dua

An active clinician, teacher and prolific researcher, Harminder Dua's most recent contribution to the science of ophthalmology was the discovery of a new corneal layer in 2013. He serves as editor-in-chief of the British Journal of Ophthalmology, is past president of EuCornea and is immediate past president of the Royal College of Ophthalmologists.

19 Claes Dohlman

Once referred to as "father of modern corneal science", Swedish-born ophthalmologist Claes Dohlman has spent the majority of his career in Boston, becoming Chief of Ophthalmology the Massachusetts Eye and Ear Infirmary in 1974. He developed the Boston keratoprosthesis, an effective (and revolutionary) treatment option for severe corneal diseases.

18 Robert Nussenblatt

Robert Nussenblatt is an ocular immunologist. His primary research interests are uveitis and the role of inflammation in causing AMD. He also investigates new therapeutic approaches to treating human disease, including oral tolerance and the use of natural products, and studies the role epigenetics plays in the development or non-development of disease.

17 John Marshall

John Marshall's research covers a wide range of ocular disorders and his research has covered the development of lasers for use in ophthalmic diagnosis and surgery, and it's this that he is most famous for: he invented and patented the excimer laser and also created the first diode laser that was used for treating eye problems.

16 Gerd Auffarth

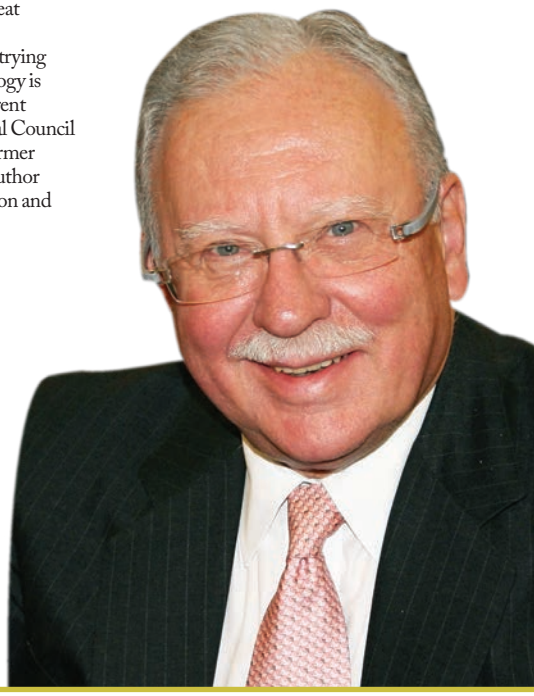
Gerd Auffarth is director of the David J. Apple Laboratory. This international lab, which is devoted to research on intraocular ophthalmic devices, recently relocated to Heidelberg from South Carolina. Auffarth's research interests include cataract surgery; intraocular lenses; implants; viscoelastic, refractive laser technology and surgery, diagnostic tools, and the cornea.

15 Frank Holz

Frank Holz is an AMD researcher whose focus is on the pathogenesis and therapy of AMD as well as on retinal imaging methodologies and phenotyping. In addition, Holz has lead numerous ranibizumab clinical trials. He is Editor-in-Chief of the journal of the German Ophthalmological Society (DOG), Der Ophthalmologe, and a past president of DOG.

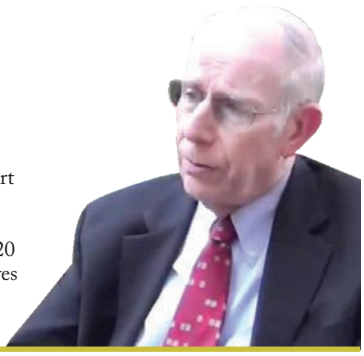
14 Bruce Spivey

Bruce Spivey is one of the great educators in ophthalmology, spending much of his career trying to improve how ophthalmology is taught and assessed. The current President of the International Council of Ophthalmology (and a former AAO CEO), Spivey is the author of over 130 scientific education and management articles.



13 Dan Albert

Daniel Albert is a prominent researcher in ocular melanoma and retinoblastoma, notably on mechanisms of tumor growth and inhibition. He is also a co-author and currently senior editor of Albert & Jakobiec's Principles & Practice of Ophthalmology, a widely-used textbook. Albert previously spent 20 years as Editor-in-Chief of Archives of Ophthalmology.



12 Rudy Nuijts

Rudy Nuijts identified the etiology of toxic endothelial cell destruction after cataract surgery (Toxic Anterior Segment Syndrome). His current research interests include innovations in corneal, cataract and refractive surgery, particularly the use of femtosecond lasers and transcleral drug delivery. He is treasurer of ESCRS, and serves on the Corneal and Educational Committees.

11 Renato Ambrósio

A major contributor to the introduction of corneal imaging technology, Renato Ambrósio also holds multiple academic appointments. His work has helped establish the true nature of corneal pathologies, from keratoconus to post-LASIK dry eye, and he is a strong proponent of pre-surgical anterior segment OCT to drive better outcomes.

10 John Kanellopoulos

A CXL expert, John Kanellopoulos developed the Athens protocol for keratoconus and ectasia, which combines laser normalization of the irregular cornea with cross-linking. He also introduced higher fluency cross-linking and prophylactic cross-linking with LASIK, a precursor to LASIK Xtra, and demonstrated how CXL helps in infectious keratitis, corneal melts and pseudophakic keratopathy.

9 David Huang

Co-inventor of optical coherence tomography and first author of the seminal article on the topic, which has been cited more than 3,300 times, David Huang received the AAO's Achievement Award in 2004. His research on refractive surgery, laser and imaging technologies combines an understanding of laser surgery from both clinical and an engineering perspective.

8 Abhay Vasavada

A cataract/refractive surgeon and Fellow of the Royal College of Surgeons, Abhay Vasadva has great expertise in the successful resolution of complicated cataract and pediatric cases. This knowledge is in great demand: Vasadva is a renowned educator and is regularly asked to share his experiences by performing live surgery.

7 Ike Ahmed

Ike Ahmed is an eye surgeon who has developed many novel treatments and methods for glaucoma, cataract, and lens implant surgery. He has performed pioneering work in glaucoma surgery, developing microinvasive glaucoma surgery, MIGS (and coining the term), which ushered a new generation of surgical approaches and devices into ophthalmology.

6 Ioannis Pallikaris

Ioannis Pallikaris was the first to perform the LASIK procedure on a human eye. He went on to develop Epi-LASIK, and has a current research interest in corneal inlays. He is also an enthusiastic educator who has over 30 years of teaching experience in both Greece and Switzerland at undergraduate and post-graduate levels.

5 David Chang

A past president of ASCRS and current chair of the AAO Cataract Preferred Practice Pattern Committee, David Chang is the cataract/refractive surgeon who wrote what many consider to be the definitive textbook on the subject. Chang was the first in the US to implant a light-adjustable IOL and the first to implant the Synchrony accommodating IOL.

4 Richard Lindstrom

Richard Lindstrom holds more than thirty patents in ophthalmology, having developed a number of solutions, intraocular lenses and instruments. He serves in the Board of Directors of several companies that operate within ophthalmology, is a past president of ASCRS and ISRS, and a member of the ASCRS Executive Committee.

3 Donald Tan

Donald Tan's many contributions include new forms of selective lamellar keratoplasty, femtosecond corneal and refractive surgery, the Osteo-Odonto Keratoprosthesis, surgical devices for lamellar corneal transplantation, and multiple interventional myopia clinical trials. The founder of the Asia Cornea society, Tan also holds twelve patents that range from stem cell culture technology to novel inserters for DSAEK surgery.

2 Amar Agarwal

Amar Agarwal is a pioneer of microincisional cataract surgery. He was first to remove cataracts through a 0.7 mm tip; first to develop no-anesthesia cataract surgery; first to implant a glued IOL, and first to use Trypan blue as epiretinal membrane stain. Most recently, he and Harminder Dua (qv) have pioneered Pre-Descemet's Endothelial Keratoplasty.

1

Theo Seiler

Theo Seiler's doctorates in physics and medicine enabled him to become a pioneer of refractive surgery. Among his achievements are the development of the first clinical dye laser and the invention of corneal crosslinking (CXL); he also performed the first ever PTK, PRK and wavefront-laser guided surgical techniques on the human eye, and was also the first to combine LASIK and rapid CXL. Seiler founded the renowned Institute for Refractive and Ophthalmic Surgery (IROC) in 2002.

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In Practice

Surgical Procedures
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New Drugs

Selecting for Patient Success

Using the best diagnostic tools will help ensure that the right procedures are selected for patients, driving improvements in outcomes for refractive surgery

By Alain Saad

Eighty-five to 95 percent of the time, outcomes in cataract, refractive, and corneal inlay surgery are excellent (1,2). To help with that troublesome last 5-15 percent, we now have numerous advances in surgical technology, novel diagnostic equipment and improved patient screening at our disposal. Major improvements in laser technology through faster excimer lasers, more accurate eye trackers, and very precise femtosecond lasers mean that much of the potential for human error during surgery has been eliminated. It is now up to us to use the best diagnostic devices available to ensure that patients who are poor candidates do not slip through the safety net of proper screening. Here are my views on the diagnostic technologies that help to achieve optimal outcomes.

At a Glance

- *A small subpopulation of patients experience poor outcomes after surgery*
- *Diagnostics and screening can help identify this problematic group*
- *Objective assessment of overall visual quality is a first step*
- *Topography and aberrometry further enhance outcomes*

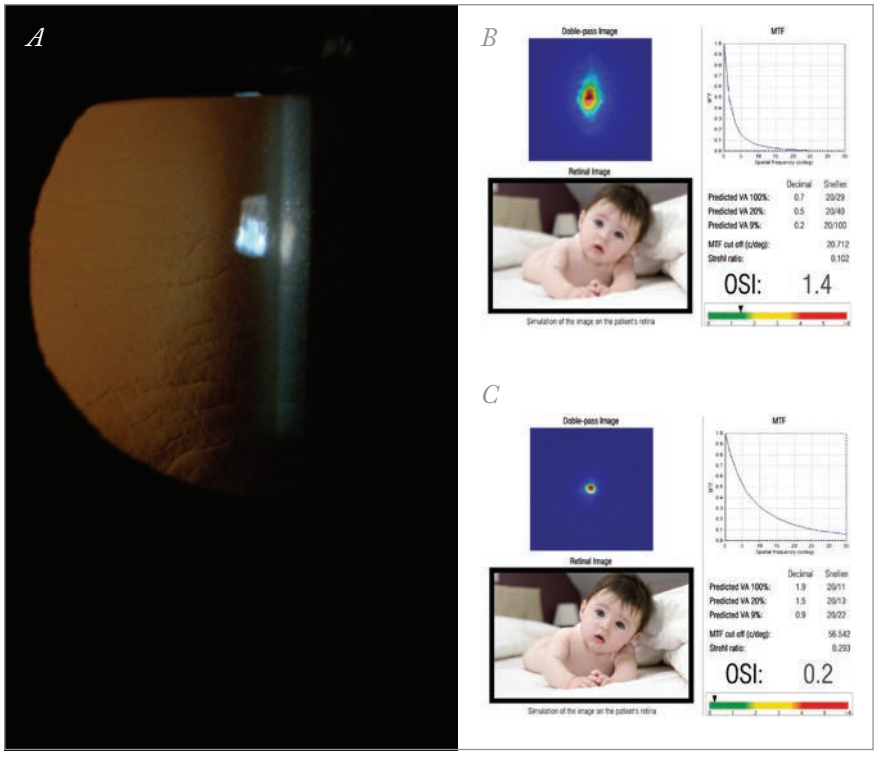

Figure 2: (a) Post-LASIK microstriae. Patient complaining of his vision in this eye while uncorrected visual acuity is 20/20. (b) Double pass image of the same patient showing an increased Ocular Scattering Index that explains patient symptoms. (c) Contralateral eye (post-LASIK) showing a small amount of scattering.

Refining pre-op, intra-op and post-op outcomes

The importance of objective assessments of overall visual quality is increasingly appreciated. Health of the tear-film, ocular light scatter, clarity of the lens and depth of focus can all impact the results of LASIK, cataract and corneal inlay surgeries. Diagnostic devices, like the AcuTarget HD (AcuFocus, Inc.), optimize clinical outcomes within a cataract and refractive practice by offering a broader range of functionality and an objective assessment of overall vision. This instrument monitors tear-film quality over time, measures depth-of-focus, assesses pre- and postoperative inlay centration, and enhances patients' understanding of the importance of postoperative care (see Figure 1).

I have found the AcuTarget HD to be most beneficial in refining selection of refractive surgery candidates by evaluating the optical quality of the eye and measuring the Ocular Scattering Index (OSI) (see Figure 2). When those metrics are abnormal, surgeons should consider what truly is the best refractive surgery option for that patient. For example, an OSI above 1.5 means that ocular transparency is not perfect. This may be caused by an early-stage cataract that can hardly be seen on slit-lamp examination, and that patient may benefit from cataract surgery or clear lens extraction.

The AcuTarget HD also evaluates tear film and dry eye. This is of paramount importance to refractive surgeons for treating and eliminating dry eye pre-operatively, which

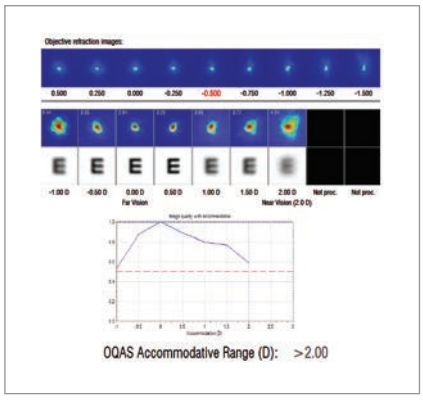

Figure 1: Increased accommodative range in a post Kamra inlay patient.

tremendously improves outcomes.

As a summary, the device provides a final image, which simulates both perfect vision and the patient's vision, enabling the surgeon to compare the two images and gain a better understanding of what the patient is seeing. It helps explain patient symptoms and thus guides us toward the appropriate postoperative management.

Topographers, such as the Orbscan (Bausch + Lomb), help refine refractive surgery outcomes by allowing us to detect abnormal topographies, which are a contraindication for refractive surgery. The Orbscan topographical maps can be screened by SCORE analyzer (Technolas Perfect Vision), a new artificial intelligence system allows the detection of subclinical keratoconus (KC) with a high sensitivity and specificity. I use it for every patient's preoperative refractive and cataract surgery evaluation to detect abnormality in the cornea (see Figure 3).

An aberrometer (OPD-Scan, Nidek) is useful for patients in whom I plan to implant a toric or multifocal IOL. If the patient presents a large amount of high-order aberrations, preoperatively, he or she is considered poor candidate

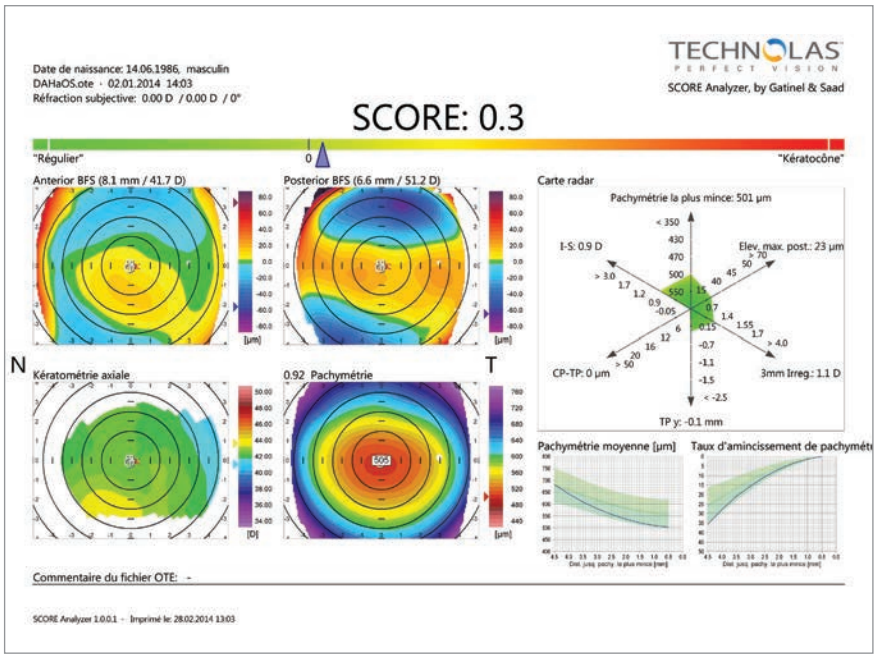

Figure 3: SCORE Analyzer showing a slightly positive score for the analyzed cornea which contra-indicates LASIK surgery in order to avoid iatrogenic ectasia.

for a multifocal intraocular lens (IOL). The aberrometer also provides the exact amount of corneal astigmatism and the axis of the astigmatism, which allow correct toric IOL implantation.

Although I don't use the OCT (Visante, Carl Zeiss Meditec) for every patient group, it is useful in performing enhancements. When I am correcting myopia in a patient who has already undergone LASIK, OCT can determine the thickness of the old flap and the residual stromal bed, so I know the amount of tissue I can photoablate safely.

Femtosecond lasers, like the iFS (Abbott Medical Optics), or the FS 200 (Alcon) have helped refine the surgical procedure by increasing the safety and the accuracy of flap incisions. Anterior and posterior stroma do not react in the same way to the femtosecond laser pulse, thus it's important to have the data to enable you to program the laser settings for spot and line separation, energy level, and desired depth of the incision.

Clinical studies

Research has shown that the two leading causes of reduced optical quality after cataract and refractive surgery are uncorrected refractive abnormalities and increased media opacities that cause increased light diffusion (3).

We evaluated the repeatability of measurements with a double-pass system (4). Forty-two eyes were separated into two control groups, a post-refractive surgery group and a cataract group. Measurements were taken using the HD Analyzer's Optical Quality Analysis System (OQAS, Visiometrics), which measured the effect of high-degree optical aberrations and loss of transparency of ocular tissues on the quality of the retinal image. The main outcome measures were OSI, the cutoff frequency of the modulation transfer function (MTF), and the Strehl ratio.

The repeatability limit for both groups was 0.841 (33.5%) for the OSI,

8.499 (31.1%) for the cutoff MTF, and 0.051 (31%) for the Strehl ratio. The repeatability limit was good and equivalent for the OSI, the MTF, and the Strehl ratio values, and there was a large gap between the normal and pathologic threshold for OSI measurements, indicating that the reliability of the double pass system complies with the requirements for quantitative assessment of scattering. We think that the double-pass system will play an important role in daily clinical practice in the near future.

Diagnostic and surgical planning instruments not only restore vision, but also enhance it. As long as surgeons continue to screen patients appropriately, they will have continued success in refractive surgery outcomes.

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Alain Saad is an ophthalmologist in the Cornea, Cataract and Refractive Surgery Department (Damien Gatinel Department) at the Rothschild Foundation in Paris, France.

Glaucoma Management Strategies

In many patients, glaucoma cannot be controlled with eyedrops, but a range of surgical techniques and drainage devices can help.

By Mark Hillen

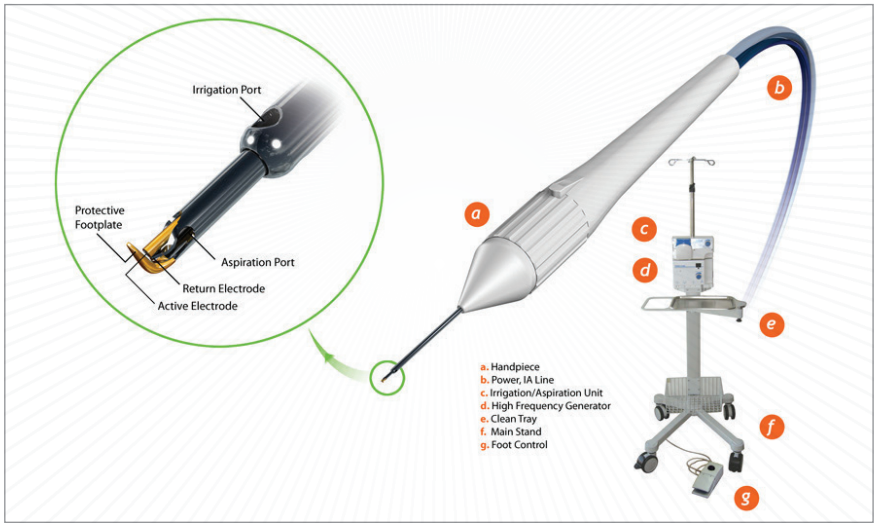

Figure 1. The Trabecutome device handpiece. This disposable, single-use handpiece generates a bipolar electrical pulse for electrocauterization at the distal end of the tip, and performs simultaneous irrigation and aspiration.

At a Glance

- *Trabeculectomy lowers IOP but carries significant peri- and post-operative risk*
- *Several techniques and devices have been developed to replace trabeculectomy*
- *Less invasive developments include trabecular meshwork stents and adjustable flow rate drainage devices*
- *Identification of the best candidate patients for each technique or device will become clearer as clinical experience grows*

Surgical intervention is required under a number of circumstances in patients with glaucoma. These include unacceptable intraocular pressure (IOP) levels despite maximal topical glaucoma medication; deterioration in visual function or ocular structures, typically the optic disc; and adverse reactions (either ocular or systemic) to glaucoma medications that cannot be resolved by changing the drug or formulation.

In such cases, surgical trabeculectomy has historically been the intervention of choice – and for many patients it still is. The procedure is simple in concept – a fistula is created to connect the anterior chamber and the subconjunctival space to improve drainage – but it requires considerable skill to perform, and it also

Figure 2. Abbott Medical Optics' Baerveldt glaucoma device (BG 101-350).

Figure 3. Alcon's EX-PRESS shunt, which connects the anterior chamber to the intrascleral space, allowing drainage to a bleb.

forms a bleb under the conjunctiva.

Trabeculectomy is often highly effective at reducing IOP, but the procedure is also associated with a number of complications (see Box 1, "Trabeculectomy's Troubles"), most of them related to blebbing. The shortcomings prompted the development of a range of instruments and devices that aim to either perform a better trabeculectomy, or manage glaucoma by different means.

Beyond trabeculectomy

The Trabectome surgical technique is an alternative take on trabeculectomy developed by George Baerveldt at the University of California, Irvine, USA. It is an ab interno technique that uses high-frequency electrocautery to ablate a 60°–120° strip of the trabecular meshwork and the inner wall of Schlemm's canal. The single-use Trabectome handpiece, connected to a console, performs three functions: electrocauterization; fluid irrigation, to stabilize the anterior chamber during the procedure; and aspiration, to remove the ablated tissue. The procedure impacts the area of greatest resistance to fluid outflow, removes debris and does not create a bleb.

The cost of the Trabectome technique is not trivial given that, for a disposable, single-use device, it is a complex tool. It is, however, effective: data from one retrospective analysis of over 700 Trabectome procedures showed that the intervention was associated with a 40 percent decrease in IOP at 24 months after surgery (1). When combined with cataract surgery and IOL implantation, the Trabectome technique had successfully controlled IOP at one year after surgery in 87 percent of patients with exfoliation glaucoma and 91 percent of patients with primary open-angle glaucoma (2).

Trabeculectomy's Troubles

- Risks during surgery include subconjunctival hemorrhages or conjunctival buttonholes or tears.
- Early post-operative issues include filtering complications related to blebbing, such as early bleb leaks or failures, and hypotony or hypertony due to under or over-filtration.
- Late postoperative complications include many bleb-related events, such as late bleb failures or leaks, cystic bleb, blebitis, bleb dysesthesia or bleb-related endophthalmitis, plus hypotony, cataract development or progression.

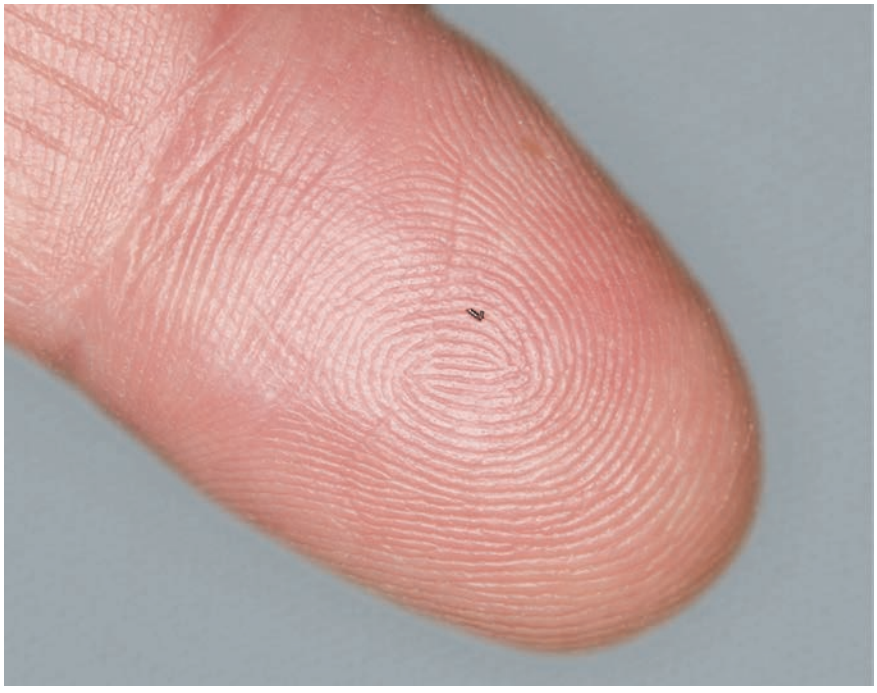

Figure 4. Glaukos' tiny iStent (pictured) is inserted into Schlemm's canal, opening up that channel, bypassing the trabecular meshwork, and facilitating fluid flow.

Devices to foster fluid flow

As with trabeculectomy, the concept behind implanted drainage devices is straightforward. In this case, an apparatus that causes the aqueous humor to drain at a faster rate from the anterior chamber to the surface of the conjunctiva is placed into the trabecular meshwork, thus alleviating the increased IOP. The device may or may not have a valve. These device can be pure shunts – unvalved, pure drainage devices, or contain valves, enabling the surgeon to pre-set the drainage rate that's required.

The market for valve-containing glaucoma implant devices includes three principle products: Abbott Medical Optics' Baerveldt device (Figure 2), New World Medica's Ahmed valve, and Molteno Ophthalmic's eponymous Molteno implant. Non-valved devices include Alcon's EX-PRESS shunt (Figure 3) which, after implantation at the corneal limbus following insertion under a scleral flap, allows a limited amount of aqueous humor to drain into the intrascleral space.

Each of these devices has successfully reduced IOP in many thousands of patients with glaucoma. However, it requires skill and judgment to place drainage devices safely and correctly in order to avoid adverse events and to obtain the best possible outcomes. In particular, bleb issues – such as bleb encapsulation and conjunctival tissue thinning, and bleb infection – are not uncommon (3).

New solutions are coming to the market that avoid bleb formation, such as Glaukos' iStent (Figure 4), the iStent inject, and Ivantis Inc.'s Hydrus Microstent. These tiny devices are intended for the treatment of primary open-angle glaucoma. They are inserted into Schlemm's canal, which they open up to let the aqueous humor drain more freely; this bypasses the blocked trabecular meshwork and all without forming a bleb. There are also bleb-less stents that utilize a different outflow pathway, namely from the anterior chamber to the suprachoroidal space. These products, such as Glaukos' iStent Supra and Transcend Medical's CyPass, generate potentially very large reductions in IOP.

Judging drainage perfectly is a considerable challenge, in part because intra-operative IOP can be different to pre-operative levels, depending upon the type of glaucoma the patient has, the type and location of anesthesia used, and even the procedure required to place the implant or shunt. Even the most experienced surgeon cannot predict exactly what IOP reduction might be achieved; the risk of postoperative

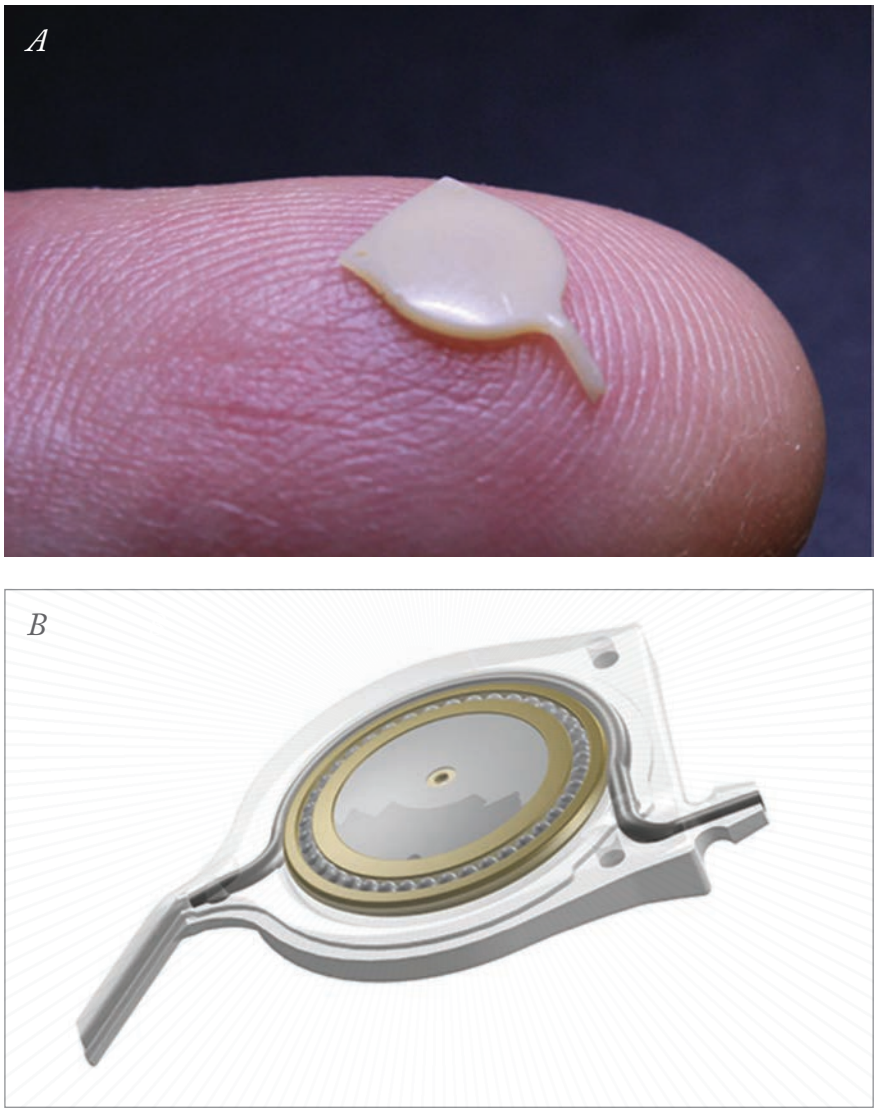

Figure 5. (a) The Rheon eyeWatch device, (b) a diagram showing the eccentrically shaped magnetic disk resting on ball bearings to allow rotation. As the disk rotates, the drainage tube is increasingly compressed, increasing the device's fluidic resistance.

hypertony or hypotony is ever-present. In some cases, inadequate post-operative IOP reduction can be corrected by the addition (or removal) of more shunts or stents. This, however, requires additional surgery. A drainage device could be altered for flow resistance properties after implantation without having to resort to revision surgery would be a valuable addition to the armamentarium.

Such a device is now available. Called the eyeWatch (Figure 5a), it has been produced by Nikos Stergiopulos along with a team of researchers at the École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland (4) for a new company, Rheon Medical. EyeWatch, which received the CE mark earlier this year, contains a drainage tube that includes a flow resistance controller. The tube can be compressed by an eccentrically shaped magnetic disk that is placed on ball bearings to allow rotation. Compression of the drainage tube, and therefore its fluidic resistance, is determined by the angle of rotation (Figure 5b). The magnetic disk can be rotated by an external control unit, providing the means of non-invasive adjustment. The device is being offered as a standalone drainage device or for use in combination with Baerveldt or Molteno implants.

The pace at which glaucoma drainage techniques and technologies are evolving is rapid and their real-world impact will become clearer as more patients receive them. Analysis of the outcomes will then allow surgeons to determine which patients should receive what device.

It is likely that different approaches will serve certain types of patient better than others, depending on the type of glaucoma and IOP reduction required, but a future can be foreseen in which all but a few patients avoid trabeculectomy.

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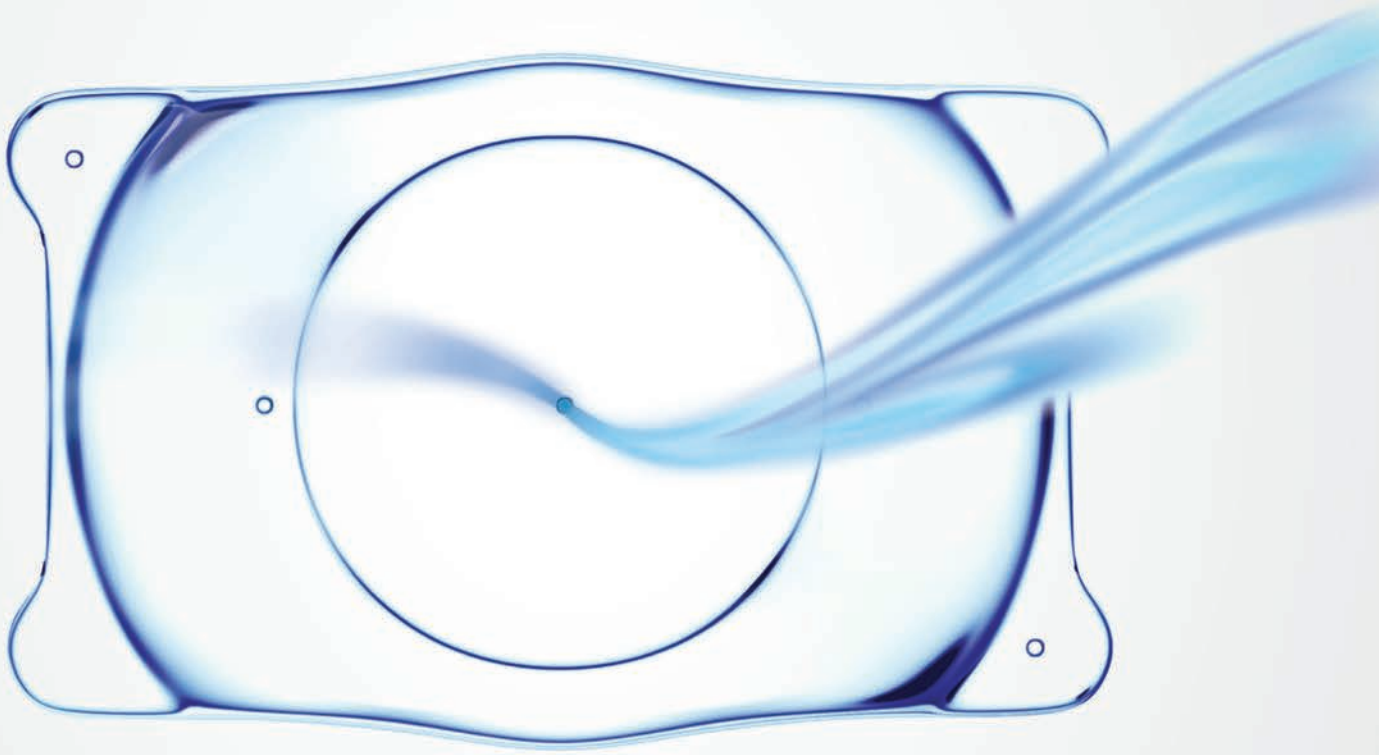

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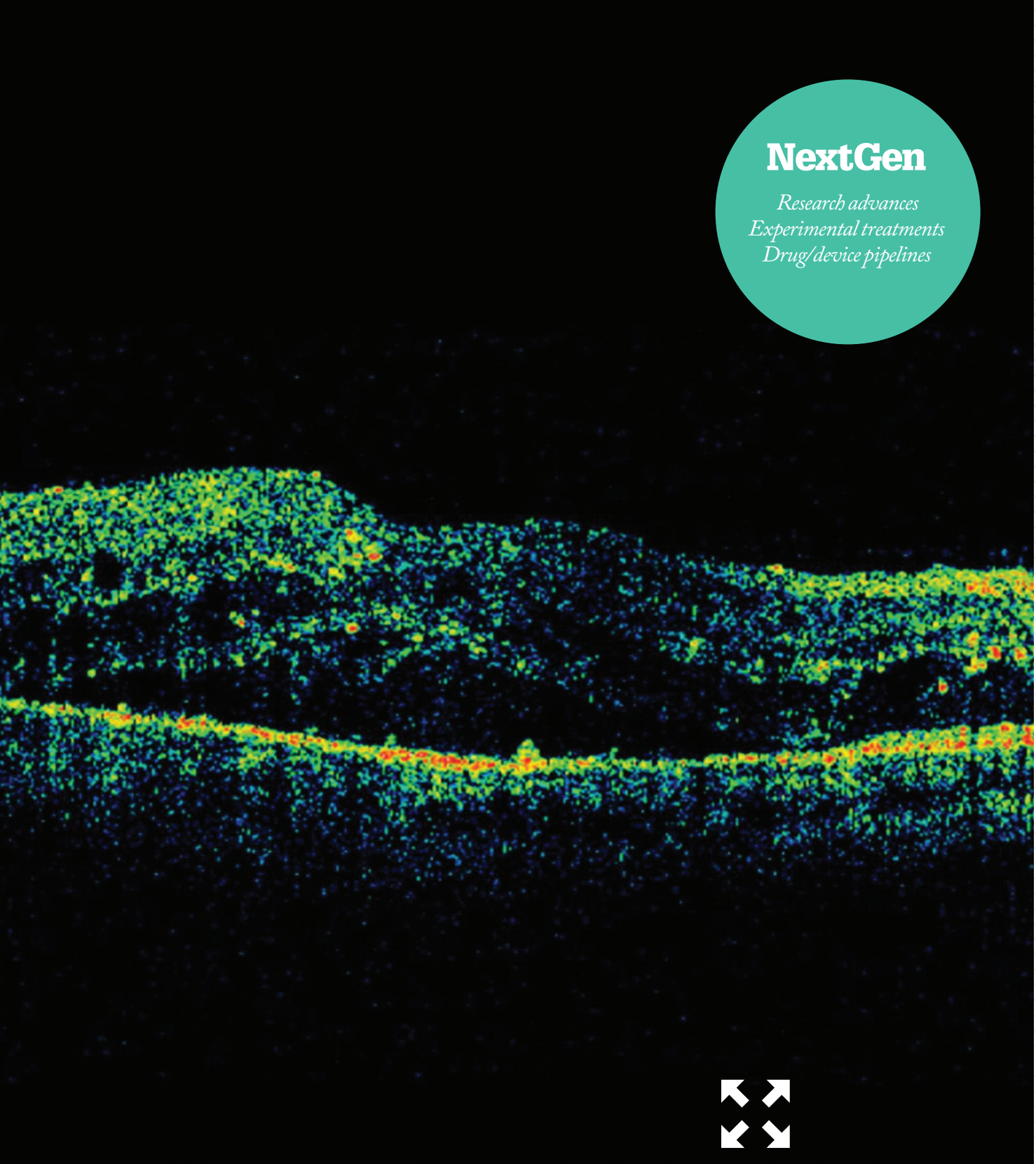

Benchmarking DME

What does analysis of the last five years of literature on diabetic macular edema tell us about the priorities of the field and the major contributors to it?

By Mark Hillen

Diabetic macular edema (DME) is the major cause of vision loss in people with diabetic retinopathy – if a person has diabetes, they have a 1 in 10 chance of developing DME during their life. The raw numbers are chilling: the International Diabetes Federation estimates that in 2011 that there were 366 million people with diabetes, and they predict this to rise to 552 million by 2030 (1).

To provide insight into the past and predictions for the future of the field, a series of metrics were applied to the last five years of the published literature. We asked:

- What are the major topics for the field?
- Which publications have the greatest impact?
- How is the knowledge available online?
- Who are the most prolific authors?

PubMed, was searched for diabetic macular edema* with results limited to the last five years, in humans (for a clinical focus). The data were analyzed in Microsoft Excel 2013.

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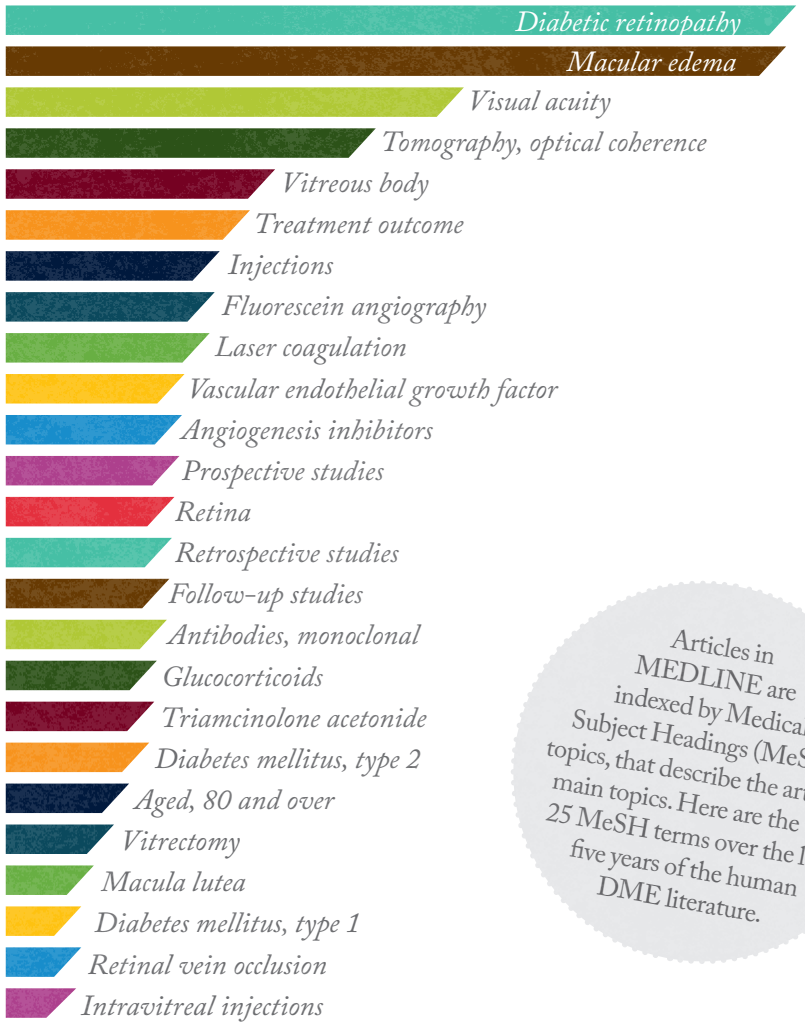
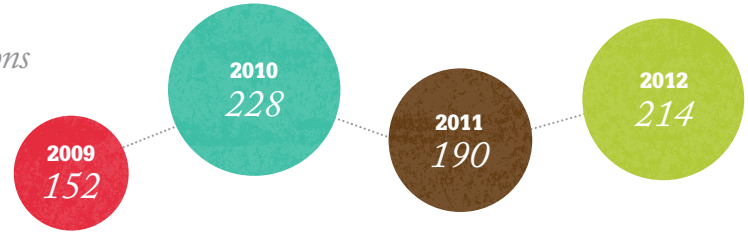
Most frequent topics on PubMed

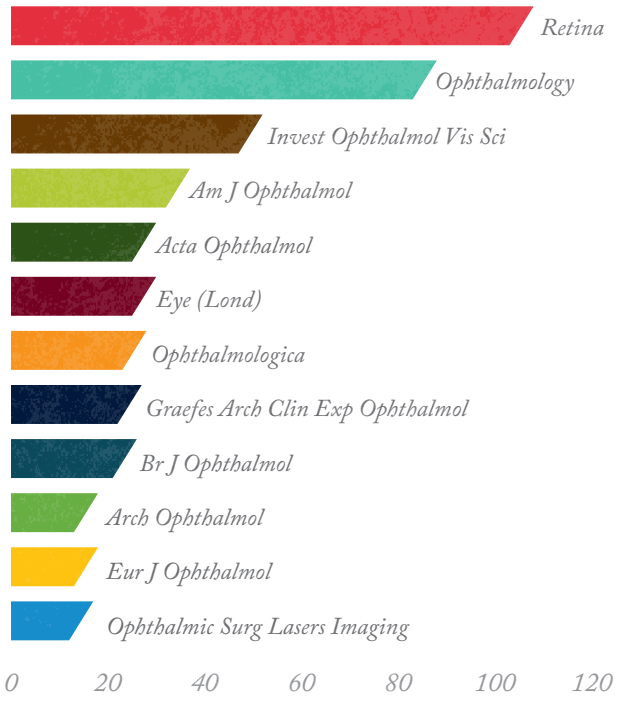


Articles in MEDLINE are indexed by Medical Subject Headings (MeSH) topics, that describe the articles' main topics. Here are the top 25 MeSH terms over the last five years of the human DME literature.

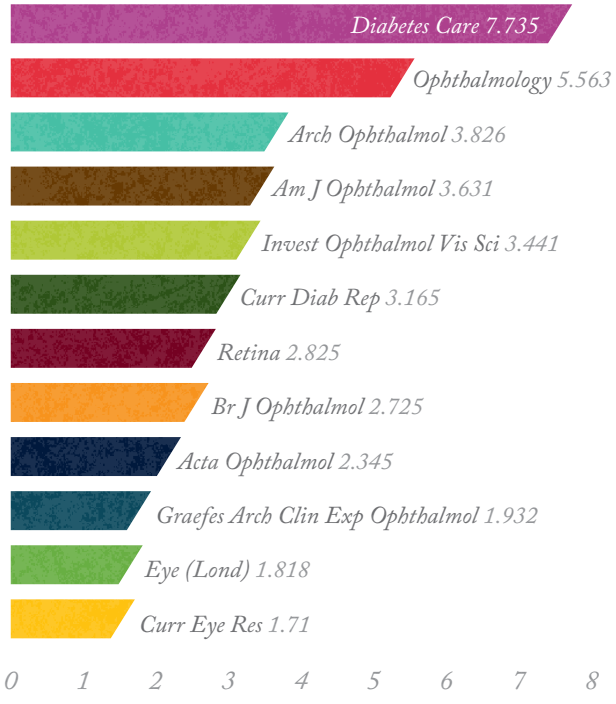
DME publications per year



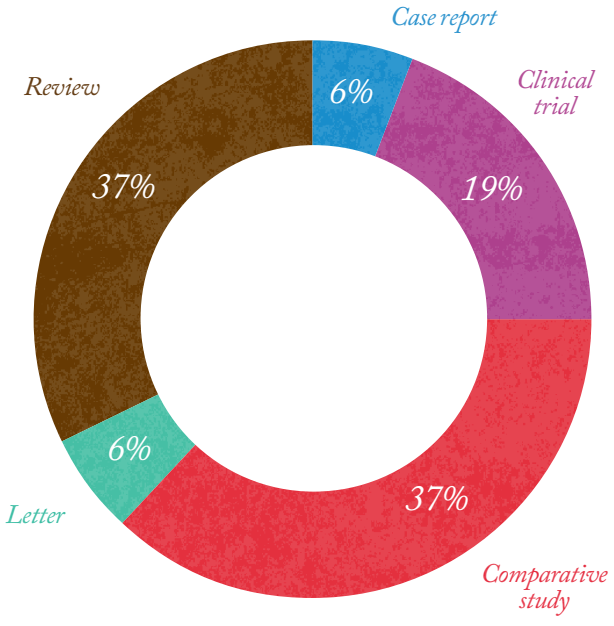
Top 12 journals *(number of publications)*



Journal Impact Factors for 2013

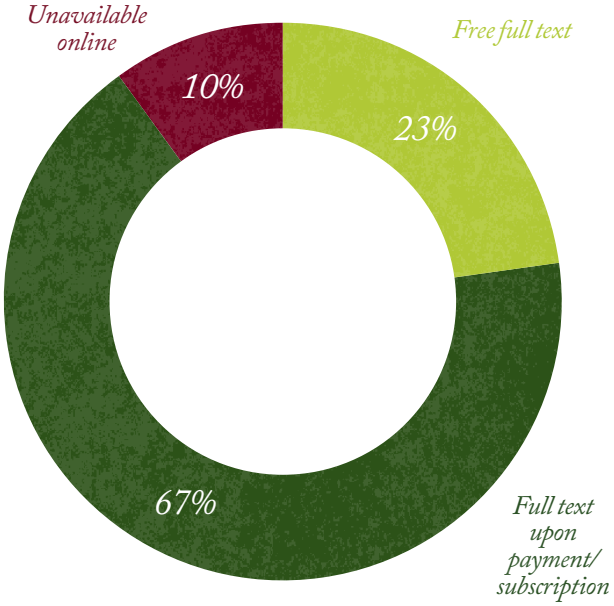


Categorization of articles



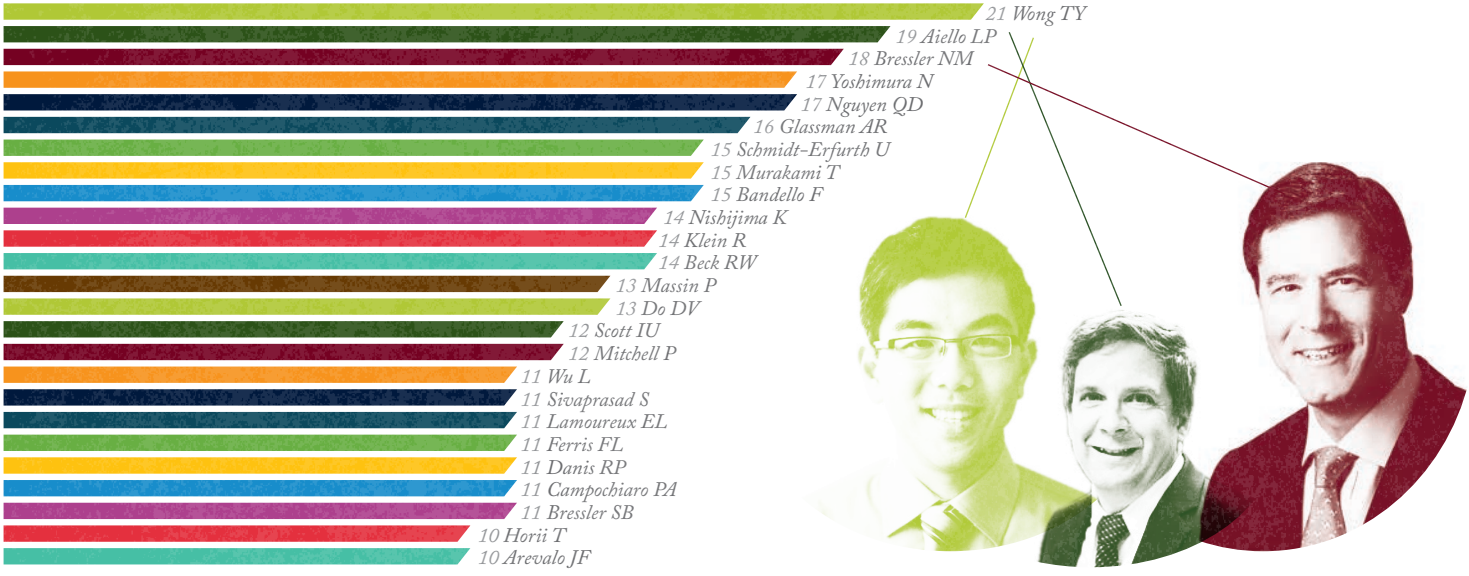
Articles are categorized according to PubMed criteria. Clinical study represents a clinical evaluation of a drug, device or technique that was not a clinical trial.

Fee or free?

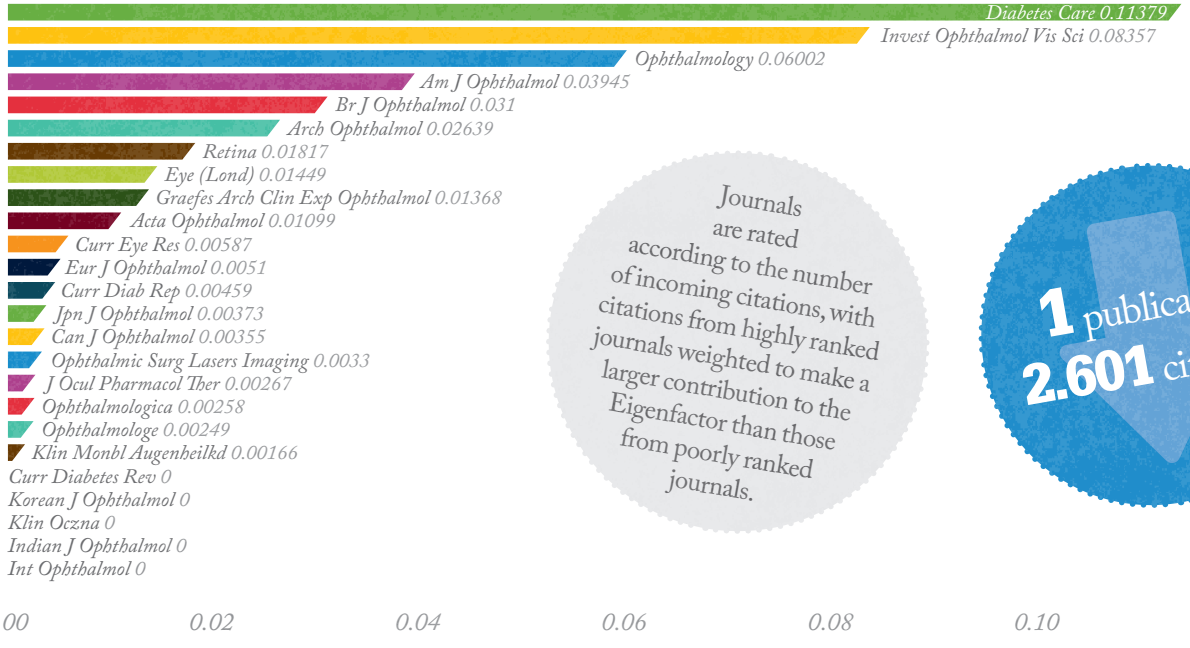


Just under one in every four articles are available online, free of charge. However, a tenth are still unavailable online.

Most prolific authors in DME, 2009–2013



Average journal Eigenfactor score



Journals are rated according to the number of incoming citations, with citations from highly ranked journals weighted to make a larger contribution to the Eigenfactor than those from poorly ranked journals.

1 publication
2.601 citations

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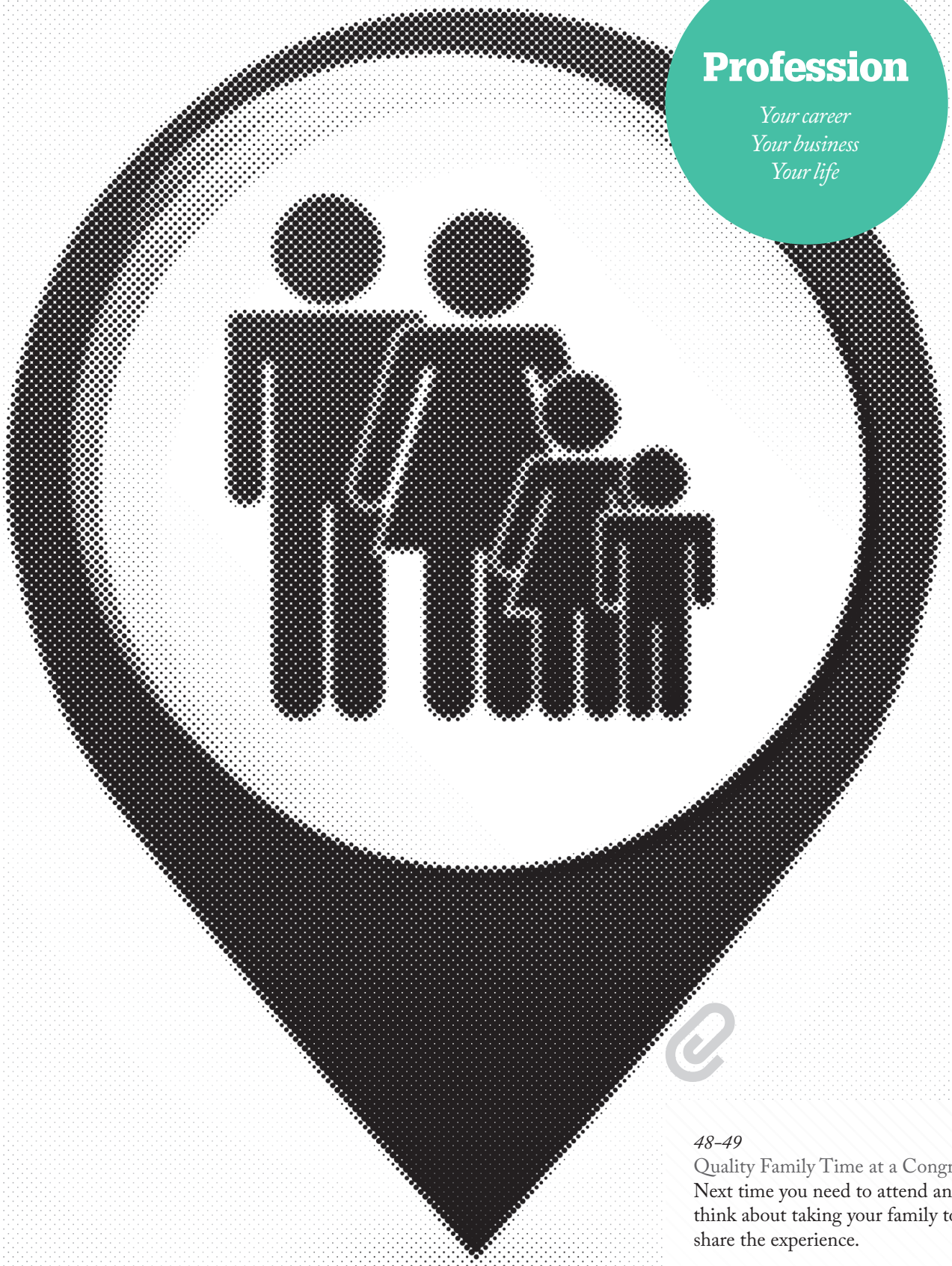


48-49
Quality Family Time at a Congress
Next time you need to attend an event, think about taking your family to share the experience.

Quality Family Time at a Congress

Grasp the opportunity to take the whole family to conference locations – and gain a new perspective on the places you visit.

By Nicole Kretz

Our family is pretty typical. My husband, Florian, and I have two children: a son, aged thirteen, and a daughter, aged four. Florian's regular attendance at ophthalmology conferences around the world presents us with a choice: the rest of us either stay at home, and miss our father/husband, or we pack our bags and go to the conferences together. We often choose the second option. Doing so needs careful planning, but we are rewarded with being together, seeing the world, and (with a little effort) having some amazing experiences along the way.

Planning

Communication is the key to planning a working vacation that's fun for all of the family. The first task is to map out Florian's schedule, to determine when he needs to present his work, which sessions he would like to go to, and what activities he needs to attend in the evenings. From that starting point, it's surprising how much time the family can have together – I definitely see more of my husband when we travel than when he is at home.

The second issue to factor in is schooling. With our eldest child, schooling comes first. We try to travel during school holidays, but when that isn't possible we bring homework bags and set strict guidelines about study times. That means there's no arguing, and when we do explore the cities that we visit, we can do it together and have fun.

The third consideration is where we will stay. Often the congress hotels are quite expensive, and as a family, we're paying our own way. In addition, when you're with children it can be awkward being in a luxury hotel, and a five-star restaurant is a waste of money if I can't sit with my daughter singing quietly or drawing in her coloring-in book. I don't want half of the clientele wishing we were on a different planet. However, some business hotels are family-friendly and most restaurants will make a special effort to make some toddler-friendly food or a treat younger children.

There's a good alternative to hotels: it's often much less expensive for our family to stay in an apartment with a small kitchen. We can prepare meals, have breakfast together and just generally have more room to relax in. The criteria I use are a good location, affordability, comfort and practicality.

We study maps, and read the reviews on websites like Tripadvisor and Airbnb.

You can't have a successful vacation without good packing organization. Children – particularly toddlers – add a new dimension to packing for a working vacation. Sure, pack enough clothing, toys and reading materials to make it through the trip, but the most important holdall is the travel bag: include everything you might need for an unwell toddler. In addition to diapers and diaper cream, I pack fever medication, sun cream, nasal spray, wipes, baby teething paste, and so on. It's not fun when a distressed, snotty infant with a fever wakes up all of the family at three o'clock in the morning, but it's so much more worse if you are not prepared.

If Florian is travelling at his own expense we book flights and hotels together as a family. Things are more difficult if the trip is paid for and arrangements conducted through a travel company. We can ask if the children and I can also travel on the same flights and stay in a bigger room in the hotel at our expense, but flights are sometimes fully booked or prohibitively expensive. We then have to consider later flights and alternative accommodation.

When you're there

Sometimes the family and Florian's work can mix – it all depends on the environment. A cocktail dinner is not appropriate for children, but a dinner at a museum with nibbles can be – we can walk around freely and explore the venue – and I find that our most congress-goers are quite happy to talk about topics unrelated to eyes! Keeping children entertained is important (some museums are more interesting to them than others) so I bring small games or a coloring-in book with crayons, and iPhone apps, particularly educational ones. Being flexible is the key: if the dinner is boring, I may take the children outside to play. Sometimes other congress attendees have brought their

At a Glance

- *Working vacations are an opportunity for the whole family to have new experiences*
- *A well-planned itinerary and a sensible approach is crucial*
- *Flexibility around work commitments is a must*
- *Connect with the families of colleagues and make new friends*
- *An inquiring mind guarantees a rewarding experience*

children along, and they all quickly become friends. It's always a pleasure to meet other parents who want to include their children.

When Florian is working, we get out and explore. Orientation group tours are great for helping to discover the area with the aid of a guide. Tourist centers are usually fantastic, offering all the help you need find interesting places to visit and everything you need to navigate, including maps, timetables and the best advice for dealing with taxi drivers. Of course, good hotels always have someone to help too. I find concierges to be really helpful and full of great advice. Even your smartphone can help. Google and Google Maps can give you almost everything you need (assuming you can obtain free Wi-Fi), and Yelp is fantastic for finding good restaurants, museums and fun things to do.

We've had some memorable trips. For example, AAO 2012 in Orlando was great. The kids loved Sea Life and Disney World and afterwards we had a beach vacation in Daytona. For ASCRS 2013 in San Francisco, we rented an apartment and included Florian's colleagues into our family, which was fun and a fantastic bonding experience. ESCRS in 2011 was in Vienna, and for that we rented an apartment that was close to the conference, with Florian's aunt and uncle. When Florian was working, we saw all the sights of the city, visiting museums and the Prater, and when he had time off we did the activities he most enjoyed. Planning ahead meant it worked out perfectly.

The best advice I can give when you are out and about with your children is to talk to people. For example, when we visited Morocco, we learned so much from local people just by being interested in the culture and asking questions. I was even invited into kitchens to learn how to make bread and a real tagine, and we were shown the real off-the-tourist-map city. That was a bumpy ride (honestly, it really seemed that the car door might fall off) but we were always safe and well taken care of. A small gesture that comes with a big heart is always appreciated.

Overall, working vacations can be a great way of combining work and quality family time. With good communication, organization, realistic goals and a relaxed approach you can explore the world together and make lasting memories for your family and great connections with your colleagues.

Nicole Kretz is a mother of two young children, wife of an ophthalmologist, and a keen world traveler.

Calling the Plays for Alimera

Sitting Down With Dan Myers,
President and CEO of
Alimera Sciences, Inc.

Where did your journey to Alimera begin?

I actually grew up in Atlanta, not far from where Alimera is based today. In my younger days, I was very proficient in sports and attended Georgia Tech on an American football scholarship. I played quarterback; a position that leads the offence and decides what we do on the field. It involved quick thinking under a lot of stress, and I think that experience helped with my subsequent career. Thankfully though, I also realized that Georgia Tech was a great school, with a lot to offer academically, so I decided to apply myself with as much effort to my industrial management studies as I did to my football.

What took you into ophthalmology?

I started in ophthalmology in the early 1980s as an Allergan sales rep in Atlanta, spending about a year carrying the bag, travelling from doctor to doctor. It was another valuable experience. Next, I spent about three years outside of ophthalmology with American Hospital Supply, but came back and worked with Johnson and Johnson, this time in Los Angeles, who had acquired Cooper Vision Pharmaceuticals. There I had my first taste of being an entrepreneur as I was involved in assimilating that acquisition into their Iolab division. But I wanted to move back to Atlanta, and when I heard that CIBA Vision (who were based in Atlanta at the time) were diversifying into the ophthalmic pharmaceutical business, I jumped at the chance to become one of the founding members of CIBA Vision Ophthalmics. It was a small team building a business unit almost from nothing – something that I've repeated with Alimera. To complete the chronology, in 1996, Novartis was formed by the merger of CIBA-Geigy and Sandoz, and so we became Novartis Ophthalmics. Soon afterwards I became President of the division, a position that I held between 1997 and 2002, during which time we launched the first drug that could be used to treat retinal disorders: Visudyne, back in 2000.

How did Alimera come about?

Novartis decided to rationalize its operations and move Novartis Ophthalmics to New Jersey. I knew that I wanted to remain in Georgia so I and my fellow founders of Alimera pooled our severance packages and also raised venture capital funding. Fortuitously, this was just after the dotcom bubble burst and investors wanted to back companies with more than just IP and a website – and healthcare was something that they were prepared to back. I used to hear that "money follows management" and it seems to be true: the VCs valued the management experience of the team, and we raised $60 million. Soon afterwards I met Paul Ashton, of pSivida, (who developed the advanced drug-delivery technology that's in ILUVIEN) and within a couple of hours, we knew that we had something special. It was serendipitous; we were together at the right place at the right time.

What's the management style for building successful businesses?

I don't constrain people; I give them freedom to express themselves. I want the staff to come to work at Alimera motivated, every day, to do their best – and I try to build an environment where that happens. I can't be running around personally motivating everyone but I want the workplace to be motivating. We are not your typical giant pharmaceutical company, so we don't have their highly defined structures and procedures and some people coming from that background find our approach slightly daunting at first, but they quickly realize that the freedom and flexibility that Alimera provides results in a driven group that enjoy their work. I also like a bit of emotion. In meetings I want people to tell me exactly what they believe; if they have differing opinions, I want to hear from them. When we make a decision, we get behind it completely – I often say that we get 100 percent behind a 51 percent decision.

"I don't constrain people; I give them freedom to express themselves."

You have also served on the Carter Foundation Board of Councilors.

Yes. The Carter Foundation has two main goals in ocular health: the control and elimination of river blindness and trachoma, and I was genuinely honored to be invited to contribute my time to the Foundation and to sit on the board. I was very fortunate to meet President Carter for dinner on one occasion, and I found him to be a genuine, intelligent and honorable man.

FOR INSUFFICIENTLY RESPONSIVE DMO

ILUVIEN® is indicated for the treatment of vision impairment associated with chronic diabetic macular oedema (DMO), considered insufficiently responsive to available therapies.

36:1

36 MONTHS OF SUSTAINED TREATMENT

ACHIEVABLE WITH ONE INJECTION[1,2]

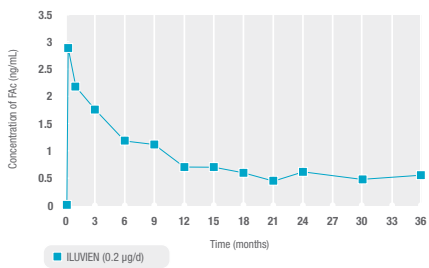
NICE RECOMMENDS ILUVIEN

(TA301)[3] for treating chronic diabetic macular oedema that is insufficiently responsive to available therapies in pseudophakic eye under a patient access scheme.

For further details, see http://guidance.nice.org.uk/TA301

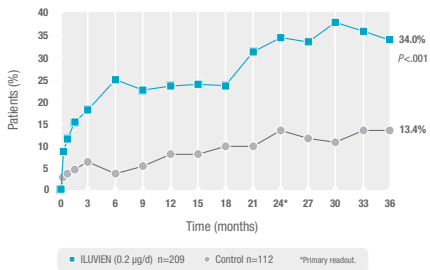
Human Aqueous Concentrations of Fluocinolone Acetonide (FAc) With 1 Implant[1]

- ILUVIEN® provides at least 36 months of in vivo drug delivery[1]



Percentage of Patients With ≥15-Letter Response Over Baseline (chronic DMO)[1]

- Significantly more patients with chronic DMO treated with ILUVIEN achieved ≥15-letter improvement over baseline at month 36 vs control[1,2]
- 76.1% of chronic DMO patients received 1 implant in 3 years, the remaining patients received 2 or more implants[2]



ILUVIEN®
Fluocinolone Acetonide
190 micrograms intravitreal implant in applicator

Prescribing Information can be found on the back of this page.

Learn more at: ILUVIEN.co.uk

Please visit us during the RCO at stand D

36:1

36 MONTHS OF SUSTAINED TREATMENT

ACHIEVABLE WITH ONE INJECTION[1,2]

Market research suggests that many DMO patients do not achieve optimal outcomes.[4]

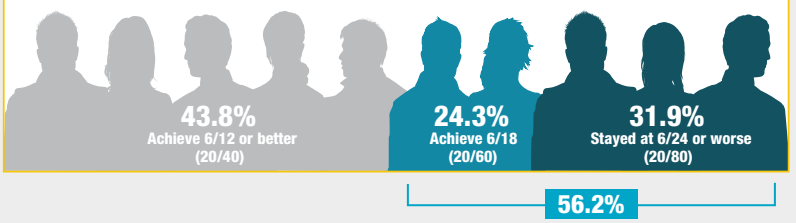
DMO Quantitative Market Research Survey[4]

Results from third-party survey of 180 retina-treating ophthalmologists in EU.*

- In the study, retina-treating ophthalmologists estimated 56.2% of DMO patients experience poor vision outcomes (6/18 or worse) long term

*Survey conducted in UK, DE, FR, AT, IT, ES, PT from 26 April to 9 September 2012.

Spectrum of BCVA levels over the long term for DMO patients



ILUVIEN® has the potential to provide chronic DMO patients with improved visual acuity at 36 months compared with baseline.[1,2]

Learn more at: ILUVIEN.co.uk

To request more product information, email medicalinformation@alimerasciences.com or call 0800 148 8274

ILUVIEN® Prescribing Information Refer to the Summary of Product Characteristics (SPC) before prescribing. **Presentation:** intravitreal implant in applicator. Each implant contains 190 micrograms of fluocinolone acetonide. Light brown coloured cylinder, approximately 3.5mm x 0.37mm in size. Implant applicator with 25 gauge needle. **Indication:** ILUVIEN is indicated for the treatment of vision impairment associated with chronic diabetic macular oedema, considered insufficiently responsive to available therapies. **Dosage and method of administration:** The recommended dose is one ILUVIEN implant in the affected eye. Administration in both eyes concurrently is not recommended. An additional implant may be administered after 12 months if the patient experiences decreased vision or an increase in retinal thickness secondary to recurrent or worsening diabetic macular oedema. Retreatments should not be administered unless the potential benefits outweigh the risks. Only patients who have been insufficiently responsive to prior treatment with laser photocoagulation or other available therapies for diabetic macular oedema should be treated with ILUVIEN. Children under 18: No relevant use. **Special populations:** No dosage adjustments are necessary in elderly patients, or those with renal or hepatic impairment. **Contraindications:** the presence of pre-existing glaucoma or active or suspected ocular or periocular infection including most viral diseases of the cornea and conjunctiva, including active epithelial herpes simplex keratitis (dendritic keratitis), vaccinia, varicella, mycobacterial infections, and fungal diseases. Hypersensitivity to the active substance or to any of the excipients. **Special warnings and precautions:** Intravitreal injections have been associated with endophthalmitis, elevation in intraocular pressure, retinal detachments and vitreous haemorrhages or detachments. Patients should be instructed to report without delay any symptoms suggestive of endophthalmitis. Patient monitoring within two to seven days following the injection may permit early identification and treatment of ocular infection, increase in intraocular pressure or other complication. It is recommended that intra-ocular pressure be monitored at least quarterly thereafter. Use of intravitreal corticosteroids may cause cataracts, increased intraocular pressure, glaucoma and may increase the risk of secondary infections. The safety and efficacy of ILUVIEN administered to both eyes concurrently have not been studied. Concurrent treatment of both eyes is not recommended until the patient's systemic and ocular response to the first implant is known. **Interactions:** No interaction studies with other medicinal products have been performed. **Pregnancy and lactation:** There are no adequate data from the use of intravitreal administered fluocinolone acetonide in pregnant women. ILUVIEN is not recommended during pregnancy unless the potential benefit justifies the potential risk to the foetus. ILUVIEN is not recommended during breast feeding unless clearly necessary. **Driving and using machines:** Patients may experience temporarily reduced vision after administration of ILUVIEN and should refrain from driving or using machines until this has resolved. **Undesirable effects:** Very common (≥ 1/10): cataract operation, cataract, increased intraocular pressure, floaters (myodesopsia); common (≥1/100 to < 1/10): glaucoma, trabeculectomy, eye pain, vitreous haemorrhage, conjunctival haemorrhage, blurred vision, glaucoma surgery, reduced visual acuity, vitrectomy, trabeculoplasty; uncommon (≥1/1,000 to < 1/100): endophthalmitis, headache, retinal vascular occlusion, optic nerve disorder, maculopathy, optic atrophy, conjunctival ulcer, iris neovascularisation, retinal exudates, vitreous degeneration, vitreous detachment, posterior capsule opacification, iris adhesions, ocular hyperaemia, sclera thinning, removal of extruded implant from sclera, eye discharge, eye pruritus, extrusion of implant, implant in line of sight, procedural complication, procedural pain. Consult the SPC for full details of undesirable effects. **Overdose:** No case of overdose has been reported. **Legal classification:** POM. **Pack size and NHS list price:** £5,500.00 (ex VAT) for each ILUVIEN 190 micrograms intravitreal implant in applicator. **Marketing Authorisation number** PL41472/0001. **Marketing Authorisation Holder:** Alimera Sciences Limited, Centaur House, Ancells Business Park, Ancells Road, Fleet, GU51 2UJ UK. **Date of preparation of PI:** January 2014

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard. Adverse events should also be reported to Alimera Sciences Limited (telephone: 0800 148 8274) pvalimerasciences@alimerasciences.com

For medical enquiries please email: medicalinformation@alimerasciences.com

References: 1. ILUVIEN, Summary of Product Characteristics. 2. Campochiaro PA, Brown DM, et al. Ophthalmology 2012; 119: 2125-2131. 3. NICE technology appraisal guidance 301 (issued November 2013): Fluocinolone acetonide intravitreal implant for treating chronic diabetic macular oedema after an inadequate response to prior therapy (http://guidance.nice.org.uk/TA301) 4(8). Data on file. Alimera Sciences.

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Date of preparation: April 2014 UKILV0107

ILUVIEN®
Fluocinolone Acetonide
190 micrograms intravitreal implant in applicator

AMARIS® 1050RS AMARIS® 750S AMARIS® 500E

Impressively evolutionary

The SCHWIND AMARIS® 1050RS

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1050 Hz Repetition Rate
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