Health Education England

Evidence Brief: Ophthalmology

Contents

Produced by the HEE Knowledge Management team Evidence Briefs offer a quick overview of the published reports, research, and evidence on a workforce-related topic.

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- Complete Evidence Brief list – link for HEE staff
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Key publications – the big picture

Cataract services and workforce calculator tool March 2021, The Royal Collee of Ophthalmologists
This guidance aims to support local eye health systems, service leads and commissioners to plan and deliver safe, sustainable, and efficient cataract services to meet current and future demand. It seeks to enable accurate multidisciplinary workforce planning, using pathways that integrate primary and secondary care, and optimise patient -ow in hospital. The guidance provides a 'workforce calculator' to support workforce planning by calculating the staff needed to deliver cataract services using community or hospital-based pathways for the patient population. It provides practical guidance for planning staffing and operating lists to utilise theatre time efficiently, considering complex cases and training.

Mitigating the impact of COVID-19 on ophthalmology training November 2020, Royal College of Ophthalmologists
The COVID-19 pandemic has had significant adverse effects on the training programme and learning opportunities for ophthalmologist in training both in terms of experiences and in assessments1-3 .

Getting it Right First Time (GIRFT) ophthalmology national report December 2019, NHS Improvement
The ophthalmology national report from the Getting It Right First Time (GIRFT) programme features 22 recommendations to improve units treating the major sight-threatening conditions, including cataract, glaucoma, wet age-related macular degeneration (wet AMD) and diabetic retinopathy.
See p. 57 "Workforce and workspace"

Interim People Plan June 2019, NHS
Our Interim NHS People Plan, developed collaboratively with national leaders and partners, sets a vision for how people working in the NHS will be supported to deliver care and identifies the actions we will take to help them.

The NHS Long Term Plan Updated August 2019, NHS
The NHS Long Term Plan was developed in partnership with those who know the NHS best – frontline health and care staff, patients and their families and other experts.

Primary Eye Care, Community Ophthalmology and General Ophthalmology 2019, Royal College of Ophthalmologists, February
This document concentrates on the commissioning and provision of eye health and ophthalmology services in England. It is intended to provide an overview of what should be in place across the eye health service system. Ophthalmology accounts for 8% of the 94 million hospital outpatient attendances and is the busiest outpatient attendance specialty.1 With demand already overwhelming many hospital eye services (HES), addressing the challenge of an ageing population and delivering new treatments is a problem for which we must find a solution. More innovative approaches for the management of acute and chronic eye disease are necessary to provide safe and sustainable services.

Handbook: Transforming elective care services ophthalmology January 2019, NHS England
This handbook has been created to support the improvement of local health and care systems for ophthalmology elective care services.

Blog post: Creating a community of care on eye health January 2019, NHS England

The chief operating officer with the Local Optical Committee Support Unit (LOCSU) explains how local optical practices can play a significant role providing patient-centred, preventative health:
Sight is the sense we fear losing most and a growing elderly population is more likely to suffer sight issues. There are almost two million people in the UK living with sight loss – this is expected to double by 2050. Many people think that a sight test is just about checking whether your vision needs correcting with glasses or contact lenses. But checking a patient's sight could transform their health and wellbeing through the identification of other health issues.

Digital Ophthalmology in Scotland: Benefits to patient care and education 2019, Clinical Ophthalmology
Tackling visual impairment remains an important public health issue. Due to limited resources and the increasing demand on hospital eye services (HES), delivery of quality eye care within the community is essential. Training of clinical ophthalmic specialists and allied health-care professionals in the detection and management of common eye conditions can thus help to reduce the burden of eye disease and improve prognostic outcomes. Digital imaging has become a useful tool in facilitating eye-care delivery in both the community and hospital setting. In the last decade, the advent of electronic image exchange via a centralized referral unit in Scotland has revolutionized screening for ophthalmic disease, referrals, and shared care between community and HES clinicians. A government-led initiative known as the Scottish Eyecare Integration Project introduced electronic transfer of digital images within referrals from community optometrists to HES, which greatly reduced outpatient waiting times and improved patient satisfaction.

Opthalmology outpatients – safe and efficient processes
February 2018, Royal College of Ophthalmologists
Ophthalmology is the second busiest outpatient specialty and demand is outstripping capacity, with the risk of delays, particularly to follow up patients which can result in permanent loss of vision. It is crucial to ensure robust processes to ensure effective safe use of resources to deliver outpatient care. This document outlines some key principles and aims to support national programmes involved in reconfiguration of ophthalmology services for improvement such as the National Elective Care Transformation programme, Getting it Right First Time and Right Care.

Workforce Census 2018, Royal College of Ophthalmologists
The combination of an aging population and expansion in diagnostic and treatment options continues to overwhelm ophthalmic services across the UK, despite significant transformation by the ophthalmic profession in the way services are delivered. Ophthalmology is a major specialty, managing nine million outpatient appointments every year and 6% of all surgery, making it the busiest outpatient department in the NHS. We do this with approximately 1,500 ophthalmologists in the UK. However, the latest RCOphth workforce census confirms what we hear daily from our members and our patients – there are not enough ophthalmologists to cope and that this crisis is getting worse. The census highlights the continuing serious shortage of ophthalmologists, a widespread use of locums, which is expensive and can create significant risk to patients, as well as many unfilled posts.
Report | Infographic

Workforce Census 2016: A picture of the size and shape of the UK ophthalmic medical workforce March 2017, Royal College of Ophthalmologists

The RCOphth, with the publication of its most recent Workforce Census 2016 report with data from 75% of hospital eye units in the UK, places another important piece of the jigsaw depicting the current state of secondary NHS ophthalmology care. The report indicates that throughout the UK, departments are struggling to provide the service required by their population. Around a half of the units have unfilled consultant and/or SAS positions, over 90% are undertaking waiting list initiative surgery or clinics, with a similar proportion estimating that they require between one and five additional consultant ophthalmologists over the next two years. Are there enough trainees in the UK to satisfy demand for new and replacement consultant positions in the next two years? Probably not according to the report. The RCOphth continues to lobby for additional training numbers (there have been many more applicants than available posts since run through training commenced in 2012), but the current government position is to freeze the number of training posts for the next ten years.

The Way Forward Resources 2017, Royal College of Ophthalmologists
The increasing demand for hospital eye services (HES) is not being met and continues to grow – currently seeing nearly 10% of all outpatient appointments and performing 6% of the surgery in the UK. The Way Forward was commissioned by The Royal College of Ophthalmologists to identify current methods of working and schemes devised by ophthalmology departments in the UK to help meet the increasing demand in ophthalmic services. The information aims to offer a helpful resource for ophthalmologists who are seeking to develop their services to meet capacity needs.

National Ophthalmology Workstream: Hospital Eye Services – Progress, Priorities & Practical Actions for a Safe, Sustainable Service across Scotland April 2017, NHS Scotland
This report sets out significant progress that has already been achieved across hospital eye services in Scotland. It also explores future opportunities for further gain and innovation. Above all it sets out opportunities and tools for clinicians to be the architects of future change in the delivery of ophthalmic care in a modern health service. This exemplar work has already delivered benefits and there is much more to achieve. See Section 5.2.3 “Workforce”

Primary Care solutions – the role of community optometry July 2016, NHS England
A presentation delivered by Katrina Venerus, Managing Director Local Optical Committee Support Unit.

Case Studies

Post Covid-19 surgical ophthalmology pathway December 2020, The Academy of NHS Fab Stuff
As a result of Covid-19 Tetbury Hospital has developed and is delivering an ophthalmology surgical pathway within current and ongoing Covid-19 guidelines. We are able to continue to deliver an efficient and effective and safe surgical pathway for patients

How artificial intelligence is revolutionising ophthalmology
December 2020, National Institute for Health Research
This research collaboration involved clinical input from ophthalmologists at Moorfields, scientific input from researchers at UCL, and computer science and engineering expertise from DeepMind. Within two years, the collaborators had developed an algorithm that could identify signs of eye disease using

historic, anonymised eye scans. The research, published in *Nature Medicine*, showed that the AI system could recommend the correct referral decision to the same accuracy as world-leading eye experts for a number of different eye diseases. This was a massive breakthrough.

Eye Clinic Liaison Officer service continues to help patients across the Bay June 2020, The Academy of NHS Fab Stuff
A cross-bay service is continuing to support people in Lancaster, Barrow and Kendal, with eye conditions during the coronavirus (COVID-19) pandemic. The Eye Clinic Liaison Officer (ECLO) service is based in the Macular Clinic at Westmorland General Hospital and also offers a service at Furness General Hospital and Royal Lancaster Infirmary. The ECLO service is still helping to support people via telephone and email whilst abiding with social distancing guidelines that have been put in place by the Government.

Eye care digital playbook n.d., NHSx
Scroll down for scenarios, pathways, and case studies.
This resource provides support to clinical teams and organisations that are looking for digital tools that support the delivery of patient pathways. We concentrate on ophthalmology pathways and how to share diagnostics and undertake monitoring at home. We welcome feedback on the playbooks, including ideas for further case studies. To get in touch, please email dnhsx@nhsx.nhs.uk

EyesWise (Elective Care Transformation Programme Project)
n.d., NHS England
EyesWise is the Elective Care Transformation Programme's project to save sight and improve people's lives, in collaboration with the Royal College of Ophthalmologists. It aims to ensure people in England who need consultant led care get it as quickly as possible, and others are spared the need to attend specialist eye clinics. (see also Transforming elective care services ophthalmology)

HEE Star

More resources and tools are available if you search for **"Ophthalmic"** in the HEE Star:
https://www.hee.nhs.uk/our-work/hee-star

This includes a video on HEE's YouTube channel "Advancing clinical practice in ophthalmology" which looks at the Ophthalmic Common Clinical Competency Framework

Statistics

You can find relevant statistics on the Health and Care Statistics Landscape by searching for **"ophthalmic"**

NHS Digital also published a supplementary analysis that has been produced to in addition to the Retrospective Review for Earliest Clinically Appropriate Date wider goals of the Ophthalmology transformation program. It contains a count of Outpatient appointments where the Earliest Clinically Appropriate Date is present and the treatment specialty is ophthalmology. This is displayed by provider and month recorded during the April 2019 to March 2020 period.
You can read the full release here.

HEE National Data Programme

HEE staff can look at the National Data Warehouse (NDL) SharePoint site to find out more about datasets and Tableau products.

Published Peer Reviewed Research

COVID-19

COVID-19 and its effect on the provision of ophthalmic care in the United Kingdom February 2021, International Journal of Clinical Practice

The first quarter of 2020 gave light to a novel virus, Coronavirus 2019 (COVID-19), causing a pandemic of unbridled proportions. The National Health Service in the United Kingdom issued guidance to ensure that capacity was increased in acute medical settings, to prepare for the surge of COVID-19 cases. The Royal College of Ophthalmologists followed suit with guidance on the curtailment of all elective activity, aimed at protecting both patients and staff. Ophthalmology is one of the busiest outpatient specialities, and risk stratification of patients with appointments cancelled or on review lists was paramount to ensure there was no serious, permanent harm to sight. Our way of working, as we knew it, had to change in a short period of time. Local emergency eye care was changed from a walk in service, with the implementation of a strict triage protocol. Ophthalmologists, as well as Otorhinolaryngology colleagues, were identified as being at high risk of infection, due to the close proximity of clinical examination. The redesign of clinical areas to allow for social distancing, slit lamp barriers and personal protective equipment was all implemented. This time of relative pause has provided the opportunity to harness new ways of working, including the streamlining of services, reduction of backlog and the incorporation of telemedicine. Health preparedness is a new lexicon to Ophthalmology departments across the world, and it will now have to be stringently implemented in the ophthalmic setting.

When ophthalmologists step up to the COVID-19 frontlines July 2020, Eye

Drawing from experiences from the 2003 severe acute respiratory syndrome (SARS) outbreak in Singapore, the National Centre for Infectious Disease (NCID), a 330-bed capacity national facility was set up to handle infectious disease outbreaks. During such an outbreak, physicians and anaesthetists are critically needed in the outbreak wards and intensive care units. Ophthalmologists can contribute meaningfully during such times too. Since 31st January 2020, ophthalmologists, together with various surgical disciplines, augmented the staffing levels of NCID, the main centre where COVID-19 suspects were screened and treated. The role was to run the screening centre (SC), where suspect cases were screened. As of 31st March 2020, 51 ophthalmologists of all ranks (Medical Officers to Consultants) had been deployed to the SC safely. Recognising that age and co-morbidities result in less favourable outcomes in COVID-19 patients, those of age >60 years old and/or with cardiovascular risk factors [1] were excluded from deployment.

Could telehealth help eye care practitioners adapt contact lens services during the COVID-19 pandemic? June 2020, Contact lens & Anterior Eye

The COVID-19 pandemic has necessitated government-imposed restrictions on social interactions and travel. For many, the guidance has led to new ways of working, most notably a shift towards working remotely. While eye care practitioners

(ECPs) may continue to provide urgent or emergency eye care, in many cases the travel restrictions present a unique challenge by preventing conventional face-to-face examination. Telephone triage provides a useful starting point for establishing at-risk and emergency patients; but patient examination is central to contact lens patient care. The indeterminate period over which conventional practice will be suspended, and the risk that resumption of 'normal' practice could be impeded by a potential secondary peak in COVID-19 cases, hastens the need for practitioners to adapt their delivery of eyecare. Specifically, it is prudent to reflect upon supportive evidence for more comprehensive approaches to teleoptometry in contact lens practice. Smartphone based ocular imaging is an area which has seen considerable growth, particularly for imaging the posterior eye. Smartphone imaging of the anterior eye requires additional specialised instrumentation unlikely to be available to patients at home. Further, there is only limited evidence for self-administered image capture. In general, digital photographs, are useful for detection of gross anterior eye changes, but subtle changes are less discernible. For the assessment of visual acuity, many electronic test charts have been validated for use by practitioners. Research into self-administered visual acuity measures remains limited. The absence of a comprehensive evidence base for teleoptometry limits ECPs, particularly during this pandemic. Knowledge gaps ought to be addressed to facilitate development of optometry specific evidence-based guidance for telecare. In particular, advances in ocular self-imaging could help move this field forwards.

Supply

2017 National Optometry Workforce Survey May 2021, Optometry and Vision Science *Abstract only**

SIGNIFICANCE Planning for the effective delivery of eye care, on all levels, depends on an accurate and detailed knowledge of the optometric workforce and an understanding of demographic/behavioral trends to meet future needs of the public. PURPOSE The purposes of this study were to assess the current and future supply of doctors of optometry and to examine in-depth trends related to (1) demographic shifts, (2) sex-based differences, (3) differences in practice behaviors in between self-employed and employed optometrists, and (4) the concept of additional capacity within the profession. METHODS The 2017 National Optometry Workforce Survey (31 items) was distributed to 4050 optometrists, randomly sampled from a population of 45,033 currently licensed and practicing optometrists listed in the American Optometric Association's Optometry Master Data File. A stratified sampling method was applied to the population of optometrists using primary license state, age, and sex as variables to ensure a representative sample. RESULTS With a response rate of 29% (1158 responses), the sample ensured a 95% confidence interval with a margin of error of <5%. Key results include finding no significant differences between men and women for hours worked (38.9 vs. 37.5), productivity (patient visits per hour, 2.0 vs. 1.9), or career options/professional growth satisfaction with 65% for both. The data indicate a likely range of additional patient capacity of 2.29 to 2.57 patients per week (5.05 to 5.65 million annually profession-wide).CONCLUSIONSThe optometric workforce for the next decade is projected to grow 0.6 to 0.7% more annually than the U.S. population. The study found additional capacity for the profession more limited than previously suggested. Findings also illustrate an evolving/equitable workforce based on sex, in terms of both productivity and satisfaction. The trend toward employed versus self-employed was marked with 44% reporting they are employed, up from 29% in 2012.

Demographics and distribution of new entrants to the optometry profession in Australia March 2021, Clinical and Experimental Optometry *Abstract only**

CLINICAL RELEVANCE An assessment of the total number, demographics and geographic distribution of new entrants to the optometry profession in Australia can assist planning for workforce requirements. BACKGROUND Over the past decade, the number of registered optometrists in Australia has increased by 30.1 per cent, a rate that is greater than the population growth of the country (12.1 per cent). Concerns have been expressed about the size of the optometry workforce in a context of increasing numbers of graduating optometrists. This paper analyses data obtained from the Australian Health Practitioner Regulation Agency (AHPRA) about new entrants to the profession and their initial practice location during the period 1 July 2010 to 30 June 2018.METHODSA de-identified dataset was obtained from AHPRA that revealed the following characteristics of new entrants: qualification, gender, year of birth (in five-year bands), registration type, registration endorsement and principal place of practice including its Remoteness Area classification. RESULTS Data for 1,680 entrants were eligible for analysis; 80 per cent graduated from an Australian university, 12 per cent graduated from the optometry program in New Zealand, and seven per cent were graduates of an overseas university. The remaining two per cent registered via the Trans-Tasman Mutual Recognition Agreement, although the dataset did not include the qualification. The United Kingdom and Republic of Ireland provided the majority of overseas entrants (60 per cent). Most (75 per cent) entrants commenced practice in a major Australian city. Graduates of Australian universities tended to commence practice in the state in which they trained or an adjacent state or territory. Juxtaposed on the data outlined above is the high proportion (42 per cent) of overseas-trained optometrists commencing practice in Western Australia. CONCLUSION Coincident with the newer optometry programs producing graduates is the increased number of optometrists entering the Australian workforce over the past decade, with the majority commencing practice in major cities. Australia-trained optometrists tend to commence practice in the state where their training was undertaken. New entrants to the optometry profession can be generalised as graduates of an Australian optometry program, female, aged in their early-mid 20s and qualified for therapeutic practice.

Mismatch in Supply and Demand for Neuro-Ophthalmic Care March 2021, Journal of neuro-ophthalmology *Abstract only**

BACKGROUND Previous research suggests the number of neuro-ophthalmologists in the United States may be below a level that provides sufficient access to neuro-ophthalmic care in much of the United States. However, national estimates of the amount of clinical time spent on neuro-ophthalmology are lacking. METHODS The North American Neuro-Ophthalmology Society administered a survey on professional time allocation to its active members. Survey response was 95%. The survey characterized the hours each week each respondent allocated to overall work, clinical work, clinical work in ophthalmology/neurology, and clinical work in neuro-ophthalmology specifically. The survey additionally collected information regarding demographics, current wait times to be seen for new patients, and the difference in clinical time spent in neuro-ophthalmology spent between the current day compared with that shortly after completing clinical training. Linear regression was used to identify potential relationships between the above and average wait time. RESULTS On average, responding physicians spent 70% of their clinical time on neuro-ophthalmology. In 6 states, there were no reported practicing neuro-ophthalmologists, and in only 8 states was the clinical full-time equivalent to population ratio below the

suggested threshold of 1 for every 1.2 million. The median wait time for a new patient was 6 weeks. This wait time was associated with the fraction of clinical time spent in neuro-ophthalmology (0.2 weeks longer wait for a 10 percentage point increase in the fraction of time spent in neuro-ophthalmology; P = 0.02), and suggestively associated with training (training in ophthalmology was associated with 1.0 week shorter wait time; P = 0.06).CONCLUSION The survey suggests that neuro-ophthalmologists are unable to see patients in a timely manner and a decreasing number of clinicians are entering the field. Future interventions should be considered to incentivize neuro-ophthalmology training in ophthalmology and neurology residents such that the United States population is able to appropriately access neuro-ophthalmic care.

Workforce Shortage for Retinopathy of Prematurity Care and Emerging Role of Telehealth and Artificial Intelligence August 2020, Paediatric clinics of North America *Abstract only**

Retinopathy of prematurity (ROP) is the leading cause of childhood blindness in very-low-birthweight and very preterm infants in the United States. With improved survival of smaller babies, more infants are at risk for ROP, yet there is an increasing shortage of providers to screen and treat ROP. Through a literature review of new and emerging technologies, screening criteria, and analysis of a national survey of pediatric ophthalmologists and retinal specialists, the authors found the shortage of ophthalmology workforce for ROP a serious and growing concern. When used appropriately, emerging technologies have the potential to mitigate gaps in the ROP workforce.

Geographic distribution of eye-care practitioners in Aotearoa/New Zealand: implications for future eye health workforce July 2020, Clinical and Experimental Optometry *Abstract only**

BACKGROUND The New Zealand Ministry of Health provides funding for the delivery of health care across regions via 20 District Health Boards. Funding includes the subsidisation of therapeutic pharmaceutical agents/drugs. The distribution of optometrists and ophthalmologists across the regions was investigated to understand the accessibility of eye care in New Zealand. Changes made to the optometrists' scope of practice in 2005 and in 2014 increased the range of drugs that suitably qualified optometrists could prescribe. Therefore, the distribution of optometrists authorised to prescribe drugs and those not authorised to prescribe drugs was also investigated. METHODS Information from the New Zealand Optometrists and Dispensing Opticians Board register and information from the Medical Council's website were used to create a database of ophthalmic practitioners and their locations. The $\chi 2$ goodness-of-fit test was carried out to determine whether the distribution of the number of practitioners across the regions was in proportion to the population of the regions. RESULTS Ophthalmologists were distributed across the regions in proportion to the regional population size. However, optometrists were concentrated in Auckland and other regions with high populations. Optometrists authorised to prescribe drugs comprised over 74 per cent of optometrists and were the majority of optometrists in most regions. Many of the regions with populations less than 200,000 had high population-to-practitioner ratios, indicating that they may not have sufficient numbers of ophthalmic practitioners in order to provide for the ocular needs of the community. CONCLUSION Better distribution of the optometric workforce could make eye care more accessible in many regions of New Zealand.

Do we have enough ophthalmologists to manage vision-threatening diabetic retinopathy? A global perspective July 2020, Eye *Abstract only**

We aimed to estimate the supply of ophthalmologists in relation to the global and regional burden of vision-threatening diabetic retinopathy (VTDR). Diabetes mellitus (DM) population data from seven world regions were obtained from the International Diabetes Federation Atlas 2017. A systematic review was performed to include population-, community-based studies that reported country-specific VTDR prevalence. Random effect meta-analysis was then performed to estimate global and regional VTDR prevalence. VTDR prevalence estimates coupled with DM population data were then used to estimate the number of VTDR cases. Global and regional number of ophthalmologists were derived from the International Council of Ophthalmology Report 2015. Fifty studies (17 from Western Pacific [WP], nine North America and Caribbean [NAC], nine Middle East and North Africa [MENA], five Europe, eight South East Asia [SEA], one South and Central America [SACA] and one from Africa) were included. Global VTDR prevalence was 7.26% (95% CI, 6.18-8.32%). Regional VTDR prevalence was 14.35% in Africa, 11.21% in MENA, 10.00% in NAC, 6.32% in Europe, 6.22% in WP, 5.83% in SACA and 2.97% in SEA. Globally, there were 7.16 ophthalmologists per 1000 VTDR patients. Europe had the highest ophthalmologist per 1000 VTDR patient ratio at 18.03 followed by SACA (17.41), while NAC, MENA and Africa had the lowest at 4.90, 4.81 and 0.91 respectively. Across regions, the ophthalmologist densities ranged from 0.91 to 18.03 per 1000 VTDR patients, with NAC, MENA and Africa having less than 5 ophthalmologists per 1000 patients. These findings will aid global and regional policy planning and healthcare resource allocation for VTDR management.

Estimated number of ophthalmologists worldwide (International Council of Ophthalmology update): will we meet the needs? April 2020, The British Journal of Ophthalmology

BACKGROUND/AIMS To estimate 2015 global ophthalmologist data and analyse their relationship to income groups, prevalence rates of blindness and visual impairment and gross domestic product (GDP) per capita. METHODS Online surveys were emailed to presidents/chairpersons of national societies of ophthalmology and Ministry of Health representatives from all 194 countries to capture the number and density (per million population) of ophthalmologists, the number/density performing cataract surgery and refraction, and annual ophthalmologist population growth trends. Correlations between these data and income group, GDP per capita and prevalence rates of blindness and visual impairment were analysed. RESULTS In 2015, there were an estimated 232 866 ophthalmologists in 194 countries. Income was positively associated with ophthalmologist density (a mean 3.7 per million population in low-income countries vs a mean 76.2 in high-income countries). Most countries reported positive growth (94/156; 60.3%). There was a weak, inverse correlation between the prevalence of blindness and the ophthalmologist density. There were weak, positive correlations between the density of ophthalmologists performing cataract surgery and GDP per capita and the prevalence of blindness, as well as between GDP per capita and the density of ophthalmologists doing refractions. CONCLUSIONS Although the estimated global ophthalmologist workforce appears to be growing, the appropriate distribution of the eye care workforce and the development of comprehensive eye care delivery systems are needed to ensure that eye care needs are universally met.

Workforce Issues in Paediatric Ophthalmology January 2020, Journal of Paediatric Ophthalmology and Strabismus *Athens log in required**

The fate of pediatric ophthalmology may be in jeopardy. For the past 20 years, there has been declining interest in the field compared to other subspecialties in ophthalmology, as fellowship positions and jobs remain unfilled. Of those fellows who do match in pediatric ophthalmology and strabismus, many are international medical graduates who often return to their native countries to practice, further diminishing the supply of pediatric ophthalmologists in the United States. In previous surveys, resident graduates have expressed disinterest in the field, reluctance to work with children, inadequate reimbursements, and insufficient interactions with faculty as reasons not to pursue this subspecialty. Millions of people throughout the United States do not have access to pediatric ophthalmologists, highlighting the issue of unequal distribution. As more pediatric ophthalmologists retire, there is concern that there will not be enough providers to meet the demands of this subspecialty. Although many of these factors deterring residents from entering this field have been resolved, the major issue of financial reimbursements has not been adequately addressed. [J Pediatr Ophthalmol Strabismus. 2020;57(1):9-11.].

Could adoption of the rural pipeline concept redress Australian optometry workforce issues? November 2019, Clinical & Experimental Optometry *Abstract only**

People living in rural and remote areas have poorer ocular health outcomes compared with those living in metropolitan areas. Reasons for this are multiple and complex but access to care is consistently reported as a defining factor. The geographic maldistribution of eye-care professionals is a major obstacle for regional, rural and remote Australians seeking care. Research from the medical profession suggests adopting the 'rural pipeline' concept to address the issue of maldistribution. This approach appears to have had some success in medicine, and involves recruiting students from a rural background, exposing students to rural practice through placements and offering graduates incentives and support to practice rurally. Lessons could be learnt from the medical field as there is a dearth of literature describing the utilisation of the rural pipeline in allied health. However, given the differences between professions it cannot be assumed factors and results will be the same. A greater understanding is required to determine whether optometry is a profession which may benefit from the rural pipeline concept.

A workforce in crisis: a case study to expand allied ophthalmic personnel August 2016, Canadian Journal of Ophthalmology, *Abstract only**

OBJECTIVE To examine how the development of allied ophthalmic personnel training programs affects human resource capacity. […] RESULTS Current human resource capacity development and deployment is inadequate to provide the needed eye care services in Canada. A competency-based curriculum and accreditation model as the platform to develop formal academic training programs is essential. Access to quality eye care and patient services can be met by task-shifting from ophthalmologists to appropriately trained allied ophthalmic personnel. CONCLUSION Establishing formal training programs is one important strategy to supplying a well-skilled, trained, and qualified ophthalmic workforce. This initiative meets the criteria required for quality, relevance, equity, and cost-effectiveness to meet the future demands for ophthalmic patient care.

Adequacy of the ophthalmology workforce under Ontario's Local Health Integration Networks June 2016, Canadian Journal of Ophthalmology *Abstract only**

OBJECTIVE To determine the current distribution of ophthalmologists across Ontario's Local Health Integration Networks (LHINs) and the influence on LHIN-specific cataract surgery wait times. […] RESULTS There are currently 3.28 ophthalmologists per 100 000 total population in Ontario. LHIN-specific ratios ranged from 8.87 (Toronto Central) to 1.67 (Central West), with 3 out of 14 LHINs having met the previously recommended ratio of 3.37. Median cataract surgery wait times ranged from 30 to 72 days. Although the number of cataract surgeries performed was positively correlated with the population aged 65 years and older ($p < 0.001$), there was no statistically significant association between wait times and number of cataract cases per 1000 population ($p = 0.41$).CONCLUSIONS Although Ontario appears to have a sufficient number of ophthalmologists overall, there is significant variation in the distribution of the ophthalmology workforce at the LHIN level. This variation did not appear to significantly influence LHIN-specific cataract surgery wait times.

Future trends in ophthalmology health human resources in Canada June 2016, Canadian journal of Ophthalmology *Abstract only**

Projections of future Canadian ratios of ophthalmologists to population have fluctuated because of changes in numbers of residency spots and retirement rates. Although this ratio plateaued in recent years, the ratio of ophthalmologists to the population over 65 years of age is projected to steadily deteriorate. All graduating residents are going to be needed to meet the upcoming workload, yet current graduates are finding increasing difficulty obtaining full-time positions with operating room privileges. This problem is affecting all specialties who require hospital facilities, and exploration of this problem by the Royal College, Canadian Medical Association (CMA), Resident Doctors of Canada, and council of the Provincial Deputy Ministers of Health is presented. Proposed solutions to the current job shortages include residents starting in positions outside of major metropolitan areas, clinicians in practice giving up some operating room time to make way for new graduates, government increasing infrastructure commensurate with the increased number of medical school positions, and optimizing use of current resources by running operating rooms for longer hours and on the weekends.

Optometric supply and demand in Australia: 2011-2036 May 2015 Clinical & Experimental Optometry *Athens log in required**

BACKGROUND The effective size of the optometric workforce is dependent on graduate numbers, retention rates and immigration and is influenced by age, gender and working hours of optometrists. This paper presents modelling results of the relationship between the projected Australian optometric workforce and projected demand for optometric services for the period 2011 to 2036. Nine hypothetical optometric supply-side and demand-side scenarios are presented […] RESULTS It was estimated that there would be a surplus of over 1,200 equivalent full-time optometrists (EFTO) in 2036 for the highest service demand scenario of 13.8 million Medicare services, where 21 hours of a 38-hour week per EFTO were allowed for the provision of optometric services under Medicare. Substantial surpluses were predicted in all states and territories except Queensland, Tasmania and the Northern Territory where predicted supply was within six EFTO of predicted demand. CONCLUSIONS Projections using current weightings for mortality, attrition, proportion of optometrists in active practice, working hours, immigration, new graduates and 21 hours per EFTO per week available for Medicare services indicate that in 2036, there will be excess optometrists in relation to projected demand for services, if service utilisation is maintained at current levels or increased by 10 or 20 per cent. Substantially greater excesses result if each EFTO has 28 or 35 hours per week available for Medicare services.

Workforce supply of eye care providers in Canada: optometrists, ophthalmologists, and subspecialty ophthalmologists December 2015, Canadian Journal of Ophthalmology *Abstract only**
OBJECTIVE To assess the population distribution of optometrists, ophthalmologists, and subspecialist ophthalmologists in Canada […] RESULTS In 2012 there were 5729 optometrists and 1164 ophthalmologists, of which 524 ophthalmologists (45%) were subspecialized, representing 4.92 optometrists per ophthalmologist. For every 100,000 Canadians there were 3.35 ophthalmologists (1.84 comprehensive and 1.51 subspecialists) and 16.48 optometrists. Of the 148 census areas, 1 (0.7%, Yellowknife) had no optometrist and 43 (29%) had no ophthalmologist. The greatest proportions of ophthalmology subspecialists were in surgical retina (20.6%) and the lowest was ocular pathology (1.5%).CONCLUSIONS Although benchmarks regarding the ideal balance among number of optometrists, ophthalmologists, and subspecialists in relation to population are unknown, we found that all census regions had at least 1 ophthalmologist or optometrist. Forty-five percent of ophthalmologists identified a subspecialty interest, of which the majority was surgical retina. This information may be of value to training ophthalmologists when deciding on a subspecialty and practice location.

Optometry services in Ontario: supply - and demand-side factors from 2011 to 2036 2014, Healthcare Policy
Optometric labour market projections are provided. First, population growth and ageing-based estimates of the rate of increase of eye-care services in Ontario from 2011 to 2$ are presented, holding the age-sex structure of utilization constant. Then, using data on the 2011 supply and working hours of Ontario's optometrists, the number of optometrists needed to keep the level of optometric services per age-sex-adjusted person comparable over time is estimated. The projections suggest that the number of Ontario optometrists should grow by approximately 30-40 full-time equivalents per year; to offset retirements and account for decreasing work hours, this suggests 77-90 new practitioners are required each year. However, in recent years, the number of Ontario optometrists has been growing faster than this, suggesting either that demand has exceeded supply and/or surpluses will accumulate if this trend continues.

New and extended roles

Changing practice for the non-medical ophthalmic hospital workforce in the UK-a snapshot survey September 2020, Eye *Abstract only**

BACKGROUND/OBJECTIVES To obtain a picture of the current status, training and governance for advanced practice and extended roles in the ophthalmic hospital non-medical workforce. METHODS A 10 question, quantitative survey was designed with multidisciplinary members of the UK Ophthalmology Alliance and sent to the membership to obtain information on expanded non-medical roles.RESULTS34 of the 58 UKOA member hospitals responded (58% response rate). All responding units were using registered optometrists, orthoptists and nurses to undertake expanded outpatient roles and 28/34 (82%) had expanded roles for undertaking procedures. Some units had large numbers of staff undertaking these roles. There were noticeable trends for certain professional groups to undertake certain roles. For example, nurses were undertaking most procedures, apart from lasers which were mainly delivered by optometrists. Nurses had the lowest banding and optometrists the highest for apparently similar roles. Training was mostly in-house apprenticeship style although some formal external qualifications were undertaken. CONCLUSIONS Ophthalmology is developing many innovative

roles for the non-medical workforce and, with the launch of the OCCCF training, this is likely to increase. Terminology is confusing and a categorisation suitable for ophthalmology is proposed.

Leadership

Academic background, professional experience, and research achievements of United States academic ophthalmology leadership January 2021, Irish Journal of Medical Science *Abstract only**

PURPOSE To characterize the academic background, professional experience, and scholarly achievements of United States (US) academic ophthalmologists serving in leadership positions. METHODS This is a cross-sectional study. An online search of publicly available resources was conducted for demographics, background, research productivity, and academic appointments of academic ophthalmologists in leadership positions: chairperson (CP), vice chair (VC), service director (SD), and program director (PD). RESULTS Five hundred and fifty-one academic ophthalmologists in leadership positions were analyzed. A male predominance was found in all positions, ranging from 86% male CPs to 68% of SDs. Eighty-nine percent were graduates of US medical schools, and 97% completed their residency in a US ophthalmology program. Harvard Medical School and The Johns Hopkins University School of Medicine and their affiliated programs were the most frequently attended by leaders. The most common subspecialties among leaders were surgical retina (21%), cornea (18%), and glaucoma (16%). Overall, 18% of leaders are endowed professors, 34% are full professors, 25% are associate professors, and 20% are assistant professors. Overall, 28% of department leaders were residents and 16% were fellows in their current program. Chairpersons, followed by their vice, are the most academically proficient leaders within their departments, having the largest number of publications and h, hc, hm, and AWCR bibliometric indices. CONCLUSIONS Ophthalmology leaders in all positions are highly accomplished with an established interest in research. Typically, CPs and their VCs have a longer duration of professional experience with a greater research output and a superior median academic appointment. Gender discrepancies within leadership positions are evident.

Leadership in Ophthalmology: the role of physicians-MBAs April 2018, American Journal of Ophthalmology *Abstract only**
PURPOSEAs American health care evolves, an increasing number of doctors are pursuing MBAs. However, relatively little is known about how business training translates into their future careers. This study characterizes ophthalmologists who have completed MBAs and identifies opportunities for physician leadership in the field. […] RESULTS Physician-MBAs in ophthalmology are 80% male; 80% are fellowship trained; and 28% are in primarily nonclinical roles and 55% participate in significant nonclinical activity. Hospital administration is most common (31%), followed by pharmaceutical administration (7%) and consulting (5%). Older ophthalmologist-MBAs were more likely to work in nonclinical roles, with 79% of those who completed residency before 2000 engaged in significant nonclinical activity compared to 30% of those who completed residency after 2000. The most common employers of physician-MBAs in ophthalmology are academic medical centers (43%), large group practices (30%), and private practices (13%). CONCLUSIONS The majority of ophthalmologist-MBAs work in primarily clinical roles, although a sizable proportion hold nonclinical positions. Moving forward, we anticipate an increased role for physician leaders in health care administration, policy, and entrepreneurship. While formal management training is not necessary for these roles, a

growing number of physicians have sought out MBAs to support their nonclinical interests.

Leadership of United States Academic Departments of Ophthalmology: Chairperson characteristics, accomplishments, and personal insights February 2018, American journal of Ophthalmology *Abstract only**
PURPOSE To report on the characteristics, accomplishments, and past experiences of current academic ophthalmology department chairs. […] RESULTS Fifty-five chair responses were received (96% male, mean age 57 years, mean term 7 years). The majority were American medical graduates (93%), full professors of ophthalmology (93%), and permanent chairs (96%). All completed their residency in the US and 96% completed a fellowship (25% vitreoretinal surgery, 22% cornea and external disease, and 20% glaucoma). On average, chairs authored 98 peer-reviewed articles, 2 books, and 11 book chapters. They were also significantly involved in peer-reviewed journal literature, serving as editors (20%), associate editors (18%), or editorial board members (60%). The majority of chairs indicated they decided to seek their position late in their career, having already become a full (33%) or associate professor (26%), primarily owing to a desire to build and promote an academic ophthalmology department (61%). Chairs regarded their experience as head of service as most important for their current performance as department heads. Their principal advice to aspiring ophthalmology chairs was to focus on developing skills as a clinician, researcher, and educator ("triple threat"). CONCLUSIONS Overall, academic department chairs are accomplished leaders in ophthalmology and prolific authors with an established academic record. Chairs regarded their previous leadership roles within the department as invaluable to their effectiveness as chair.

Diversity, Inclusion and Participation

Gender and ethnic diversity in global ophthalmology and optometry association leadership: a time for change May 2021, Ophthalmic and Physiological Optics

PURPOSE To assess the diversity of leadership bodies of member organisations of the International Council of Ophthalmology (ICO) and the World Council of Optometry (WCO) in terms of: (1) the proportion who are women in all world regions, and (2) the proportion who are ethnic minority women and men in Eurocentric high-income regions. METHODS We undertook a cross-sectional study of board members and chairs of ICO and WCO member organisations using a desk-based assessment of member organisation websites during February and March 2020. Gender and ethnicity of board members and chairs were collected using a combination of validated algorithmic software and manual assessment, based on names and photographs where available. Gender proportions were calculated across Global Burden of Disease super-regions, and gender and ethnicity proportions in the high-income regions of Australasia, North America and Western Europe. RESULTS Globally, approximately one in three board members were women for both ICO (34%) and WCO (35%) members, and one in three ICO (32%) and one in five WCO (22%) chairpersons were women. Women held at least 50% of posts in only three of the 26 (12%) leadership structures assessed; these were based in Latin America and the Caribbean (59% of WCO board positions held by women, and 56% of WCO chairs), and Southeast Asia, East Asia and Oceania (55% of ICO chairs). In the Eurocentric high-income regions, white men held more than half of all board (56%) and chair (58%) positions and white women held a further quarter of positions (26% of board and 27% of chair positions). Ethnic minority women held the fewest number of board (6%) and chair (7%) positions. CONCLUSIONS

Improvements in gender parity are needed in member organisations of the WCO and ICO across all world regions. In high-income regions, efforts to address inequity at the intersection of gender and ethnicity are also needed. Potential strategies to enable inclusive leadership must be centred on structurally enabled diversity and inclusion goals to support the professional progression of women, and people from ethnic minorities in global optometry and ophthalmology.

Improving Racial Diversity in the Ophthalmology Workforce: A Call to Action for Leaders in Ophthalmology March 2021, American Journal of Ophthalmology

Racial injustice and disparities have been at the forefront of discussions in the United States during recent months. The tragic incidents of police brutality and the ravishing effects of COVID-19 on underrepresented minorities (URMs)—Black/African American, Hispanic/Latinx, and Native American—have highlighted the consequences of systemic racism that have been embedded in our country's history.1 URMs are hospitalized owing to COVID-19 at 4 to 5 times the rate of White people.2 Social determinants of health, such as employment, insurance, income, environmental exposures, and healthcare access, are underlying contributors, among others, to this health disparity.1 Yet, numerous studies have demonstrated that racial and ethnic disparities in both health and healthcare persist after controlling for these social factors—a concerning finding that demonstrates the consequences of systemic racism and implicit bias.1

Ophthalmology Departments Remain Among the Least Diverse Clinical Departments at United States Medical Schools January 2021, Ophthalmology *Abstract only**

PURPOSE The current demographics of the ophthalmology workforce do not reflect the diverse United States population, which has implications for addressing health disparities. The demographics of ophthalmology department faculty may influence the recruitment of underrepresented students into the field. This study sought to determine how the racial and ethnic demographics of ophthalmology department faculty compare with those of other clinical departments at United States medical schools. DESIGN Secondary data analysis of medical school faculty demographic data from the 2019 American Association of Medical Colleges (AAMC) Faculty Roster. PARTICIPANTS Clinical faculty and department chairs at United States medical schools. METHODS We analyzed the racial and ethnic demographics of clinical department faculty and department chairpersons using data from the 2019 AAMC Faculty Roster. We calculated the proportion of underrepresented minority (URM) faculty in ophthalmology and in 17 other clinical departments. We analyzed these data for statistically significant differences between ophthalmology and other clinical departments. In addition, we compared the percentage of URM ophthalmology faculty with the proportion of URM persons among graduating United States medical students and in the United States population using data from the Medical School Graduation Questionnaire and the United States census, respectively. MAIN OUTCOME MEASURES The proportion of URM persons, defined as Black, Hispanic or Latino, Native American, or Native Hawaiian or Pacific Islander among clinical faculty and department chairs. RESULTS Ophthalmology faculty are less racially and ethnically diverse than graduating medical students and the general United States population. When compared with 17 other clinical departments, ophthalmology has the third-lowest proportion of URM faculty, with only radiology and orthopedic surgery having a smaller proportion of URM faculty. These differences were statistically significant in most departments (12 of 18). No statistically significant difference was found in the proportion of URM department chairs in ophthalmology compared with most other

clinical departments, although the absolute number of URM chairs in ophthalmology is low at only 8 chairpersons. CONCLUSIONS More work must be done to increase the recruitment of URM physicians into ophthalmology faculty positions to obtain parity with other clinical departments and with the diverse patient populations that physicians serve.

Enhancing Māori and Pasifika graduate interest in ophthalmology surgical training in New Zealand/Aotearoa: Barriers and opportunities August 2020, Clinical and Experimental Ophthalmology *Abstract only**

IMPORTANCE Improving the representation of indigenous ophthalmologists in New Zealand. BACKGROUND Māori, indigenous to New Zealand/Aotearoa and Pacific Peoples indigenous to Pacific Island Nations living in New Zealand, experience poorer health outcomes across several ophthalmic conditions. The Royal Australian and New Zealand College of Ophthalmologists have identified indigenous workforce development as a priority. DESIGN Mixed-methods study, utilizing retrospective analysis of Medical Schools Outcomes Database and Longitudinal Tracking Project responses, and prospective interviews with Māori/Pasifika medical graduates. PARTICIPANTS This study involved 64 medical graduates from the University of Auckland (UoA) and the University of Otago, and six Māori/Pasifika medical postgraduates in New Zealand. METHODS Retrospective analysis of medical graduate responses who ranked ophthalmology among their top-three preferred specialties in the Medical Schools Outcomes Database and Longitudinal Tracking Project. Prospective semi-structured interviews with Māori/Pasifika medical postgraduates. MAIN OUTCOME MEASURES Specialty training influencing factors and prevocational ophthalmology experience. RESULTS A total of 64 (6.7%) out of 954 medical graduates from the UoA and University of Otago ranked ophthalmology among their top-three preferred training specialties (2012-2017). Of the 64 graduates, six (9.3%) identified as Māori/Pasifika. No significant difference in influencing factors between Māori/Pasifika and non-Māori/Pasifika students was identified. Both groups ranked intellectual content, procedural skills, specialty exposure and mentorship as highly influential. Qualitative interviews with Māori/Pasifika graduates highlighted positive experiences in ophthalmology but limited exposure overall. Negative anecdotes and unclear training pathways discouraged Māori/Pasifika interest in Ophthalmology training. CONCLUSIONS AND RELEVANCE Māori/Pasifika graduate interest in ophthalmology training was relatively low. Valuable insights include enhancing specialty exposure, mentor development, promoting Māori/Pasifika connections and clarifying training pathways for future graduates.

Residency Program Directors of United State Ophthalmology Programs: a descriptive analysis January 2020, American Journal of Ophthalmology

Purpose: To analyze the academic background, scholarly achievements, and demographic characteristics of all US ophthalmology residency program directors (PDs). Design: Cross-sectional study. […] Results: A total of 116 program directors were analyzed. Eighty-four of 116 (72%) PDs were male. The average age was 50.0 years old. The mean age at appointment was 42.9 years old. Ninety-three percent graduated from an American medical school, and 97% received an MD degree. Twenty percent of PDs completed an additional graduate degree, most commonly a master's degree (7 of 23) and doctor of philosophy (7 of 23). Seventy-eight percent completed a fellowship, with the most frequent in glaucoma (24%), cornea and external diseases (22%), and neuroophthalmology (21%). The mean number of publications according to PubMed was 17.6 (range, 0–92). There were no significant differences between the average number of

publications by male PDs and those by female PDs (19.2 ± 20.5 vs. 13.5 ± 23.1, respectively; P = 0.21). On average, the H-index was 8.7 (range, 0–35) and was higher in male than in female PDs (9.8 ± 8.3 vs. 5.4 ± 4.0, respectively; P = 0.01). Conclusions: Ophthalmology PDs are predominantly male with fellowship training in glaucoma, cornea, or neuro-ophthalmology. Women remain underrepresented, and future efforts should be aimed at addressing this disparity.

Michigan Ophthalmology Pipeline: Exploring a Mentorship Model to Increase Diversity in Ophthalmology 2020, Journal of Academic Ophthalmology
Background: Ethnic concordance between physicians and patients improves compliance and therapeutic benefit. Current literature shows a lack of diversity within ophthalmology. Thus, we aimed to develop a longitudinal mentorship program between first year ophthalmology residents (PGY2s) and first year medical students (M1s) coming from minority communities underrepresented in medicine (URM) to provide early exposure to the field. […] Results: All 2017 M1s stated increased interest in ophthalmology, felt "satisfied" or "very satisfied" with the program, and completed all requirements. At the year-end, the mean educational value of the program for 2017 M1s was rated 4.33/5, and interest in ophthalmology 4.67/5. Quality of the clinical experiences for 2017 PGY2s 3.5/5, and the overall effectiveness of the program 3.5/5. At the year-end, the average educational value of the program for 2018 M1s was 4.4/5, and interest in ophthalmology 4.0/5. Quality of the clinical experiences for 2018 PGY2s was 3.1/5, and the overall effectiveness of the program was 3.4/5.Conclusion: Our "pipeline" program represents an ongoing effort to increase URM interest in ophthalmology. Continued assessment to identify areas for growth and improvement can optimize the program to aid other programs in initiating efforts to tackle this important issue.

Current and future status of diversity in ophthalmologist workforce 2016, JAMA Ophthalmology
Importance: Increasing the level of diversity among ophthalmologists may help reduce disparities in eye care. Objective: To assess the current and future status of diversity among ophthalmologists in the workforce by sex, race, and ethnicity in the context of the available number of medical students in the United States.[…] Results: Women and minority groups traditionally underrepresented in medicine (URM)—black, Hispanic, American Indian, Alaskan Native, Native Hawaiian, and Pacific Islander—were underrepresented as practicing ophthalmologists (22.7% and 6%, respectively), ophthalmology faculty (35.1% and 5.7%, respectively), and ophthalmology residents (44.3% and 7.7%, respectively), compared with the US population (50.8% and 30.7%, respectively). During the past decade, there had been a modest increase in the proportion of female practicing ophthalmologists who graduated from US medical schools in 1980 or later (from 23.8% to 27.1%; P < .001); however, no increase in URM ophthalmologists was identified (from 7.2% to 7.2%; P = .90). Residents showed a similar pattern, with an increase in the proportion of female residents (from 35.6% to 44.3%; P = .001) and a slight decrease in the proportion of URM residents (from 8.7% to 7.7%; P = .04). The proportion of URM groups among ophthalmology faculty also slightly decreased during the study period (from 6.2% to 5.7%; P = .01). However, a higher proportion of URM ophthalmologists practiced in medically underserved areas (P < .001). Conclusions and Relevance: Women and URM groups remain underrepresented in the ophthalmologist workforce despite an available pool of medical students. Given the prevalent racial and ethnic disparities in eye care and an increasingly diverse society, future research and training efforts that increase the level of diversity among medical students and residents seems warranted.

Decadelong profile of women in ophthalmic publications March 2015, JAMA Ophthalmology
IMPORTANCE In recent decades, there has been an increase in the number of women practicing medicine. We believe this shift may be reaching academic publications in ophthalmology and changing gender trends. OBJECTIVE To determine whether there has been an increase in women publishing academic articles and editorials in ophthalmology during the past decade. […] RESULTS Our analysis included 671 original articles (336 from 2000 and 335 from 2010) and 89 editorials. The percentage of original articles with a woman as first author increased from 23.2% in 2000 to 32.5% in 2010, a difference of 9.3% (95% CI, 23.3%-32.5%; P = .005). The percentage of original articles with a woman last author increased from 16.4% in 2000 to 24.2% in 2010, a difference of 7.8% (95% CI, 16.4%-24.2%; P = .01). The percentage of original articles with a woman first author increased in Asia from 1.2% in 2000 to 8.4% in 2010, a difference of 7.2% (95% CI, 1.2%-8.4%; P < .001). The percentage of articles with a woman last author increased in Europe from 2.2% in 2000 to 7.5% in 2010, a difference of 5.3% (95% CI, 2.2%-7.5%; P < .001) and in Asia from 0% in 2000 to 6.0% in 2010, a difference of 6.0% (95% CI, 0%-6%; P < .001). Editorials were written predominantly by men: 33 of 38 editorials (87%) in 2000 and 46 of 51 (90%) in 2010, a difference of 3% (95% CI, 87%-90%; P = .62), showing a trend toward decreased editorial authorship by women during the past decade. CONCLUSIONS AND RELEVANCE Our data suggest an increase in women publishing original investigations in ophthalmic literature, but no increase in editorial authorship.

Aging and feminization of the physician workforce in Canada: comparing ophthalmologists to all other physicians June 2014, Canadian Journal of Ophthalmology *Abstract only**
OBJECTIVE To describe the changing demographic of ophthalmologists compared with all other physicians in Canada. […] RESULTS The mean age of physicians is increasing over time; however, the mean age of ophthalmologists has been greater than all other physicians since 1972 by a mean of 2.4 years. In 2011, the mean age of all ophthalmologists was 53.1 years compared with 50.4 years for all other physicians. The yearly mean age of female ophthalmologists (48 in 2011) and all other female physicians (46.1 in 2011) was younger than males. The proportion of female ophthalmologists has increased from 3.1% to 20.5% from 1970 to 2011. This is significantly less than all other specialties where the proportion increased from 7.8% to 36.8% (p < 0.001). The proportion of female ophthalmologists varies significantly among the provinces from 7.1% in Newfoundland and Labrador to 31.1% in Quebec in 2011. CONCLUSIONS The mean age of all physicians is increasing over time with ophthalmologists being, on average, 2.3 years older than other physicians. Although the proportion of female physicians is increasing, the rate of increase is less in ophthalmology compared with all other physicians and varies significantly between provinces.

Women in Ophthalmology to focus on leadership, diversity and science at Summer Symposium June 2019, Ocular Surgery News *Office365 log in required**
The symposium kicks off with a keynote session featuring presentations and discussions that include "Diversity and Equality in Medicine: A Perspective from the AMA," "Building Equality in Medicine" and a breakout session with "Chairs in Ophthalmology" New this year is the first Women in Ophthalmology Charity Golf Tournament, which will benefit Orbis International as part of WIO's philanthropic international outreach, and making a return appearance on the program is the "Battle of the MIGS" and "Dry Eye" wet labs, among others. Empowering female ophthalmologists to elevate their

aspirations and gain the tools they need to meet the challenges of the future is the reason this meeting is so popular every year" Professional development Empowerment comes in the form of professional development, from over 20 hours of CME sessions, to mentorship, leadership and self-care talks, to skill development in communication training, workshops in negotiations and practice management. [...]we are proud to announce a new WIO philanthropic venture - a charity golf tournament to kick off the meeting on Thursday, proceeds of which will be donated to Orbis International.

Collaboration

The role of optometry in collaborative eye care May 2016, Clinical & Experimental Optometry
The National Framework for Action to Promote Eye Health and Prevent Avoidable Blindness and Vision Loss calls for improvements in communication and co-ordination of the fragmented eye health-care system. Collaborative care would reduce duplication of services and minimise confusion within the community, leading to continuity of care and improved services.

Education and Training

A systematic review of simulation-based training tools for technical and non-technical skills in ophthalmology March 2020, Eye
To evaluate all simulation models for ophthalmology technical and non-technical skills training and the strength of evidence to support their validity and effectiveness. A systematic search was performed using PubMed and Embase for studies published from inception to 01/07/2019. Studies were analysed according to the training modality: virtual reality; wet-lab; dry-lab models; e-learning. The educational impact of studies was evaluated using Messick's validity framework and McGaghie's model of translational outcomes for evaluating effectiveness. One hundred and thirty-one studies were included in this review, with 93 different simulators described. Fifty-three studies were based on virtual reality tools; 47 on wet-lab models; 26 on dry-lab models; 5 on e-learning. Only two studies provided evidence for all five sources of validity assessment. Models with the strongest validity evidence were the Eyesi Surgical, Eyesi Direct Ophthalmoscope and Eye Surgical Skills Assessment Test. Effectiveness ratings for simulator models were mostly limited to level 2 (contained effects) with the exception of the Sophocle vitreoretinal surgery simulator, which was shown at level 3 (downstream effects), and the Eyesi at level 5 (target effects) for cataract surgery. A wide range of models have been described but only the Eyesi has undergone comprehensive investigation. The main weakness is in the poor quality of study design, with a predominance of descriptive reports showing limited validity evidence and few studies investigating the effects of simulation training on patient outcomes. More robust research is needed to enable effective implementation of simulation tools into current training curriculums.

Advancing ophthalmology medical student education: international insights and strategies for enhanced teaching March 2020, Survey of Ophthalmology *Abstract only**
Enhancing medical student education in ophthalmology can lead to improved eye health care delivery and patient outcomes across all primary care and specialty disciplines. There has been a resurgence of interest in delivering high-quality ophthalmic medical student education. This educational revival is both timely and topical. A general consensus has emerged that, rather than focusing solely on increasing teaching time, strategies are needed to focus on how to optimize the limited time allotted to ophthalmology. All physicians should be

prepared to provide competent and confident ophthalmic care based on exciting innovations in ophthalmic curricula content, teaching methodologies, instructional design, learning objectives, and assessment methods. We provide an update on new and innovative ophthalmic teaching and learning practices. We critically appraise and summarize novel educational strategies from around the world that can be universally applicable in enhancing ophthalmology teaching in medical school curricula. It is our hope that, although there is marginalization of ophthalmology training, these strategies can be used to further improve teaching and learning in the limited time available in medical curricula and provide an impetus for further research and innovations in teaching ophthalmology to medical students.

Determining the needs of ophthalmic trainees entering into specialist training and how they can be met April 2019, Advances in Medical Education and Practice,

Problem: Starting ophthalmic specialty training can be daunting as new basic clinical examination and surgical skills must be acquired before meaningful assessment of patients can begin. No formal clinical induction currently exists with the aim to teach clinical and practical skills to new starters. Aim and objectives: To determine the experience and needs of ophthalmic trainees entering into specialist training. Using this information we developed and implemented a clinical skills training programme for Ophthalmology ST1s. Intervention: Using SMART objectives, PDSA cycles and Chartered Institute of Personnel Development guidance we implemented a clinical skills induction week. Pre-course skills evaluation took place in the form of a questionnaire in order to tailor the course content to the skill level of the group. Course material was made and simulation techniques devised for teaching practical skills. Qualitative data was collected via a pre- and post-course questionnaire. Outcome: All 9 participants rated the course as "extremely useful" it increased their confidence in terms of commencing clinical ophthalmology. 100% of participants felt that this course should be delivered to new ST1s. All participants reported improved confidence in managing ophthalmic emergencies and their clinical skills technique. Lessons learned: A sustainable induction programme was implemented tailored to the prior experience and skills of ST1 trainees. All participants felt it improved their confidence and clinical skills prior to commencing clinical activities. Basic clinical skills can be taught in a cost effective manner early on in postgraduate training. Keywords: ophthalmic training, starting ophthalmology, ophthalmology run-through training, ophthalmic clinical skills, ophthalmic training needs.

Effectiveness of flipped classroom combined with team-. Case-, lecture-, and evidence-based learning on ophthalmology teaching for eight-year program students 2019, BMC Medical Education

Background: This study aimed to investigate the benefits and challenges of the flipped classroom combined with team-, case-, lecture- and evidence-based learning (FC-TCLEBL) for ophthalmology teaching for eight-year program students. […] Results: Both the students and teachers were more satisfied with the FC-TCLEBL model. More students in the FC-TCLEBL group agreed that the course helped them to develop skills in creative thinking, problem solving, and teamwork. Students in the FC-TCLEBL group spent significantly more time preparing for class than those in the LBC group, but the time spent on review was significantly lower in the FC-TCLEBL group. The students from the FC-TCLEBL group performed better in a post-test on diabetic retinopathy (DR) as compared to the LBC group. Conclusions: FC-TCLEBL teaching model is effective and suitable for ophthalmology teaching.

Status of Canadian undergraduate medical education in ophthalmology October 2018, Canadian Journal of Ophthalmology *Abstract only**
Objective: To use the perspectives of undergraduate program directors to assess the current structure and adequacy of undergraduate ophthalmology curricula at Canadian medical schools. Results: Responses were obtained from 7 of the 14 (50%) program directors. All of the respondents represented metropolitan institutions of greater than 100 seats. After combining survey and web site data, only 5 of 14 (35.7%) schools were found to have a mandatory clinical clerkship ophthalmology rotation. In each case, the mandatory rotation is less than 2 weeks. A core curriculum based on the International Council of Ophthalmology (ICO) guidelines is used in only 20% of schools. Extracurricular ophthalmology exposure in the form of research opportunities and interest groups exists in 100% and 71.4% of schools, respectively. Conclusions: The proportion of schools requiring mandatory clerkship ophthalmology rotations is only 35.7%. However, most departments use strategies to optimize the limited time allotted to ophthalmology rotations during medical school. A greater degree of adherence to the ICO curriculum guidelines may help to ensure that medical students develop an appropriate level of proficiency in managing patients with eye disease.

Sharpening the focus on ophthalmology teaching: perceptions of medical students and junior medical officers June 2018, Experimental Ophthalmology *Abstract only**
Importance: Worldwide, ophthalmology teaching is being reduced or eliminated from medical school curricula. The current state of ophthalmic teaching in Australia is unknown. Background: To evaluate the perceptions of junior medical officers (JMOs) and medical students on ophthalmology teaching in Australian medical schools. Design: Survey-based cross-sectional study. Participant: A total of 838 JMOs and medical students from across Australia. […] Results: Four hundred and thirty-two (51.6%) surveys were received from JMOs and 406 (48.4%) from medical students. The most common form of teaching received were lectures (71.3% JMOs, 65.5% medical students), while the most preferred type were hospital tutorials (37.7% JMOs, 61.6% medical students). Mean confidence in ophthalmology-specific skills and knowledge topics were not high for medical students (skills: 2.66/5, 95% confidence interval [CI] = 2.55–2.76; knowledge: 2.88/5, 95% CI = 2.80–2.96) and JMOs (skills: 2.52/5, 95% CI = 2.43–2.60; knowledge: 2.84/5, 95% CI = 2.77–2.91). Many participants voiced the need for more ophthalmology teaching, particularly clinically oriented opportunities. Conclusions and relevance: JMOs and medical students do not show high levels of confidence in basic ophthalmological clinical skills and knowledge, and report inadequate emphasis on ophthalmology during medical school.

Enhancing Medical Student Education by Implementing a Competency-based Ophthalmology Curriculum January 2017, Asia-Pacific Journal of Ophthalmology
Purpose: To evaluate innovative educational strategies that help optimize ophthalmology teaching in a crowded medical curriculum. The knowledge acquisition and perceptions of medical students undertaking the revised competency-based curriculum were compared with the prior content-based curriculum within the Sydney Medical Program. […] Results: In the original curriculum there was an improvement of 19.9% from pre- to post-test scores [2.15; 95% confidence interval (CI), 1.35-2.94; $P < 0.001$] and a greater improvement of 31.6% from pre- to post-test (3.50; 95% CI, 3.03-3.97; $P < 0.001$) in the revised curriculum. When assessing retained knowledge at 12 months, students from the revised curriculum scored 11.5% higher than students from the original curriculum (1.56; 95% CI, 0.42-2.71; $P = 0.008$). In addition, qualitative feedback also

improved, with the rotation being highly valued.
Conclusions: The revised ophthalmic curriculum resulted in an increase in academic performance and a higher degree of student satisfaction. Given the gradual decline of ophthalmic education in the standard medical school curriculum, our results are timely in providing guidance for minimum ophthalmic curriculum exposure and strategies to improve ophthalmic education in medical schools.

Present and future of the undergraduate ophthalmology curriculum: a survey of UK medical schools 2017, International Journal of Medical Education
Objectives: To investigate the current undergraduate ophthalmology curricula provided by the UK medical schools, evaluate how they compare with the guidelines of the Royal College of Ophthalmologists (RCOphth) and International Council for Ophthalmology (ICO), and determine the views of the UK ophthalmology teaching leads on the future direction of the curriculum. […] Results: A response rate of 93% (n=29/31) was achieved. The knowledge and clinical skills taught by the UK medical schools match the RCOphth guidelines, but fail to meet the ICO recommendations. A diverse range of assessment methods are used by UK medical schools during ophthalmology rotations. Variation was also observed in the organisation and methods of ophthalmology teaching. However, a significant consensus about the future direction of the curriculum was reported by teaching leads.
Conclusions: Comprehensive RCOphth guidance, and resource sharing between medical schools could help to ensure ophthalmology's continuing presence in the medical curriculum and improve the effectiveness of undergraduate ophthalmology teaching, while reducing the workload of local teaching departments and medical schools.

A systematic review of best practices in teaching ophthalmology to medical students January 2016, Survey of Ophthalmology, *Abstract only**
Ophthalmic medical student education is a cornerstone to improving eye health care globally. We review the current state of the literature, listing barriers to potential best practices for undergraduate ophthalmology teaching and learning within medical curricula. We describe recent advances and pedagogical approaches in ophthalmic education and propose specific recommendations for further improvements and research. Future research should concentrate on developing teaching and learning innovations that may result in a more time- and resource-effective models for interactive and integrated learning. As well as demonstrating that a competency-based approach results not just in better eye health, but also improvements in patient care, education, and medical care in general. By optimizing teaching available through improved evidence-based education, the ultimate goal is to increase medical students' knowledge and produce graduates who are highly trained in eye examination skills, resulting in improved patient eye care through timely diagnosis, referrals, and treatment.

Undergraduate ophthalmology education – survey of UK medical schools 2011, Medical Teacher *Abstract only**
Changes in the UK undergraduate medical curriculum mean that a clinical placement in ophthalmology is no longer a requirement. An ophthalmic assessment is necessary for a full physical examination and failure to elicit and interpret signs could mean missing sight and life-threatening pathology. This study was to investigate current undergraduate ophthalmology teaching. An email questionnaire, about the content and delivery of the ophthalmology teaching, was sent to each UK medical school in 2007/2008. The response rate was 83%. Nineteen (79%) medical schools had a compulsory attachment

to the ophthalmology department with an average length of 7.6 days (range 3.5–15 days). There was variation as to how ophthalmology was included in the curriculum. Teaching methods and standards also varied. Finally, assessments ranged from formal written and practical exams in some medical schools to informal or non-existent ones in others. The most striking finding was the variation in ophthalmology education a student may receive, with some students receiving none. It is necessary to improve the profile of ophthalmology and ensure that all students achieve a minimum basic standard.

Technology

A survey of clinicians on the use of artificial intelligence in ophthalmology, dermatology, radiology and radiation oncology
March 2021, Scientific Reports
Artificial intelligence technology has advanced rapidly in recent years and has the potential to improve healthcare outcomes. However, technology uptake will be largely driven by clinicians, and there is a paucity of data regarding the attitude that clinicians have to this new technology. In June-August 2019 we conducted an online survey of fellows and trainees of three specialty colleges (ophthalmology, radiology/radiation oncology, dermatology) in Australia and New Zealand on artificial intelligence. There were 632 complete responses (n = 305, 230, and 97, respectively), equating to a response rate of 20.4%, 5.1%, and 13.2% for the above colleges, respectively. The majority (n = 449, 71.0%) believed artificial intelligence would improve their field of medicine, and that medical workforce needs would be impacted by the technology within the next decade (n = 542, 85.8%). Improved disease screening and streamlining of monotonous tasks were identified as key benefits of artificial intelligence. The divestment of healthcare to technology companies and medical liability implications were the greatest concerns. Education was identified as a priority to prepare clinicians for the implementation of artificial intelligence in healthcare. This survey highlights parallels between the perceptions of different clinician groups in Australia and New Zealand about artificial intelligence in medicine. Artificial intelligence was recognized as valuable technology that will have wide-ranging impacts on healthcare.

The Electronic Health Record in Ophthalmology: Usability Evaluation Tools for Health Care Professionals 2021, Ophthalmology Therapy
Introduction: The adoption of the electronic health record (EHR) has grown rapidly in ophthalmology. However, despite its potential advantages, its implementation has often led to dissatisfaction amongst health care professionals (HCP). This can be addressed using a user centred design (UCD) which is based on the philosophy that 'the final product should suit the users, rather than making the users suit the product'. There is often no agreed best practice on the role of HCPs in the UCD process. In this paper, we describe practical qualitative methodologies that can be used by HCPs in the design, implementation and evaluation of ophthalmology EHRs. Methods: A review of current qualitative usability methodologies was conducted by practising ophthalmologists who are also qualified health informaticians. Results: We identified several qualitative methodologies that could be used for EHR evaluation. These include: 1 Tools for user centred design: shadowing and autoethnography, semi-structured interviews and questionnaires 2 Tools for summative testing: card sort and reverse card sort, retrospective think aloud protocol, wireframing, screenshot testing and heat maps Conclusion: High-yield, low-fidelity tools can be used to engage HCPs with the process of ophthalmology EHR design, implementation and evaluation. These methods can be used by HCPs without the

requirement for prior training in usability science, and by clinical centres without significant technical requirements.

Clinical Outcomes of a Hospital-Based Teleophthalmology Service: What happens to patients in a Virtual Clinic? May 2019, Ophthalmology *Abstract only**
PURPOSE: Demographic changes as well as increasing referral rates from national screening services put pressure on available ophthalmologic resources in the United Kingdom. To improve resource allocation, virtual medical retina clinics were introduced in 2016 in Moorfields Eye Hospital, South Division. The scope of this work was to assess clinical outcomes of patients followed up in a virtual clinic setting.[…] RESULTS: Seven hundred twelve of 728 patients received a clinical outcome. Four hundred ninety-seven patients (70%) were eligible for further virtual follow-up after the second virtual clinic visit, whereas 15% each (107 and 108 patients) were either discharged or referred to a face-to-face clinic. In total, 661 patients attended their appointments in person and were reviewed by trained staff. Seventeen patients were referred for urgent treatment and 8 patients were not suitable for virtual follow-up. In 542 (82%) of all patients, diabetic retinopathy was the most common diagnosis. CONCLUSIONS: This study reports clinical outcomes of a virtual model of care for medical retina clinics that imply safety of patient care in this clinic setting. This clinic format optimizes the use of already available resources and increases the skills of our existing workforce while maintaining high-quality clinical standards.

Teaching ophthalmology for machines June 2018, Open Ophthalmology Journal
Physicians and engineers are currently working together to improve early ophthalmology diagnosis and follow-up. Algorithms are created for what is being called machine learning to assist medical decision-making and improve medical care. With the aim of providing better health service to populations, research has been done to develop new protocols of care that involve the use of artificial intelligence as a new tool for physicians to diagnose their patients more effectively and quickly.

Evaluation of eLearning for the teaching of undergraduate ophthalmology at medical school: a randomized controlled crossover study May 2018, Eye
Aim: To compare ophthalmology teaching delivered by eLearning with traditional lectures, in terms of undergraduate performance and satisfaction. […] Results: The mean examination score for questions taught by eLearning was 58% (95% CI, 55.7–59.6), versus 55% (95% CI 53.1–56.8) for traditional lectures (P = 0.047). Across all topics students were more satisfied with eLearning than traditional lectures, with 87% (95% CI 84.5–88.4) rating eLearning as 'excellent' or 'good' versus 65% (95% CI 62.0–67.4) for lectures (p < 0.0001). Overall 180 (75.6%) preferred eLearning compared to traditional lectures, with 166 (69.7%) rating eLearning 'much better' or 'better,' 61 (25.6%) 'neutral' and 11 (4.6%) 'worse' or 'much worse.' Conclusions: Student satisfaction and examination performance are both enhanced by ophthalmology eLearning. Similar eLearning modules may be suitable for other specialties and postgraduate learning.

Real-time teleophthalmology video consultation: an analysis of patient satisfaction in rural Western Australia January 2018, Clinical & Experimental Optometry
BACKGROUND: Teleophthalmology, particularly real-time video consultation, holds great potential in Australia and similar countries worldwide, where geography, population and medical workforce distribution make it difficult to provide specialist eye services outside of major cities. Assessment and referrals from rural optometrists are vital to the success of teleophthalmology.

While there is good evidence for the efficacy of such services, there is limited evidence for patient satisfaction with video consultation […] RESULTS One hundred and nine of the 137 eligible patients completed the questionnaire (79.6 per cent; 55 per cent male; mean age 64.61 years). The majority of the participants were either 'Very satisfied' (69.1 per cent) or 'Satisfied' (24.5 per cent) with the service. No one reported being either 'Dissatisfied' or 'Very dissatisfied'. Linear regression did not reveal any demographic or follow-up variables as predictive of greater total satisfaction; however, participants who were older, felt they could easily explain their medical problems to the doctor in the video consultation and believed that telemedicine enabled them to save money and time, and were more likely to report higher overall satisfaction. CONCLUSION Teleophthalmology is a promising new way to overcome barriers to the delivery of eye care services to rural and remote populations. This study demonstrates a high level of overall satisfaction with teleophthalmological video consultation and patients are accepting of this emerging consultation modality, regardless of age.

A technician-delivered 'virtual clinic' for triaging low-risk glaucoma referrals June 2017, Eye
Purpose: The purpose of this study is to describe the outcomes of a technician-delivered glaucoma referral triaging service with 'virtual review' of resultant data by a consultant ophthalmologist. […] Results: Between 1 March 2014 and 31 March 2016, 1380 patients were seen in the clinic. The number of patients discharged following consultant virtual review was 855 (62%). The positive predictive value of onward referrals was 84%. Three of the 82 patients brought back for face-to-face review were deemed to require treatment, equating to negative predictive value of 96%.ConclusionsOur technician-delivered glaucoma referral triaging clinic incorporates consultant 'virtual review' to provide a service model that significantly reduces the number of onward referrals into the glaucoma outpatient department. This model may be an alternative to departments where there are difficulties in implementing optometrist-led community-based referral refinement schemes.

Supply and perceived demand for teleophthalmology in triage consultations in California Emergency Departments May 2016, JAMA Opthalmology
Importance: Determining the perceived supply and potential demand for teleophthalmology in emergency departments could help mitigate coverage gaps in emergency ophthalmic care. Objective: To evaluate the perceived current need for and availability of ophthalmologist coverage in California emergency departments and the potential effect of telemedicine for ophthalmology triage and consultation. […] Results: Of the 187 emergency departments surveyed, 18 of 37 rural facilities (48.6%) reported availability of emergency ophthalmology coverage, compared with 112 of 150 nonrural facilities (74.7%). Rural facilities reported a mean (SD) of 23.72 (14.15) miles between the facility and referral location, while nonrural facilities reported a mean of 4.41 (10.23) miles (19.3% difference). On a scale of 1 to 5 (where 1 signifies very low value and 5 signifies very high value), 124 of 187 nurse managers (66.3%) and 80 of 121 physicians (66.1%) rated teleophthalmology as having high or very high value for triage purposes. The most frequently cited potential advantage of emergency teleophthalmology was assistance in patient triage and immediate real-time electronic communication, and the most frequently cited potential disadvantages were unknown cost of contracting and maintenance and concern that eye trauma might make photographs or videos less conclusive. Conclusions and Relevance: Availability of ophthalmology coverage for emergency eye care is limited, particularly among rural emergency departments in California. Surveyed emergency department nurse managers and physicians indicated

moderately high interest and perceived value for a teleophthalmology solution for remote triage and consultation. Overall, the study suggests that teleophthalmology could play a role in mitigating coverage gaps in emergency ophthalmic care and could be further investigated through similar studies in other regions.

Nursing

An integrative literature review of the effectiveness of nurse-led clinics in ophthalmology March 2017, Insight (American Society of Ophthalmic Registered Nurses) *Abstract only**
The purpose of this review was to determine the best available evidence related to the effectiveness of nurse-led clinics in ophthalmology. The review question was: How effective are nurse-led clinics in ophthalmology? Specifically, the objectives were to identify whether nurse-led clinics:
• Reduced re-presentation rates,
• Reduced surgical complications,
• Alleviated anxiety, and
• Promoted patient satisfaction.

Glaucoma diagnosis and treatment: the role of the ophthalmic nurse 2016, Insight (American Society of Ophthalmic Registered Nurses) *Abstract only**
Glaucoma is one of the single largest causes of irreversible blindness. Glaucomatous vision loss is preventable with the appropriate diagnostic testing and treatment. Ophthalmic nurses play and important role in ensuring the success of glaucoma diagnosis and treatment.

Burnout

An eye center-wide burnout intervention: resilience program and burnout survey January 2019, Digital Journal of Ophthalmology,
Purpose: Burnout affects half of doctors in the United States. Programs to decrease burnout and foster resilience are needed to prevent loss of doctors in the workforce and maintain quality care. To ameliorate burnout at our eye center, we developed a resilience program and used a survey to identify additional groups with higher burnout for future interventions. […] Results: A total of 593 individuals were invited to participate, of whom 252 completed the survey. Overall, 37% of the respondents reported being emotionally exhausted, and 17% had experienced depersonalization. With regard to work-life balance, 43% of the respondents were satisfied and 34% were dissatisfied. Burnout was higher in respondents who participated in clinical care (P = 0.001), particularly among ophthalmic technicians (P = 0.044). Feedback from the doctors participating in the "Doctors Lounge" suggested perceived benefits, including enhanced collegiality, life skills, and improved self-management. Conclusions: Our baseline burnout survey showed higher burnout in our clinical workers, particularly in our ophthalmic technicians. Planning for next year will include the providers identified in the survey.

Competency Frameworks

Medical ophthalmology curriculum November 2017, General Medical Council (GMC)
The purpose of this curriculum is to define the process of training and the competencies needed for the award of a certificate of completion of training (CCT) in Medical Ophthalmology.

Ophthalmic Common Clinical Competency Framework 2016, Royal College of Ophthalmologists
The Ophthalmic Common Clinical Competency Framework (OCCCF), developed in 2016, provides standards and guidance for the knowledge and skills required for non-medical eye healthcare professionals to deliver patient care in a multidisciplinary team setting. The Framework has been developed into a curriculum in 2019, with corresponding work-place based assessments and resources, covering four clinical areas; acute and emergency eye care, cataract assessment, glaucoma and medical retina.

Community Ophthalmology Framework July 2015, Royal College of Ophthalmologists
This document outlines the broad components of a Community Ophthalmology Service. Such a service is distinct from primary and secondary care services and is defined by the functions it performs and its composition, such as the use of multidisciplinary teams with a targeted case load.
More on the Ophthalmic Clinical Competency Framework – Curriculum for HEE

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