Eyes, economics and the environment: should green issues drive changes in ophthalmic care? – Yes

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A cooling economy and a warming climate make this an opportune time to consider how ophthalmology might respond to the need to improve services while cutting costs. Although the NHS has enjoyed significant real growth in funding over the last decade, the King's Fund reports that the prospects for spending growth over the coming years look bleak.¹ Meanwhile, climate change is now recognised as the biggest threat to global health in the twenty-first century.²

These trends are likely to impact on ophthalmic services. A reduction in available resources could affect the ability of the VISION 2020 resolution, and the UK vision strategy, to achieve their goals. Meanwhile, climate change may alter the epidemiology of diseases, such as cataract, trachoma, and fungal keratitis, and our ability to provide appropriate services.³

The UK Government has responded to these challenges by setting ambitious, legally binding targets to reduce CO₂ emissions, and attempting to kick start the economy with 'a green new deal' designed to rescue us from climate and financial crises as Roosevelt's 1930's version did for America during the Great Depression. NHS England has a carbon footprint of over 18 million tonnes of CO₂ and is responsible for 3.2% of all English CO₂ emissions.⁴ In all, 16% of this is related to travel, 22% to building energy use, and 62% to procurement. If the NHS is to have its role in meeting the legislative targets, fundamental changes, not just to building energy use but also to the way that care is provided, will be required. Fortunately, adopting lower

carbon care may offer opportunities to improve both the quality of patient care and the cost effectiveness of its delivery.

Four principles might guide us: disease prevention, patient empowerment, lean service delivery, and the preferential use of low carbon technologies. William Gibson famously noted 'the future is already here—it's just unevenly distributed.' Looking at some examples reveals the outlines of what higher quality, more resource-efficient ophthalmic care may look like in future.

Advances in technology have the power to transform⁵ and can contribute heavily to any solutions. Imaging technologies are increasingly used to improve referrals, aid triage, and reduce unnecessary visits by facilitating the sharing of digital images of cases of strabismus⁶ and anterior⁷ and posterior-segment^{8,9} disease. This can enable more patient-centered care by allowing optometry services to provide more primary eye care through one-stop cataract clinics,^{10,11} shared-care glaucoma clinics,¹² and contributions to screening programmes for diabetic retinopathy and retinopathy of prematurity.

Personal computers can facilitate data management, education and, in the absence of appropriate vision charts, the measurement of visual acuity.¹³ Online video and image banks are already valuable learning resources and are being further developed. 'Eye-Site' (<http://www.e-lfh.org.uk/projects/eyesite/index.html>) is a collaborative development by the Royal College of Ophthalmologists and 'e-learning for health,' which will provide interactive knowledge sessions and a validated case archive to support the learning goals of the new curriculum. This builds on the new blended learning approach, which has improved the College's basic surgical skills

course by allowing more time to be dedicated to practical tasks when visiting the skills centre. Other developments include new knowledge aggregators, such as NHS evidence, which improve access to the best sources of evidence, electronic patient records, which can facilitate audit, feedback and appropriate referral,¹⁴ and virtual reality simulation for surgical training.¹⁵ In future, perhaps, we will see live surgery¹⁶ demonstrated at virtual conferences,¹⁷ online decision aids,¹⁸ or self-tonometry for the monitoring of IOP in glaucoma.¹⁹

Simple, low-tech measures also have a role and can improve existing systems. For example, water-saving taps reduce the amount of water used when scrubbing,²⁰ checklists reduce surgical complications,²¹ patients can be followed up by telephone consultation,²² and timely communication between primary and secondary care can be enhanced through electronic communication (perhaps reducing the risk of delay or inappropriate cancellation of a patient's follow-up leading to visual loss as highlighted in the recent NPSA report) (<http://www.nrls.npsa.nhs.uk/resources/type/alerts/?entryid45=61908>).

Many of these innovations, both novel and established, are yet to be fully validated in both hospital and community settings, where their safety, acceptability, and cost-effectiveness must be assessed. However, it appears that the tools are available for ophthalmic care to be provided in better, cheaper, more sustainable ways and we might consider following the lead of our colleagues in renal medicine who are already embracing the sustainability agenda (<http://www.greenerhealthcare.org/green-nephrology-programme>). Some might argue that there is a moral dimension to this discourse, our legacy to future generations; however, more compelling are the immediate arguments for improved quality of care, better utilisation of scarce resources, greater patient safety, and wider adoption of truly innovative technologies and management systems. Perhaps it is time to leapfrog these twin crises by introducing sustainability criteria into procurement contracts for ophthalmic equipment and medicines, conducting more research on the safety, efficacy, and acceptability of low carbon care and developing and implementing the most promising of the innovative solutions, which abound in ophthalmology.

Conflict of interest

The authors declare no conflict of interest.

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