

Title: **How to defuse a demographic time bomb: *the Way Forward?***

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## **Introduction**

The pressure of rising demand on ophthalmic services in the UK, and the negative effect of capacity shortfall on clinical outcomes is well attested.<sup>1</sup> With the major ophthalmic conditions of public health interest, cataract, glaucoma, age-related macular degeneration (AMD) and diabetic retinopathy (DR), being strongly associated with increasing age, the capacity/demand disequilibrium is expected to worsen with an ageing demographic. Epidemiological modelling for The Royal College of Ophthalmologists (RCOphth) commissioned *Way Forward* project predicted that between 2015 and 2035 the UK will experience a growth in case numbers of 44% for glaucoma, 50% for operable cataract and 59% for AMD.<sup>2</sup> Published projections suggest that diabetic numbers will also rise by ~50%.<sup>3,4</sup>

Rising prevalence is compounded by expansion of cost-effective but labour-intensive treatment options and lower treatment thresholds without a commensurate growth in resources. Human resources are a particular problem with a global shortage of ophthalmologists,<sup>5</sup> and realisation that recruitment of staff from the health systems of countries with far greater ophthalmic human resource problems than the UK is no longer ethically acceptable.<sup>6</sup>

A paradigm shift is required in the delivery of ophthalmic care to protect patients. The *Way Forward* project was constructed to facilitate shared learning as innovations in service design are identified and disseminated. The full reports are available online ([www.rcophth.ac.uk/standards-publications-research/the-way-forward](http://www.rcophth.ac.uk/standards-publications-research/the-way-forward)); this article provides a summary of the findings with exemplars.

### ***Way Forward* Methodology**

A literature review was conducted and semi-structured telephone interviews, offered via Lead Clinicians, were completed with consultant ophthalmologists responsible for Glaucoma (n=43), Cataract (50), Diabetic Retinopathy (36), and AMD (30) from December 2015 - June 2016.

## **Glaucoma**

**Demand management** – Typically ~40% of community optometrist referrals for suspected glaucoma are false positives<sup>7,8</sup> and are amenable to reduction by referral filtering schemes.<sup>7-10</sup> Two thirds of glaucoma consultants reported such schemes in their locality, so for one third, the opportunity exists to, at least, start a repeat measures scheme for intra-ocular pressure (IOP) based referrals.

**Pathway redesign** – Optimal utilisation of the decision-making ability of senior ophthalmologists for complex cases is essential. This is not a new concept with early innovators running modified services in the 1990s.<sup>11</sup> Stratification of cases by risk permits allocation of low risk cases to either a virtual clinic, or a multi-disciplinary team (MDT) clinic, with optometrists/nurse practitioners/orthoptists (non-medical health care practitioners (HCPs)) requesting consultant input only as required. Virtual clinics involve visual acuity (VA), IOP and visual field data acquisition by HCPs / technicians, often also obtaining disc images, pachymetry and even gonioscopy. Consultant review of the data/images is then undertaken (typically 10-12 patients reviewed per hour) and letters sent to patients to inform them of the outcome.

**Task Shifting** – Task shifting can be a two-step process.<sup>12</sup> Once appropriate complexity patients are being managed satisfactorily by MDT in the hospital, the location of this devolved clinical work may be shifted into the community; convenient for patients but potentially more expensive.<sup>13,14</sup>

## **Cataract**

**Demand management** – A survey in England showed that 71/151 commissioning bodies explicitly ration access to cataract surgery despite poor evidence to guide criteria-setting,<sup>15,16</sup> and it being contrary to RCOphth guidelines.<sup>17</sup>

**Pathway redesign** – Bilateral cataract patients can be treated with just three hospital visits (figure 1); safety in this pathway is permitted by easy-access symptom-driven post-operative review, autorefractometry guiding second eye lens selection. A less radical change, well established in many units

is to discharge uncomplicated second-eye cataract patients from theatre. This is an easy win capacity reduction, but refractive outcome data collection must be monitored.

**Task Shifting** - Nine out of ten departments still routinely reviewing post-operative cataract patients use non-ophthalmologists. More difficult to replicate perhaps is the one in five departments who has trained HCPs seeing cataract referrals; ophthalmologists only see the patient for surgery. This pathway relies on high-quality MDT members and does not adhere to current RCOphth guidelines.

**Efficient surgical service delivery** –Despite the recommendation from RCOphth and Monitor that one cataract operation is done every 30 minutes,<sup>18</sup> the mode number of cases reported at interview was 6 on 4 hour lists both for training and consultant-only lists. However, 5 departments routinely scheduled  $\geq 10$  cases. The expense of anaesthetists can be saved on dedicated local anaesthetic lists provided staff have appropriate life support training.

## **AMD**

**Demand management** – Referral refinement was not a perceived need, but two thirds of departments run virtual AMD clinics (VA/OCT/photo), and for some this is their standard initial evaluation for all new referrals to minimise delays for high-risk cases, and discharge of false-positive referrals.

**Pathway redesign** – AMD pathways are in a state of evolution nationally.<sup>19</sup> Almost one third of departments offer one-stop assessment/injection for first visits, and almost half do for follow-ups.

**Task shifting** – Virtual clinics can be quality assured, hence many consultants pass on the virtual review work to trained HCPs. Non-ophthalmologist injection services are commonplace, however over one third of departments still have all injections given by ophthalmologists.<sup>20</sup>

## **Diabetic Retinopathy**

**Demand management** – Repeated local audits showed more than 50% of new DR referrals were for maculopathy that did not require intervention.<sup>21</sup> Half of the consultants interviewed had virtual review clinics for maculopathy, and in some cases the screening programme itself has taken on this work.<sup>22</sup> Screeners time can be freed up by automated computer disease/no disease grading removing 30% of images from their workload.<sup>23</sup>

**Task shifting** – As well as referral refinement, the pool of experienced DR screening graders can be utilised for monitoring treated proliferative disease.<sup>24</sup>

**Pathway redesign** – Capacity wastage from failure to attend (DNA) must be minimised using the evidence based interventions that exist (Figure 2).<sup>25</sup>

## **Discussion**

The *Way Forward* project has given some sense of the scale of the future demand facing UK eye departments, and some of the options already in use by colleagues around the country. Inaction is not an option. It is incumbent on each department in the UK to identify opportunities for service redesign to maximise efficiency and reduce unwarranted variation. Tasks that can be safely devolved to trained HCPs, or areas where technology may offer time savings should also be explored, such that senior ophthalmologists are fully engaged in activities which genuinely require the training, knowledge and experience that they have and so that every MDT member, the ophthalmologist included, is operating at the top of their grade.

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Figure 1: The lightest cataract pathway involved no routine review after 1<sup>st</sup> or 2<sup>nd</sup> eye

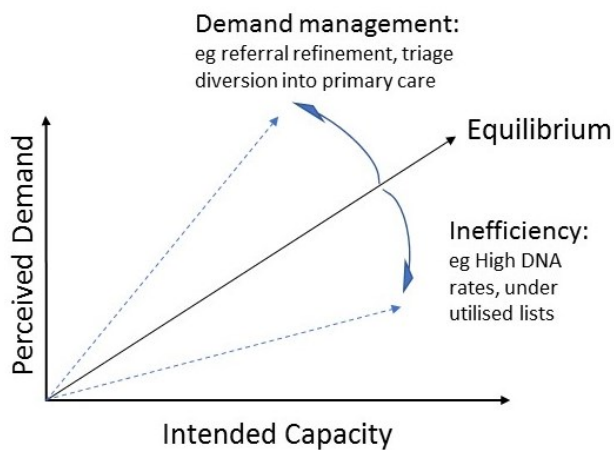


Figure 2: Strategic intentional demand-capacity management is essential

1. Foot B, MacEwen C. Surveillance of sight loss due to delay in ophthalmic treatment or review: frequency, cause and outcome. *Eye* 2017.
2. <https://www.rcophth.ac.uk/standards-publications-research/the-way-forward/>.
3. Waldeyer R, Brinks R, Rathmann W, Giani G, Icks A. Projection of the burden of type 2 diabetes mellitus in Germany: a demographic modelling approach to estimate the direct medical excess costs from 2010 to 2040. *Diabetic medicine : a journal of the British Diabetic Association* 2013; **30**(8): 999-1008.
4. Huang ES, Basu A, O'Grady M, Capretta JC. Projecting the future diabetes population size and related costs for the U.S. *Diabetes care* 2009; **32**(12): 2225-9.
5. Resnikoff S, Felch W, Gauthier TM, Spivey B. The number of ophthalmologists in practice and training worldwide: a growing gap despite more than 200,000 practitioners. *The British journal of ophthalmology* 2012; **96**(6): 783-7.
6. Bastawrous A, Hennig BD. The global inverse care law: a distorted map of blindness. *The British journal of ophthalmology* 2012; **96**(10): 1357-8.

7. Henson DB, Spencer AF, Harper R, Cadman EJ. Community refinement of glaucoma referrals. *Eye* 2003; **17**(1): 21-6.
8. Ratnarajan G, Newsom W, Vernon SA, et al. The effectiveness of schemes that refine referrals between primary and secondary care--the UK experience with glaucoma referrals: the Health Innovation & Education Cluster (HIEC) Glaucoma Pathways Project. *BMJ open* 2013; **3**(7).
9. Bourne RR, French KA, Chang L, Borman AD, Hingorani M, Newsom WD. Can a community optometrist-based referral refinement scheme reduce false-positive glaucoma hospital referrals without compromising quality of care? The community and hospital allied network glaucoma evaluation scheme (CHANGES). *Eye* 2010; **24**(5): 881-7.
10. Devarajan N, Williams GS, Hopes M, O'Sullivan D, Jones D. The Carmarthenshire Glaucoma Referral Refinement Scheme, a safe and efficient screening service. *Eye* 2011; **25**(1): 43-9.
11. Vernon SA, Adair A. Shared care in glaucoma: a national study of secondary care lead schemes in England. *Eye* 2010; **24**(2): 265-9.
12. Holtzer-Goor KM, Ploch T, Lemij HG, van Sprundel E, Koopmanschap MA, Klazinga NS. Why a successful task substitution in glaucoma care could not be transferred from a hospital setting to a primary care setting: a qualitative study. *Implement Sci* 2013; **8**: 14.
13. Spry PG, Spencer IC, Sparrow JM, et al. The Bristol Shared Care Glaucoma Study: reliability of community optometric and hospital eye service test measures. *The British journal of ophthalmology* 1999; **83**(6): 707-12.
14. Coast J, Spencer IC, Smith L, Spry PG. Comparing costs of monitoring glaucoma patients: hospital ophthalmologists versus community optometrists. *J Health Serv Res Policy* 1997; **2**(1): 19-25.
15. McLaughlan B WS, Benjamin L, Cassels-Brown A, Smith R. Don't turn back the clock: Cataract surgery – the need for patient-centred care. *RNIB, RCOphth* 2011.
16. Coronini-Cronberg S, Lee H, Darzi A, Smith P. Evaluation of clinical threshold policies for cataract surgery among English commissioners. *J Health Serv Res Policy* 2012; **17**(4): 241-7.
17. Day AC, Wormald R, Coronini-Cronberg S, Smith R, Royal College of Ophthalmologists Cataract Surgery Commissioning Guidance Development G. The Royal College of Ophthalmologists' Cataract Surgery Commissioning Guidance: executive summary. *Eye* 2016; **30**(3): 498-502.
18. MacEwen C, Mascie-Taylor H, Wilton T. Helping NHS providers improve productivity in elective care. *Monitor / RCOphth / British Orthopaedic Association* 2015.
19. Amoaku W, Blakeney S, Freeman M, et al. Action on AMD. Optimising patient management: act now to ensure current and continual delivery of best possible patient care. *Eye* 2012; **26 Suppl 1**: S2-21.
20. DaCosta J, Hamilton R, Nago J, et al. Implementation of a nurse-delivered intravitreal injection service. *Eye* 2014; **28**(6): 734-40.
21. Looker HC, Nyangoma SO, Cromie DT, et al. Rates of referable eye disease in the Scottish National Diabetic Retinopathy Screening Programme. *The British journal of ophthalmology* 2014; **98**(6): 790-5.
22. Manjunath V, Papastavrou V, Steel DH, et al. Wide-field imaging and OCT vs clinical evaluation of patients referred from diabetic retinopathy screening. *Eye* 2015; **29**(3): 416-23.
23. Philip S, Fleming AD, Goatman KA, et al. The efficacy of automated "disease/no disease" grading for diabetic retinopathy in a systematic screening programme. *The British journal of ophthalmology* 2007; **91**(11): 1512-7.
24. Negretti GS, Vafidis GC. Is it safe to discharge treated proliferative diabetic retinopathy patients from the hospital eye service to a community screening programme? *Eye* 2014; **28**(6): 696-700.
25. Thompson AC, Thompson MO, Young DL, et al. Barriers to Follow-Up and Strategies to Improve Adherence to Appointments for Care of Chronic Eye Diseases. *Investigative ophthalmology & visual science* 2015; **56**(8): 4324-31.