Institution: University of Bristol

Unit of Assessment: UoA2

Title of case study: Cataract Surgery – Quality of Life Benefits and Improved Access to Treatment in the UK and beyond

1. Summary of the impact

The most frequent surgical procedure undertaken in the NHS is cataract surgery and it improves vision and quality of life (QoL). In the 1990's there were long waiting times for cataract surgery with rationing most frequently restricting surgery on the 2nd eye. A randomised controlled trial undertaken at the University of Bristol (UoB) demonstrated clear QoL benefits from 2nd eye cataract surgery, followed by a population study quantifying population requirements for 1st and 2nd eye surgery and the surgical backlog. Government policy, announced in 'Action on Cataracts - Good Practice Guidance, 2000', advised that the volume cataract surgery, including on the 2nd eye, should be increased. This policy ensured timely access to surgery becoming routine practice in the NHS, thus improving the lives of thousands of people. Second-eye surgery rates rose from ~25% of operations to 35-40%, with overall increases in operations for patients needing surgery (e.g. in England up from 201,682 operations in 1998-1999 to 332,625 in 2009-2010) and reduced waiting times. These improvements were sustained through to the end of the 2000's. The research has become highly relevant again as the NHS enters another period of constrained expenditure.

2. Underpinning research

Prior to and during the 1990s there was uncertainty and disagreement regarding the indications for and benefits from cataract surgery, in particular 2nd eye surgery. There were widespread limits to the number of NHS procedures permitted, with more stringent restrictions applied to 2nd eye surgery on the assumption that good vision in one eye was sufficient for the needs of most people. Demand for surgery outstripped supply resulting in the build up of long waiting times. These NHS delivery and clinical issues provided the rationale for the UoB research, which aimed to address two key questions:

Q1. What are the benefits of a 2nd eye cataract operation following a successful 1st eye operation?

A Wellcome Trust funded[1] randomised controlled trial of 2nd eye cataract surgery, published in 1998 in the Lancet[2] was undertaken collaboratively between the University of Bristol and the Bristol Eye Hospital from 1993 to 1998. People who had undergone a successful 1st eye cataract operation and who were awaiting surgery for their 2nd cataract were eligible for recruitment. The intervention group underwent expedited surgery and were compared at 6 months following randomisation with the control group (who were still awaiting 2nd eye surgery). Outcomes included visual function and patient reported benefits which were assessed with a valid cataract specific instrument, the Visual Symptoms and Quality of life (VSQ) questionnaire[3] developed by the research group for the trial. 208 patients were recruited into the study which showed significant visual function and vision related QoL benefits from 2nd eye surgery. Distance acuity, near acuity, contrast sensitivity and particularly stereo-acuity and self reported vision problems (such as reading and seeing faces) improved when assessed with both eyes open[1]. Our RCT remains the only randomised trial of 2nd eye cataract surgery to date which directly addresses the visual function and quality of life benefits of 2nd eye surgery following a successful 1st eye operation.

Q2. What are the population requirements for cataract surgery?

A further University of Bristol and Bristol Eye Hospital collaboration funded by DH[4] and Regional R&D research[5,6] funding streams from 1995 to 2001 undertook a cross sectional geographically based population study of chronic potentially blinding eye disease on over 1000 participants aged 65 years and older. Eligibility for cataract surgery in this representative sample was assessed using an applied epidemiological approach in which indications for surgery were modelled from detailed clinical and quality of life data. From this work it was estimated that the backlog of cataract surgery for visually significant cataract in England was of the order of half a million operations [7].

Key researchers with UoB positions from 1992 forward:

- Sparrow, J. M. Senior Lecturer UoB 1992-2000, subsequently Honorary Senior Lecturer and Honorary Professor
- Donovan, J. L. Lecturer, subsequently Professor and Head of School of Social and Community Medicine, UoB
- Frankel, S. J. Professor, Head of Department of Social Medicine, UoB, now retired
- Laidlaw, D. A. Lecturer UoB 1993-1995, subsequently left Bristol for promotion to Consultant
- Harrad, R. A. Honorary Senior Lecturer UoB, subsequently Honorary Reader
- Peters, T. J. Senior Lecturer, subsequently Professor of Primary Care Health Services Research and Head of School of Clinical Sciences, UoB
- Frost, N. A. Research Fellow and Honorary Lecturer UoB, 1994-2001, subsequently left Bristol for promotion to Consultant.

3. References to the research

[1] The Wellcome Trust. Project: Is there a benefit from second eye cataract extraction? Wellcome Trust Grant Code: 039254/Z/93/Z/1.5/DG/SRD. Holders: Harrad, Frankel, Sparrow, Williams, Laidlaw. Period: 1/101993-30/9/1995. £92,079 (peer reviewed).
[2] Laidlaw DA, Harrad RA, Hopper CD, Whitaker A, Donovan JL, Brookes ST, Marsh GW, Peters TJ, Sparrow JM, Frankel SJ. Randomised trial of effectiveness of second eye cataract surgery. Lancet 1998;352:925-9. (Document can be supplied upon request)
[3] Donovan JL, Brookes ST, Laidlaw DA, Hopper CD, Sparrow JM, Peters TJ. The development and validation of a questionnaire to assess visual symptoms/dysfunction and impact on quality of life in cataract patients: the Visual Symptoms and Quality of life (VSQ) Questionnaire. Ophthalmic Epidemiology 2003;10:49-65. DOI: 10.1076/opep.10.1.49.13775
[4] DH: Population requirements for elective surgery: Cataract Surgery. DH Grant Code: 121/6022. Holders: Frankel, Williams. Period: 1/4/1995-30/9/1997. £99,873 (peer reviewed).
[5] SW Regional Research & Development Project Grant: The identification of the Population Requirements for Cataract Surgery. R&D Grant code: C/COM/01/15-08-94/Sparrow/D. Sparrow, Frankel, Williams. Period: 1/5/1995-31//8/1998. £162,262 (peer reviewed).
[6] SW Regional Health Authority R&D Directorate: Research training fellowship – Frost NA, Supervisors: Sparrow, Williams, Frankel. Period: 1/10/1994-30/9/1997. £86,229 (peer reviewed).
[7] Frost NA, Hopper C, Frankel S, Peters TJ, Durant J, Sparrow J. The population requirement for cataract extraction: a cross-sectional study. Eye 2001;15:745-52. (Document can be supplied upon request)

4. Details of the impact

During the 1990s rationing of surgery for visually impairing cataract was common with contract limits placed on secondary care providers. 2nd eye surgery was particularly targeted for access restrictions and NHS waiting times for surgery were typically a year or more. For older people, for example, the implications of long waits and poor vision were substantial, leading to potentially reduced confidence and higher functional dependence. Following publication of our Randomised Controlled Trial of 2nd eye cataract surgery in the Lancet in 1998[2], the DH 'Action on Cataracts' policy document released in 2000 recommended 2nd eye surgery as uncontroversially good practice[a]. Our Lancet paper was referred to as 1 of just 7 references in the policy document. The clear benefits, both in terms of visual function and self reported symptoms which our research demonstrated, informed a firm and strong policy recommendation in favour of 2nd eye surgery across the NHS. During the early and mid 1990s, prior to the publication of our research report, 2nd eye surgery comprised around 25% of operations[b]. Data from the National Ophthalmology Database (NOD - 30 contributing NHS trusts) for the years 2004-2010 show a steady increase each year of 2nd eye surgery from 24.2% in 2004 to 34.9% in 2010 based on around 232,000 operations[c], with our own published analysis of over 55,000 operations (12 trusts) in the mid to late 2000s indicating 41.5% of operations being on 2nd eyes[d] reflecting widespread acceptance within the NHS of the benefits gained from 2nd eye surgery for bilateral cataract. Similarly the European Registry of Quality Outcomes for Cataract and Refractive Surgery (EUREQUO) reported that based on 318,000 operations from 2009 to August 2011, 40.6% of cataract surgery was for 2nd

eyes [e].

The findings of our RCT have since been corroborated through studies in which the benefits of 1st and 2nd eye surgery have been found to be either similar or, as in the Swedish National Cataract Register data, greater from 2nd eye surgery for certain subgroups compared with 1st eyes[f].

Our research report on the population requirements for both 1st and 2nd eye cataract surgery[7] provided a robust estimate of the cataract surgical backlog facing the NHS. Our estimate of around half a million additional operations needed to clear the backlog was based on sound applied epidemiological and ophthalmological methodology and provided an empirically evidenced and considerably more accurate estimate of unmet need for surgery than earlier inflated estimates. During the decade following publication of our research an uplift of just over half a million operations cleared the backlog (HES data), confirming the accuracy of our estimate.

The 2000 DH 'Action on Cataracts' document referred to our randomised trial and recommended 2nd eye cataract surgery along with process and commissioning changes to increase efficiency, delivery and access for cataract surgery [a]. This document was reinforced by the subsequent NHS Institute for Innovation and Improvement publication, 'Focus on Cataracts' [g], and sequential updates of the Royal College of Ophthalmologists Cataract Surgery Guidelines in 2010[h] which directly cited our research. Internationally our RCT on 2nd eye cataract surgery has been referred to in the previous and the current American Academy of Ophthalmology Preferred Practice Pattern: Cataract in the Adult Eye, 2011 [i] and in Guidelines based on data in the European Registry of Quality Outcomes for Cataract[e], with the International Centre for Eye Health [j] having recommend the Royal College 2010 Guidelines which directly cite our research.

In the NHS, with achievable numbers [7] and the strong policy impetus provided by the DH significant inroads were made into the unmet need for cataract surgery. A 65% increase in the frequency of cataract surgery resulted across England, from 201,682 operations in 1998-1999 to 332,625 in 2009-2010. During the 1990s long waiting times for cataract surgery patients were routine, typically around a year. As a consequence of the policy adjustments informed by our research, this increase in cataract surgery reduced waiting times in England to below 18 weeks from referral to surgery for well over 90% of NHS patients.

In addition to the direct benefits to vision [d] and QoL [f] provided by cataract surgery, there are downstream benefits to health such as a reduction in falls for people with improved vision. These benefits are difficult to quantify but include prevention of falls and associated mortality and morbidity among elderly people. Recent austerity-driven reductions in numbers of cataract operations has attracted professional and media interest. Giving evidence to a hearing of the public accounts committee in January 2013 the Medical Director of the NHS, Sir Bruce Keogh said: "We do know that about 50 per cent of PCTs have restricted access to cataract surgery, and we do know that the bulk of policies used by PCTs actually haven't used the best evidence that's available in order to ration that care."

The Royal National Institute for Blind people (RNIB) has cited our RCT[2] in its collaborative report with the RCOphth 'Don't turn back the clock: Cataract surgery- the need for patient-centred care', June 2011[k]. The RNIB is investigating the variation in cataract surgery across England and has done a FOI request to each PCT with regards to their commissioning policies on 2nd eye surgery. The RNIB Assistant Policy and Campaigns Officer (Eye Health) has indicated that the UoB research evidence would be used to 'interact with commissioners and highlight evidence as to why their restrictive 2nd eye policy is harmful to patients' and that 'some PCTs have decided to review their policies in light of our [RNIB] concerns'. NHS Atlas of Variation in Healthcare (Nov 2010) discusses standardising cataract surgery. It mentions 'added value of 2nd eye surgery' and cites our RCT. Our RCT is cited first in The European Registry of Quality Outcomes for Cataract and Refractive Surgery (EUREQUO) project publication 'Evidence-based guidelines for cataract surgery: Guidelines based on data in the European Registry of Quality Outcomes for Cataract and Refractive Surgery database', 2012 [e]. The Technology Scoping Report No.8 from Healthcare Improvement Scotland (August 2012) cites our RCT.

In summary, UoB research has been instrumental in informing and changing cataract surgical policy to the visual and quality of life benefit of hundreds of thousands of older people with cataract in the UK and beyond. We demonstrated the visual and QoL benefits of 2nd eye cataract surgery

following successful 1st eye surgery, corroborated by subsequent observational research, and we quantified the population requirements for 1st and 2nd eye cataract surgery and the unmet need for NHS surgery, our estimates being borne out by the numbers of operations subsequently required to bring down the surgical backlog. In the current climate of austerity our research is again of direct relevant to policy decisions as illustrated by the recent RNIB FOI survey of PCTs and the ongoing citations of UoB cataract research in both academic and the policy setting arenas.

5. Sources to corroborate the impact

[a] DH. Action on Cataracts: Good practice guidance, NHS Executive. http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4005637 2000. *2nd eye cataract surgery should uncontroversially be provided by the NHS with streamlined patient pathways to facilitate and support increased surgical throughput*.

[b] Claridge KG, Francis PJ, Bates AK. Should second eye cataract surgery be rationed? Eye (Lond) 1995;9:47-9. *In early to mid 1990s ~26% NHS cataract operations were for 2nd eyes*.

[c] Donachie P. National Ophthalmology Database tabulation of rates of 2nd eye cataract surgery between 2004 and 2010 derived from data contributed by 30 NHS cataract surgery units. June 2013. *Increasing proportion of 2nd eye NHS cataract operations through mid to late 2000's*.

[d] Jaycock P, Johnston RL, Taylor H, Adams M, Tole DM, Galloway P, Canning C, Sparrow JM. The Cataract National Dataset electronic multi-centre audit of 55,567 operations: updating benchmark standards of care in the United Kingdom and internationally. Eye 2009;23:38-49. *In mid to late 2000s ~42% of NHS cataract operations were for 2nd eye cataracts (P40). This sample indicates a significant increase in the proportion of 2nd eyes in comparison to 1990s.*

[e] Lundstrom M, Barry P, Henry Y, Rosen P, Stenevi U. Evidence-based guidelines for cataract surgery: guidelines based on data in the European Registry of Quality Outcomes for Cataract and Refractive Surgery database. J Cataract Refract Surg 2012;38:1086-93. *European guidelines illustrate international recognition of UoB RCT evidence for the benefit of 2nd eye surgery and recommend surgery for symptomatic 2nd & 1st eye cataracts. The document confirms the current rate of 2nd eye cataract surgery in Europe is just over 40% (P1087).*

[f] Lundstrom M, Stenevi U, Thorburn W. Quality of life after first- and second-eye cataract surgery: five-year data collected by the Swedish National Cataract Register. J Cataract Refract Surg 2001;27:1553-9. *Self reported benefits from 2nd eye cataract surgery are similar or greater than 1st eye surgery (P1555, T4&5). Observational evidence supports our RCT result*.

[g] DH. Focus on Cataracts. NHS Institute for Innovation and Improvement publication 2006; http://www.institute.nhs.uk/quality_and_value/high_volume_care/cataracts.html . *Policy encouraged high volume cataract surgery to meet population requirements for surgery and confirmed that 2nd eye surgery should be uncontroversially routine care when indicated*.

[h] The Royal College of Ophthalmologists Cataract Surgery Guidelines (current). 2010; http://www.rcophth.ac.uk/core/core_picker/download.asp?id=544&filetitle=Cataract+Surgery+Guidelines+2010. *Royal College guideline comments on population requirements (P6) recommended that people with symptomatic 1st and 2nd eye cataracts should be considered for surgery (P10,14,17,60) and cites UoB research (P8,15,65)*.

[i] American Academy of Ophthalmology's Preferred Practice Pattern: Cataract in the Adult Eye. 2011; http://one.aao.org/CE/PracticeGuidelines/PPP.aspx?sid=a3043761-ec14-40a0-bb84-d353240d211e. *US guideline recommended that people with symptomatic 1st and 2nd eye cataracts should be considered for surgery (P40) and cites UoB research (Ref 769)*.

[j] International Centre for Eye Health 2013; https://www.iceh.org.uk/display/WEB/Cataract+Surgery+Guidelines+2010. *Endorsement of [h] recommendation that people with symptomatic 1st and 2nd eye cataracts should be considered for surgery internationally*.

[k] Royal National Institute for Blind people and Royal College of Ophthalmologists Joint report: Don't turn back the clock. Cataract surgery – the need for patient-centred care. http://www.rnib.org.uk/getinvolved/campaign/policy/eyehealth/reports/Pages/cataract-2011.aspx. *Draws attention to cost driven and inappropriate restrictions on access to NHS cataract surgery and the targeting of 2nd eye surgery, and cites UoB research (Ref 3).*