Development of a cost-effectiveness model for optimisation of the screening interval in diabetic retinopathy screening

Peter H Scanlon,1* Stephen J Aldington,1 Jose Leal,2 Ramon Luengo-Fernandez,2 Jason Oke,3 Sobha Sivaprasad,4 Anastasios Gazis5 and Irene M Stratton1

1Gloucestershire Retinal Research Group, Gloucestershire Hospitals NHS Foundation Trust, Cheltenham General Hospital, Cheltenham, UK
2Health Economics Research Centre (HERC), Nuffield Department of Population Health, University of Oxford, Oxford, UK
3Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, UK
4King’s College Hospital NHS Foundation Trust, King’s College Hospital, London, UK
5Department of Diabetes and Endocrinology, Nottingham University Hospitals NHS Trust, Nottingham, UK

*Corresponding author

Declared competing interests of authors: Peter Scanlon has received fees from Bayer Plc (Newbury, UK), Allergan Ltd (Marlow, UK), Roche (F. Hoffmann-La Roche Ltd, Basel, Switzerland) and Boots Opticians Ltd (Nottingham, UK) for consultancy work or advisory board participation and part of his salary is supported by the NHS Diabetic Eye Screening Programme in Public Health England. Stephen Aldington has part of his salary supported by the NHS Diabetic Eye Screening Programme in Public Health England. Sobha Sivaprasad has received fees from Novartis Pharmaceuticals UK Ltd (Frimley, UK), Bayer, Allergan and Roche for travel grants and research grants and advisory board participation.

Published September 2015
DOI: 10.3310/hta19740

Plain English summary

Optimisation of the screening interval in diabetic retinopathy screening
Health Technology Assessment 2015; Vol. 19: No. 74
DOI: 10.3310/hta19740

NIHR Journals Library www.journalslibrary.nihr.ac.uk
Diabetic eye disease [diabetic retinopathy (DR)] is a major cause of blindness in the working-age population in the UK, but if sight-threatening retinopathy (STDR) is detected early by taking digital photographs of the retina, treatment is effective and affordable.

Since the English NHS DR screening programme was introduced in 2003, fewer people have lost their vision. Currently, the programme has a standard for photographing every patient annually, which may not be necessary and puts a strain on resources.

In Gloucestershire, data from high-quality screening and general practitioner (GP) information were used to evaluate what screening intervals could match patient conditions with existing resources.

Two models to identify people at greater risk of sight loss were designed; the first using only results from screening data and the second using screening and GP data. Both models were checked using data from other screening programmes.

Annual screening for all who have no indication of STDR was found to be unnecessarily expensive. If no risk evaluation is used, screening this group (non-STDR) every 3 years was the most cost-effective option. If a risk model is employed with personalised intervals, low-risk groups can be safely and effectively screened every 5 years, whereas screening high-risk groups every 2 years further improves overall cost-effectiveness. Benefits were assessed using a measure called quality-adjusted life-years, which combines both life-expectancy and quality of life. There is uncertainty around some of the information used in cost-effectiveness models, so further research would be needed to support this work.
Criteria for inclusion in the Health Technology Assessment journal

Reports are published in Health Technology Assessment (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in Health Technology Assessment are termed ‘systematic’ when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. ‘Health technologies’ are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

For more information about the HTA programme please visit the website: http://www.nets.nihr.ac.uk/programmes/hta

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 10/66/01. The contractual start date was in May 2012. The draft report began editorial review in December 2014 and was accepted for publication in May 2015. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors’ report and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health.

© Queen’s Printer and Controller of HMSO 2015. This work was produced by Scanlon et al. under the terms of a commissioning contract issued by the Secretary of State for Health. This issue may be freely reproduced for the purposes of private research and study and extracts (or indeed, the full report) may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Published by the NIHR Journals Library (www.journalslibrary.nihr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).
Editor-in-Chief of Health Technology Assessment and NIHR Journals Library

Professor Tom Walley  Director, NIHR Evaluation, Trials and Studies and Director of the HTA Programme, UK

NIHR Journals Library Editors

Professor Ken Stein  Chair of HTA Editorial Board and Professor of Public Health, University of Exeter Medical School, UK

Professor Andree Le May  Chair of NIHR Journals Library Editorial Group (EME, HS&DR, PGfAR, PHR journals)

Dr Martin Ashton-Key  Consultant in Public Health Medicine/Consultant Advisor, NETSCC, UK

Professor Matthias Beck  Chair in Public Sector Management and Subject Leader (Management Group), Queen's University Management School, Queen's University Belfast, UK

Professor Aileen Clarke  Professor of Public Health and Health Services Research, Warwick Medical School, University of Warwick, UK

Dr Tessa Crilly  Director, Crystal Blue Consulting Ltd, UK

Dr Peter Davidson  Director of NETSCC, HTA, UK

Ms Tara Lamont  Scientific Advisor, NETSCC, UK

Professor Elaine McColl  Director, Newcastle Clinical Trials Unit, Institute of Health and Society, Newcastle University, UK

Professor William McGuire  Professor of Child Health, Hull York Medical School, University of York, UK

Professor Geoffrey Meads  Professor of Health Sciences Research, Faculty of Education, University of Winchester, UK

Professor John Norrie  Health Services Research Unit, University of Aberdeen, UK

Professor John Powell  Consultant Clinical Adviser, National Institute for Health and Care Excellence (NICE), UK

Professor James Raftery  Professor of Health Technology Assessment, Wessex Institute, Faculty of Medicine, University of Southampton, UK

Dr Rob Riemsma  Reviews Manager, Kleijnen Systematic Reviews Ltd, UK

Professor Helen Roberts  Professor of Child Health Research, UCL Institute of Child Health, UK

Professor Helen Snooks  Professor of Health Services Research, Institute of Life Science, College of Medicine, Swansea University, UK

Professor Jim Thornton  Professor of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, University of Nottingham, UK

Please visit the website for a list of members of the NIHR Journals Library Board: www.journalslibrary.nihr.ac.uk/about/editors

Editorial contact: nihredit@southampton.ac.uk