

Impact case study (REF3)

Institution: University of Liverpool		
Unit of Assessment: UoA4		
Title of case study: Post stroke visual impairment: influence on clinical guidelines and improving service and care.		
Period when the underpinning research was undertaken: 2006 - present		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Fiona Rowe	Professor in Orthoptics	1998 – present
Dr Lauren Hepworth	Postdoctoral Research Fellow	2014 – present
Dr Kerry Hanna	Lecturer in Orthoptics	2018 – present
Period when the claimed impact occurred: 2015 - present		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>The University of Liverpool VISION research unit (led by Prof Rowe) is unique in focussing on research for post-stroke visual impairment (PSVI). PSVI affects 60% of stroke survivors but has historically been under-recognised, with poor detection and referral to eye care services, leading to restricted quality of life. UoL's work has established incidence/prevalence rates of PSVI, essential components for vision screening, requirements for eye service provision, user-defined impact of visual impairment, and consensus on management strategies. This has provided the underpinning evidence for present day PSVI policies, guidelines and clinical practice in the UK and internationally. This work has led to a significant change in clinical and societal recognition of PSVI, screening and services in the UK and internationally, and a doubling in stroke units including vision stroke services.</p>		
<p>2. Underpinning research</p> <p>Visual impairment after stroke (PSVI) is common, debilitating and costly. Most stroke survivors with visual impairment report a reduction in quality of life. This is particularly true if the visual impairment is unidentified and therefore not recognised by the multi-disciplinary team. For many stroke survivors, visual impairment results in inability or altered ability to undertake many aspects of daily activities with impact on return to work, participation in hobbies and family life, and can lead to social isolation, altered mood and depression. Wide-ranging benefits to patients, their carers and the NHS can be achieved through early and accurate identification of PSVI and integrated screening and care services.</p> <p>In order to improve outcomes for people with PSVI, the University of Liverpool VISION unit led by Professor Rowe, has carried out a programme of research with clinicians, stroke survivors and charities over the last decade. We have demonstrated the significant impact of visual impairment to stroke survivors and explored difficulties related to care provision through a range of studies including: systematic reviews, studies on screening, assessment, course and management of PSVI, and qualitative work exploring the impact of PSVI and unmet needs of stroke survivors. We have developed interventions and led evaluations (10 randomised control trials/cohort studies) addressing patient care pre and post discharge. UoL's work has led to over 50 active NHS/academic collaborations in the delivery of multi-site studies and the largest UK database for PSVI.</p> <p>Evidence synthesis:</p> <p>UoL's systematic reviews (Cochrane Library/independent narrative reviews) have examined the efficacy of screening methods [3.1] and effectiveness of interventions for PSVI [3.2, www.cochranelibrary.com]. All reviews found insufficient evidence for screening methods and interventions, leading to epidemiology, screening and rehabilitation research in PSVI to address these unmet needs.</p>		

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Epidemiology studies:

We recruited 915 (VIS study) and 1500 (IVIS study) patients for the world's largest completed observation studies on PSVI (Rowe as CI; <https://www.liverpool.ac.uk/population-health-sciences/staff/fiona-rowe/>). Findings consistently show lack of standardisation across services, poor detection of PSVI, poor referral and inconsistent management.

Screening for PSVI:

Rowe designed and validated a screening form for use by the generic stroke team, which reported a 92% positive predictive value [3.1]. UoL's screening form was adopted by the British and Irish Orthoptic Society (BIOS; www.orthoptics.org.uk) and remains the national approved stroke vision screening form. We subsequently developed a visual impairment screening assessment (VISA) tool. Validation studies [3.3] showed VISA to be a reliable and sensitive means of screening for visual impairment in acute stroke survivors. A spin-off screening assessment for paramedic 999 stroke call-outs and Stroke Association 6-month reviews evolved from VISA. We led a national team to create a stroke-vision care pathway to pull all screening, assessment and referral aspects of care together [3.4].

Specialist assessment for PSVI:

Rowe's clinical practice scoping surveys [3.5] identified a lack of standardised specialist visual assessment leading to the development of a professional body (BIOS) consensus statement (led by Rowe). We defined essential and desirable recommendations for service provision. We surveyed 548 clinical professionals (UK-based/international), patients and carers to identify core outcome measures for PSVI assessment [3.5]. These results underpinned the professional development of care pathways in relation to screening, specialist assessment and driving [3.4].

Visual rehabilitation for PSVI:

UoL's reviews identified considerable variability in management options. An important part of this research has been to source the best evidence-based treatments for visual impairment. The VISION group specifically identified homonymous hemianopia (type of visual field loss) as a visual condition causing considerable impact to patient lives. Following a clinical trial of two interventions versus standard care (no treatment) a significant improvement to vision-related quality of life for visual scanning training was reported [3.6]. These results have informed the development of a larger definitive trial commencing 2020, funded by Fight for Sight and the Stroke Association.

3. References to the research

These references support the VISION units work on PSVI relating to screening, assessment, referral and management.

- 3.1 **Hanna KL, Hepworth R, Rowe FJ.** Screening methods for post stroke visual impairment; a systematic review. Disability and Rehabilitation. 2016:
[DOI:10.1080/09638288.2016.1231846](https://doi.org/10.1080/09638288.2016.1231846)
- 3.2 **Hanna KL, Hepworth LR, Rowe FJ.** The treatment methods for post-stroke visual impairment: a systematic review. Brain and behaviour. 2017; 7(5): e00682.
[DOI:10.1002/brb3.682](https://doi.org/10.1002/brb3.682)
- 3.3 **Rowe FJ, Hepworth LR, Howard C, Bruce A, Smerdon V, Payne T, Jimmieson P, Burnside G.** The Vision Screening Assessment (VISA) tool – diagnostic accuracy validation of a novel screening tool in detecting visual impairment among stroke survivors. BMJ Open. 2020, [DOI:10.1136/bmjopen-2019-033639](https://doi.org/10.1136/bmjopen-2019-033639)
- 3.4 **Rowe FJ, Hepworth LR, Howard C, Hanna KL, Helliwell B.** Developing a stroke-vision care pathway: a consensus study. Disability and Rehabilitation. 2020; May 29; 1-9.
[DOI:10.1080/09638288.2020.1768302](https://doi.org/10.1080/09638288.2020.1768302)

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- 3.5 **Rowe FJ**, Walker M, Rockliffe J, Pollock A, Howard C, Glendinning R, Feechan R, Currie J. Care provision for post-stroke visual impairment. *Journal of Stroke and Cerebrovascular Diseases*. 2015; 24: 1131-44.
[DOI:10.1016/j.jstrokecerebrovasdis.2014.12.035](https://doi.org/10.1016/j.jstrokecerebrovasdis.2014.12.035)
- 3.6 **Rowe FJ, Conroy EJ, Bedson E, Cwiklinski E**, Drummond A, **García- Fiñana M**, Howard C, Pollock A, Shipman T, Dodridge C, MacIntosh C, Johnson S, Noonan C, Barton G, Sackley C. A pilot randomised controlled trial comparing effectiveness of prism glasses, visual search training and standard care in hemianopia. *Acta Neurologica Scandinavica*. 2016; epub: [DOI:10.1111/ane.12725](https://doi.org/10.1111/ane.12725)

4. Details of the impact

Stroke is the leading cause of disability affecting 15,000,000 globally (World Health Organisation). There are in excess of 100,000 new strokes per annum in the UK and 1,200,000 stroke survivors (the Stroke Association Statistics). Despite new onset visual impairment in 60% of cases, services and care for stroke survivors with visual impairment are limited. UoL's research includes pioneering studies providing evidence to underpin clinical practice and the development of research studies and national guidelines (e.g. Intercollegiate Stroke Working Party, British and Irish Orthoptic Society (BIOS), National Institute for Health and Care Excellence, Scottish Intercollegiate Guidelines Network). A key impact of the University of Liverpool VISION unit's research has been change to clinical practice guidelines, services and education, benefitting stroke survivors and their families, orthoptists, ophthalmologists, stroke physicians, occupational therapists and physiotherapists.

National and international guidelines:

Rowe leads the vision group for the national Intercollegiate Stroke Working Party and her research on prevalence/incidence of PSVI, assessment and management led to a fully revised, evidence-based vision section in the 2016 National Clinical Guidelines for Stroke [5.1].

"Because of the case she [Prof Rowe] made for the first time in 2016 we included a separate section on vision in stroke." (National Clinical Director for Stroke, NHS England, 2019) [5.2.1]. Rowe was the vision advisor on the 2013 guideline panel for the National Institute for Health and Care Excellence (NICE) stroke rehabilitation in adults [5.3], which focused on producing evidence-based clinical practice guidelines to improve the quality of NHS patient care. As a result of her involvement, NICE guidelines changed to include new recommendations on referral and management of stroke-related vision problems.

Rowe's research informed a professional body consensus statement by BIOS outlining the orthoptic staffing requirements for acute stroke units and recommendations for vision assessment and management [5.4]. Rowe co-wrote the BIOS professional practice guidelines for extended clinical practice in stroke [5.5] documenting the essential and desirable requirements for stroke care provided by orthoptists. These documents have been used by NHS Trusts [5.2] to support the development of new vision stroke services and maintenance of existing services. A survey published by Rowe in 2010 found integrated stroke-vision services had increased from 45% of units to above 80% in the prior 10 years).

"We utilised many of the studies and reviews that Prof Rowe has published in order to evidence the need for orthoptic input into the Stroke service, as part of our successful business case." (Lead Stroke Orthoptist, St Helens and Knowsley Teaching Hospitals NHS Trust) [5.2.2].

We have provided the evidence underpinning incidence and prevalence figures for PSVI and the types of visual conditions that occur. UoL's findings are cited worldwide [5.2.10].

Service provision and international reach:

The VISION unit's research highlights the need for better identification, specialist assessment and management of PSVI. Identification of gaps in evidence led to the development of the Rowe (VIS) screening form, which is now routinely used by BIOS and orthoptists across the UK in their stroke services which has improved the detection of PSVI [5.2, 5.6].

Rowe contributed to writing the BIOS stroke care pathway [5.7] which was changed to reflect the evidence provided by Rowe's research and provide improved signposting for patient care. In recognition of the limited scope of the BIOS pathway to acute care, Rowe led a national team to develop a wide-reaching process pathway to capture stroke-vision problems at all stages from pre-hospital care to post-stroke community care [5.8].

Gaps in evidence also informed the development of research commissioned by the Stroke Association, which comprehensively outlined key needs of stroke survivors with visual impairment. In this report [5.9] and related publications, Rowe outlined the key features of an exemplar stroke vision service, UK-wide professional clinician responses on assessment methods, management options and information resources. In recognition of outstanding contributions to stroke and vision services, BIOS awarded Rowe a national service recognition award in 2015.

Assessment at 6 months post stroke is a component of the National Stroke Strategy, and visual problems now form one facet that is encompassed in such checks; for example, inclusion in the Greater Manchester Stroke Assessment Tool (GMSAT). This research has reach beyond the UK. For example, groups in Australia, USA, India, Norway and the Netherlands have sought to improve their screening for PSVI and have adopted UoL's VISA screening with language translation where needed.

"I then applied for funding for a national network on vision and stroke [now agreed NOK5,000,000, ~GBP5,000,000]. Fiona is on the steering committee and part of some of the working groups. We are using her research to build our cases and compare findings to see if we can structure things similarly". (Associate Professor, NorVIS study) [5.2.3].

Resources and education:

Rowe is an international expert advisor for PSVI, advising BIOS, Department of Health, UK Stroke Association, and Royal National Institute for the Blind (RNIB). UoL's research has been widely disseminated at RNIB and Stroke Association national education events and conferences with impact at individual practitioner level. For example, feedback from a clinician at the Northern Ireland Multi Agency Stroke Team conference in 2016:

"This has changed my practice for the future by making me more aware....I was surprised to hear what a large percentage of stroke patients do have visual problems post stroke." [5.2.11]

Rowe has overseen the writing of Stroke Association and RNIB stroke/vision information factsheets [5.10] which remain key download documents from their websites. Rowe has developed a range of resources for clinical practice and for patients which are used widely (247 department downloads; 23/06/2020) in the NHS (www.vision-research.co.uk).

"If we didn't have access to any of Fiona's resources, it's quite possible that ECLO's would not see so many patients that had had strokes, stroke survivors wouldn't have resources specific to them, and possibly wouldn't know that they were even there, people would slip through the net". (Clinical Lead for the Eye Clinic Support Team, RNIB) [5.2.4].

5. Sources to corroborate the impact

Each source listed below provides evidence for the corresponding numbered claim made in section 4 (details of the impact).

- 5.1 Royal College of Physicians. National Clinical Guidelines for Stroke. 2016, section 4.17. <https://www.strokeaudit.org/Guideline/Full-Guideline.aspx>
- 5.2 Written testimonials and results of a survey, 'The Impact of Providing VISION resources to healthcare professionals' (available at www.vision-research.co.uk)
 - 5.2.1) National Clinical Director for Stroke, NHS England
 - 5.2.2) Advanced Orthoptist, Lead for Stroke & Neuro Services, St Helens & Knowsley NHS Foundation Trust
 - 5.2.3) Associate Professor, Program Director Master Vision Rehabilitation, University of South-Eastern Norway
 - 5.2.4) Clinical Lead for Eye Clinic Support Team, Royal National Institute of Blind People (RNIB)
 - 5.2.5) Stroke ODN Network Manager, Greater Manchester Stroke Operational Delivery Network
 - 5.2.6) Stroke Consultant Physician, St Helens & Knowsley NHS Foundation Trust
 - 5.2.7) Head of Stroke Support, The Stroke Association
 - 5.2.8) Chair, VISable panel, Vision and Stroke Patient and Public Involvement Panel
 - 5.2.9) Associate Lecturer, University of Technology Sydney, Australia
 - 5.2.10) Results of survey: The impact of providing VISION resources to healthcare professionals
 - 5.2.11) Delegate feedback: 2016 stroke conference Northern Ireland

Contact details are available for individuals providing testimonials 5.2.3 and 5.2.4 to 5.2.8 for verification.
- 5.3 National Institute for Health and Care Excellence. Stroke rehabilitation in adults. Clinical guidelines 162, 2013, section 1.6. <https://www.nice.org.uk/guidance/CG162>
- 5.4 British and Irish Orthoptic Society. Position statement for vision services in stroke practice. 2019. On request from www.orthoptics.org.uk
- 5.5 British and Irish Orthoptic Society. Competency standards and professional practice guidelines for the extended role of the orthoptist. 2018. On request from www.orthoptics.org.uk
- 5.6 British and Irish Orthoptic Society. Stroke and neuro-rehabilitation screening and referral form. 2012. <https://www.orthoptics.org.uk/resources/clinical-advisory-group/stroke-and-neuro-rehabilitation/>
- 5.7 British and Irish Orthoptic Society. Stroke care pathway. 2018. On request from www.orthoptics.org.uk
- 5.8 **Rowe FJ, Hepworth LR, Howard C, Hanna KL, Helliwell B.** Developing a stroke-vision care pathway: a consensus study. Disability and Rehabilitation. 2020; May 29; 1-9. DOI:10.1080/09638288.2020.1768302
- 5.9 Care provision and unmet need for post stroke visual impairment. Final report. **Rowe FJ.** The Stroke Association and Thomas Pocklington Trust. 2013. https://www.stroke.org.uk/sites/default/files/final_report_unmet_need_2013.pdf
<https://www.pocklington-trust.org.uk/vision-care-for-stroke-survivors>
- 5.10 The Stroke Association vision factsheet: <https://www.stroke.org.uk/resources/visual-problems-after-stroke>
 RNIB stroke and sight loss factsheet: <http://www.rnib.org.uk/eye-health-sight-loss-and-other-conditions/stroke-and-sight-loss>