

Institution: University of Nottingham		
Unit of Assessment: 3 – Allied Health Professions, Dentistry, Nursing and Pharmacy		
Title of case study: Transforming community-based rehabilitation for stroke survivors		
Period when the underpinning research was undertaken: 2010-2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (eg. job title):	Period(s) employed by submitting HEI:
Dr Rebecca Fisher	Principal Research Fellow	2007-Present
Prof Marion Walker	Professor of Stroke Rehabilitation	1997-2020
Period when the claimed impact occurred: August 2013 – July 2020		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact</p> <p>Our sustained programme of research provided the expert evidence to drive improvements of community-based stroke care policy, enhancing the delivery of stroke care in the UK, Canada, USA, Malaysia and Singapore, and thereby improving the lives of thousands of stroke survivors each year.</p> <p>Our research provided the expert consensus for Early Supported Discharge services and for community rehabilitation and delivery of post-stroke health reviews, overcoming challenges faced in delivery of effective rehabilitation in practice. This has informed NHS England policy and international guidelines, and has facilitated improvement of performance monitoring, service specification development, and NHS staff training. Globally, our research underpins many of the essential advancements in community-based stroke care.</p>		
<p>2. Underpinning research</p> <p>Stroke is the leading cause of long-term disability in England. The recovery process for stroke survivors can take years, with the transfer from hospital to home being a particularly challenging time. National clinical guidelines, based on randomised controlled trial evidence, recommend the provision of community-based stroke rehabilitation and six-month follow-up reviews following stroke (Langhorne et al. 2017. Cochrane Database Syst Rev; 7:CD000443). However, implementation of these in practice has proved challenging, with uncertainty about what models of care to provide, and stroke survivors still not getting the care they require. Implementation of the current NHS Long Term Plan is informed by our research and prioritises the provision of stroke rehabilitation and community-based care.</p> <p>Our implementation research has been designed to investigate how stroke rehabilitation interventions operate in 'real world' settings. Key parts of this research have focused on: the requirement for defined core components of stroke services; the evaluation of Early Supported Discharge (ESD) - a multidisciplinary team intervention that supports accelerated transfer of stroke survivors from hospital and provides intensive rehabilitation in a patient's home; and the development of an evidence-based Post-Stroke Checklist to facilitate effective routine follow-up and appropriate onward referral of stroke survivors.</p> <p>Identification of core components of stroke services: The aim of this research was to obtain clarity on the core components of effective, evidence-based ESD and community stroke services (e.g. team composition, models of service operation, effectiveness measures). We used a modified Delphi approach with an international group of stroke experts to create consensus documents [1,2]. We then investigated challenges and enablers to adoption and provision of ESD in practice, via qualitative work conducted with service providers, commissioners, patients and carers 'on the ground' [3,4].</p> <p>We found that rehabilitation provided in the home environment, and in a timely fashion, after discharge from hospital was valued by stroke survivors and carers [4]. We identified challenges faced by NHS staff and stroke survivors, which we highlighted as being amenable to service improvement initiatives. Key issues identified were collection and sharing of data by teams, and difficulties with communication between service providers [3].</p> <p>Real-world evaluation of ESD: To investigate whether the benefits of ESD, as suggested by clinical trials, are realised in practice, we carried out a comparative cohort study of local ESD services. Patients who accessed services as defined by our consensus documents experienced reduced length of hospital stay and accelerated recovery, compared to those that did not [5].</p>		

Our NIHR Health Services and Delivery Research (HS&DR) 'WISE' study [6,7] investigated the effectiveness of implementing ESD at scale across six sites in England and included analysis of Sentinel Stroke National Audit Programme (SSNAP) data from 31 teams (6,222 patients). Adopting our consensus-defined core components of ESD was shown to be associated with providing a service that is more responsive (time to first contact) as well as more intensive (frequency of contact). The challenges and successes experienced by ESD services were also explored, in particular differences operating in rural versus urban sites and means of improving communication between services [6].

Post-Stroke Checklist: We developed the Post-Stroke Checklist (PSC) [8] as part of the Global Stroke Community Advisory Panel (GSCAP – a multi-disciplinary group of international stroke experts). This comprises an internationally relevant, easy-to-use, evidence-based tool for identification of ongoing problems after stroke and facilitation of onward referral. The PSC aimed to address the problem of fragmented long term care for stroke survivors and to help care professionals identify post stroke problems amenable to treatment and referral.

3. References to the research (University of Nottingham UoA3 researchers in bold)

1. **Fisher RJ**, Gaynor C, Kerr M, Langhorne P, Anderson C, Bautz-Holter E, Indredavik B, Mayo N, Power M, Rodgers H, Morten Rønning O, Widén Holmqvist L, Wolfe C, **Walker M**. A consensus on stroke Early Supported Discharge. *Stroke*. 2011. 42:1392-1397. DOI: 10.1161/STROKEAHA.110.606285 (<https://ahajournals.altmetric.com/details/418636/research-highlights>).
2. **Fisher RJ**, **Walker MF**, Golton I, Jenkinson D. The implementation of evidence-based rehabilitation services for stroke survivors living in the community. The results of a Delphi consensus process. *Clin Rehabil* 2013. 27(8): 741-749. DOI: 10.1177/0269215512473312
3. **Chouliara N**, **Fisher RJ**, Kerr M, **Walker MF**. Implementing evidence-based stroke Early Supported Discharge services: a qualitative study of challenges, facilitators and impact. *Clin Rehabil*. 2014. 28(4): 370-377. DOI: 10.1177/0269215513502212
4. **Cobley CS**, **Fisher RJ**, **Chouliara N**, Kerr M, **Walker MF**. A qualitative study exploring patients' and carers' experiences of Early Supported Discharge Services after stroke. *Clin Rehabil*. 2013. 27(8): 750-757. DOI: 10.1177/0269215512474030
5. **Fisher RJ**, **Cobley C**, **Potgieter I**, **Moody A**, **Nouri F**, Gaynor C, **Byrne A**, **Walker MF**. Is Stroke Early Supported Discharge still effective in practice? A prospective comparative study. *Clin Rehabil*. 2016. 30(3): 268-276. DOI: 10.1177/0269215515578697
6. **Fisher R**, **Chouliara N**, **Byrne A**, Lewis S, Langhorne P, Robinson T, Waring J, Geue C, Hoffman A, Paley L, Rudd A, **Walker M**. What is the impact of large-scale implementation of stroke Early Supported Discharge? A mixed methods realist evaluation study protocol. *Implement Sci*. 2019. 14:61. DOI: 10.1186/s13012-019-0908-0
7. **Fisher R**, **Chouliara N**, **Byrne A**, Lewis S, Paley L, Hoffman A, Rudd A, Robinson T, Langhorne P, **Walker M**. Effectiveness of Stroke Early Supported Discharge: Analysis from a National Stroke Registry. *Circulation: Cardiovascular Quality and Outcomes*. 2020;13:e006395. DOI: 10.1161/CIRCOUTCOMES.119.006395
8. Philp I, Brainin M, **Walker MF**, Ward AB, Gillard P, Shields AL, Norrving B; Global Stroke Community Advisory Panel. Development of a poststroke checklist to standardize follow-up care for stroke survivors. *J Stroke CerebrovascDis*. 2013; 22:e173–e180. DOI: 10.1016/j.jstrokecerebrovasdis.2012.10.016

Awards: (Chief Investigator (Chi))

NIHR HS & DR GBP618,548.90 *What is the impact of large scale implementation of stroke Early Supported Discharge?* 2017-2020 **Fisher (Chi)**, **Walker (co-investigator)**

Stroke Association HRH The Princess Margaret Senior Lectureship Award Stroke Association: GBP221,943 2016-2021. **Fisher (Chi)**

Chest, Heart and Stroke Scotland GBP36,015 *Implementation of Stroke Early Supported Discharge in Scotland*. 2017-2019 **Fisher(Chi)** **Walker (Co-Investigator)**

East Midlands Academic Health Science Network GBP356,812 *Stroke Rehabilitation Theme*. 2013-2016 **Fisher, Walker**

East Midlands Health Innovation Education Cluster GBP41,420 *An implementation programme to facilitate evidence based community stroke care. 2012-13 Fisher, Walker*

4. Details of the impact (number=research reference in section 3, letter=evidence source)

Research at Nottingham has transformed delivery of community-based stroke care and rehabilitation improving the efficiency of service and quality of care, nationally and internationally. The identification of core components of service provision, evaluation of Early Supported Discharge services in practice, and creation of the Post-Stroke Checklist has resulted in significant impacts, highlighted below:

Regional Impact

Improved provision and access to services

Our two-year quality improvement programme in the East Midlands, funded by the East Midlands Academic Health Science Network (EMAHSN) using the consensus findings and evidence-based core components of services [1,2], facilitated the commissioning and provision of community stroke services. The programme's 'Provision of care pathways' 2015 report [a] identified gaps and inequities in community-based service provision in the East Midlands (n=5,063 patients-per-annum, 2015-16 Sentinel Stroke National Audit Programme (SSNAP) data), which informed regional Chief Executive Officers, East Midlands Clinical Commissioning Groups, and 36 UK Strategic Clinical Networks [a]. Between April 2014 and October 2016, adoption of our Early Supported Discharge and Community Stroke Rehabilitation service specifications [a] were promoted to providers and commissioners of nine teams (n=1,200 patients, 2015-16 SSNAP data) across the East Midlands. As reported by the Chartered Society of Physiotherapists, the adopted model was based on our evaluation of Nottinghamshire based services that showed substantial benefits to stroke patients, including improved activities of daily living [b]. Our work also informed other regional specifications (London and Cheshire & Merseyside) [c], and provided evidence-based guidance and performance monitoring to a further 29 ESD teams treating a total of 2,272 stroke patients-per-annum according to 2015-16 SSNAP data.

Improvements in care practices

In 2015, we delivered a bespoke series of multidisciplinary training workshops for 9 community stroke teams across the East Midlands. Workshop topics included collection and sharing of data to monitor performance and improving communication between services, addressing challenges highlighted by our research [2,3]. The vast majority of participants (94% of n=66 community stroke team staff) reported that they were able to significantly apply their learning to their work [a – Stroke Rehabilitation Programme Impact Report p11]. Staff implemented specific evidence-based service improvement goals, as evidenced in multidisciplinary team project reports from Derbyshire, Leicestershire, Lincolnshire, and Northamptonshire [a], directly impacting on provision of care.

National Impact

Development of policy and practice: NHS England rehabilitation pilots

In April 2020, Fisher was appointed the National Rehabilitation and Life After Stroke Workstream lead, with NHS England & NHS Improvement (NHS E&I) Clinical Policy Unit. This was in recognition of Fisher being an established national leader in stroke care. She was a member of the commissioning guidance for rehabilitation working group and her team's research has informed the national commissioning guidance [d], clinical guidelines [d] and national and regional stroke care improvement [e,f]. Fisher and Walker led a task and finish group to produce a National Integrated Community Stroke Rehabilitation service specification [e], detailing team composition, intervention delivery and performance monitoring informed by the research [3,4,5]. In August 2020, this specification was circulated to 20 new Integrated Stroke Delivery Networks (n=29,773 stroke patients from 2019-20 SSNAP data) covering all CCGs in England [f]. The National Clinical Director for Stroke, NHS E&I, confirmed that "*Dr Fisher's research has informed gap analysis and improvement plans as part of implementation of the NHS Long Term plan.*" [f] The NHS Long Term Plan sets out the actions to improve care, with stroke services being one area of focus.

Findings from the NIHR 'WISE' study (n=6,222 patients), providing further evidence for the importance of adopting evidence-based core components [5,6,7], have also been critical in developing plans for the NHS England rehabilitation pilot initiative. Launched in November 2020, this programme has supported evidence-based community stroke rehabilitation service provision across England [f]. Our research *"will inform evaluation of the effectiveness of the rehabilitation pilots and ultimately how the performance of services across the country are monitored"* [...] *"This will have a beneficial effect on outcomes for stroke survivors and, crucially, will address geographical inequities."* National Clinical Director for Stroke, NHS E&I [f]. In October 2020, Fisher was appointed Associate Director of the Stroke Audit Programme to implement improved national performance monitoring informed by our research [5,7].

Reducing the impact of Covid-19

To support community stroke services across England during COVID-19, since April 2020, Fisher chaired a weekly, (now monthly) national community stroke on-line meeting with 60 regional stroke care leads to maintain evidence-based stroke services. Fisher also co-authored guidance on the restoration and recovery of stroke services during the pandemic [g]. Fisher, Walker and others produced a UK and Ireland statement on provision of evidence-based ESD and community stroke services during COVID-19 [g], highlighted in global and national webinars and endorsed by the World Health Organisation [g]. These activities emphasised the importance of continued stroke therapy provision [g].

Improved monitoring and access to services: NHS Scotland

In a successful collaboration with the Scottish Stroke Care Audit (SSCA) team and the Scottish Stroke Improvement Programme, in 2018 University of Nottingham-led researchers mapped services for stroke survivors in Scotland using consensus and evaluation findings [1,2,5]. Findings from the project were written up in the Implementation of Community Stroke Rehabilitation in Scotland report and *"were discussed at the National Advisory Committee for Stroke (NACS in April 2019) [...]. As a consequence of this work, community rehabilitation services were featured in the SSCA national audit report for the first time, raising awareness of service provision. The report was circulated to stroke managed clinical networks in Scotland and used to stimulate service improvements e.g. addressing inequality in access to services."* Strategic Lead, Scottish Stroke Allied Health Professionals Forum [h].

International Impact

Our research has also informed stroke guidelines issued by the Health Quality Ontario Ministry of Long-Term Care in 2016, and the American Stroke Association in 2019, informing international recommendations for ESD provision in Canada and USA [i].

International impact improved delivery of care: Post-Stroke Checklist

The Post-Stroke Checklist (PSC) [8], published in 2012 and subsequently endorsed by the World Stroke Organisation (a global network of over 3,200 individuals from 92 countries and scientific and stroke support organizations from 49 countries) and the Canadian Stroke Network, is used by clinicians worldwide to improve stroke survivor follow-up and care. The PSC helps stroke survivors and professionals identifying changes and problems so that they can be effectively treated [j]. The PSC has been shown to have particular utility in offering a standardised approach to delivery of six-month reviews after stroke (as recommended by NHS England [j]) to ensure longer term support for stroke survivors. The PSC has been translated into other languages including Malay, Chinese, German and Finnish.

Use in Malaysia (2016) and Singapore (2018) has demonstrated the feasibility and utility of the PSC in identifying long-term stroke care needs in clinical practice, with feedback from patients and clinicians indicating a high level of satisfaction. Email contact with a Rehabilitation Medicine Specialist, Universiti Kebangsaan Medical Centre, Malaysia (2016) confirmed *"We use it on our stroke patients during most follow-up outpatient clinics... I find that the checklist is useful to train the new medical officers in our team so as not to miss out any main important points in post-stroke care"* [j]. A further email exchange with an Advanced Practice Nurse, National University of Singapore stated *"We use this checklist in our outpatient stroke clinic. The Singapore National Stroke Association advocate the use of this tool to empower patients and family members to self-monitor for post-stroke complications"* [j].

In summary, our research in developing specifications for service delivery, raising awareness of gaps in service delivery, and creation of improvement initiatives is transforming the lives of survivors of stroke.

“Oh, yes. Yeah. Far better. ...The thing about the hospital, you did probably half an hour a day ... with the physio, which wasn't enough” “And certainly I wouldn't be where I am now as far as improvement if it wasn't for the ESD team.”

(Stroke survivor receiving ESD (2019) [6]).

5. Sources to corroborate the impact

A. East Midlands impact

East Midlands Academic Health Science Network Stroke Rehabilitation Resources [weblink](#)

B. Nottinghamshire ESD service impact

Physiotherapy works: Stroke. Chartered Society of Physiotherapy, 2018 pp 5,6 [weblink](#)

C. Other regional service specifications for Early Supported Discharge

-London [weblink](#) pp2,5 and Cheshire and Merseyside Strategic Clinical Network Service Specifications for Early Supported Discharge (2015) [weblink](#) pp 1,3,7

D. National Commissioning Guidance and Clinical Guidelines

- NHS England Commissioning Guidance for Rehabilitation (2016). Publications Gateway Ref. No. 04919. pp 36. [weblink](#)

- NHS RightCare Pathway: Stroke (2017). NHS-RightCare-Pathway-Stroke-2017 [weblink](#)

- Transition between inpatient hospital settings and community or care home settings for adults with social care needs. NICE guidelines [NG27] (2015). pp 194, 201, 324 [weblink](#)

- NIHR Roads to Recovery (2017) pp 51, 62, 63 [weblink](#)

E. National Rehabilitation & Life after Stroke Workstream Lead

- National Integrated Community Stroke service specification (2020).

F. National Clinical Director for Stroke Testimony

G. Reducing the Impact of Covid-19 on Stroke Care

- British Society of Stroke Physicians and Oxford Academic Health Science Network stroke service guidance: pp 1, 8 [weblink](#); (webinar [weblink](#)).

- Statement on the rationale for maintaining Early Supported Discharge and Community Stroke services during COVID-19 outbreak – A UK and Ireland collaborative [weblink](#)

- World Health Organisation webinar. [weblink](#)

H. NHS Scotland-Scottish Stroke Improvement Programme

- Strategic Lead, Scottish Allied Health Professionals, Testimony

- Implementation of Community Stroke Rehabilitation in Scotland: Chest Heart and Stroke Scotland Action research. Executive Summary report (2019)

-NHS National Services Scotland. Scottish Stroke Improvement Programme 2019 National Report. (pp.35, para 2-5 'Rehabilitation') [weblink](#)

I. International policy and guidelines

-American Stroke Association Policy Statement (2019). Recommendations for the Establishment of Stroke Systems of Care. Stroke. 50:e187–e210 p197,208,209

DOI10.1161/STR.000000000000173 Cited in item114. [weblink](#)

-Health Quality Ontario; Ministry of Health and Long-Term Care. Quality-based procedures:

Clinical handbook for stroke (acute and postacute). Toronto: Health Quality Ontario; 2016 December. Cited pp 87, 130. [weblink](#)

J. Post-Stroke Checklist endorsements

- World Stroke Organisation [weblink](#), Canadian Stroke Network: [weblink](#)

- NHS England Practical Guidance 2019-20: Six Month Reviews, Item 21, p16,17 [weblink](#)

- Email testimonies from stroke practitioners using the Post-Stroke Checklist.