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Research Article

Development and description of Early Stroke Specialist Vocational Rehabilitation delivered in the RETAKE trial

Kathryn A Radford[1,2*] Mary I Grant[1] Jain A Holmes[1] Julie Phillips[1] Kathryn Powers[1] Rachel L Chambers[3] Kristelle Craven[1] Brian Bell[1] Christopher McKevitt[3] David Clarke[4] Amanda Farrin[5] Diane Trusson[1] Caroline Watkins[6] Audrey Bowen[7] Ellen Thompson[5] Alexandra Wright-Hughes[5] and on behalf of the RETAKE Research Group

[1]Centre for Rehabilitation and Ageing Research, School of Medicine, University of Nottingham, Queens Medical Centre, Nottingham, UK
[2]Nottingham Biomedical Research Centre, Nottingham, UK
[3]School of Population Health and Environmental Sciences, King's College London, Strand, London, UK
[4]Academic Unit of Ageing and Stroke Research, Leeds Institute of Health Sciences, University of Leeds, Leeds, UK
[5]Clinical Trials Research Unit, University of Leeds, Leeds, UK
[6]School of Nursing and Midwifery, Faculty of Health and Care, University of Central Lancashire, Preston, UK
[7]Division of Psychology & Mental Health, University of Manchester, Manchester, UK

[*]**Corresponding author** Kathryn.Radford@nottingham.ac.uk

Disclaimer: This report contains transcripts of interviews conducted in the course of the research, or similar, and contains language that may offend some readers.

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Abstract

Objective: This paper describes the development of an Early Stroke Specialist Vocational Rehabilitation intervention to support return to work following stroke and its delivery in the RETAKE trial.

Methods: Iterative three stage, target population approach to intervention development and evaluation informed by the Medical Research Council Framework. Stage 1 (Initial codevelopment): interviews with key stakeholder service providers and users' and mapping of services supporting return to work after stroke to identify and explore barriers to and unmet needs for support; intervention codevelopment with experts and patient and public involvement (PPI). Stage 2 (Refinement): expert panel codevelopment workshops and systematic review to identify vocational rehabilitation intervention mechanisms of change in supporting return to work after stroke. Stage 3 (Testing): intervention piloting in two case studies, feasibility testing in a randomised controlled trial, acceptability interviews with stroke and employer participants. Further intervention refinement following delivery in the RETAKE randomised controlled trial.

Results: Stage 1: service mapping and 25 stakeholder interviews identified service gaps and unmet needs relating to early identification of employed stroke survivors, mild stroke, and hidden disabilities. Access to timely support relied on geographical proximity to a specialist hub and tacit knowledge of complex health, education and employment services and provider roles. Return to work issues reported by stroke survivors informed Early Stroke Specialist Vocational Rehabilitation prototype design objectives. Iterative developments following piloting included fatigue management, involvement of general practitioners, work simulation and liaison with other healthcare services. Interviews with 12 recipient stroke survivors and 6 employers identified additional features including occupational therapist negotiation skills, ability to respond to changing needs over time and patient empowerment to self-re-refer. The review corroborated intervention components and mechanisms and identified additional mechanisms, for example, peer support, supported self-management.

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Intervention mechanisms identified across the three stages were early intervention, understanding the impact of stroke on the person, their job and work environment, vocational goal setting, implementing workplace accommodations, individual tailoring, work preparation, colocation, case co-ordination, Multidisciplinary Team (MDT) working, employer engagement and education, and responsiveness, which involved monitoring work stability, providing feedback, and responding to changing needs over time and participant self-re-referral.
In RETAKE, Early Stroke Specialist Vocational Rehabilitation was successfully delivered to 95.4% of allocated participants with 75.3% compliance. Intervention commenced a median 38 days (interquartile range 23–56, range 6–216) post stroke and continued for ≤ 12 months. Participants had a median seven intervention sessions (interquartile range 4–12, range 0–37), with discharge a median 10.3 months (interquartile range 5.5–12.0, range 0–15.4) post randomisation. Most intervention sessions were delivered via telerehabilitation (51.7%), in participants' homes (35.9%) or workplaces (6.4%). There was little difference between the number of sessions offered [mean 9.6 (standard deviation 7.46, range 0–39)] and attended [mean 9.0 (standard deviation 7.16), range 0–37]. However, occupational therapist contact with employers only occurred for 109 (36.8%) participants and employer visits occurred for 74 (25.0%). The Early Stroke Specialist Vocational Rehabilitation focus changed between the feasibility and definitive trial, with greater emphasis on current issues, fatigue management and informal psychological support, possibly due to the coronavirus disease discovered in 2019 pandemic.
A programme theory and logic model illustrating the refined intervention and a description of Early Stroke Specialist Vocational Rehabilitation delivered in the RETAKE trial is reported.
Conclusion: This comprehensive description of Early Stroke Specialist Vocational Rehabilitation will enable occupational therapists to implement Early Stroke Specialist Vocational Rehabilitation in practice and facilitative future evaluation.
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Background

More than 110,000 strokes happen each year,[1] with increasing incidence in younger people and those of working age.[2,3] Almost two-thirds leave hospital with a disability,[4] which may impact employment. Working age stroke survivors are 2–3 times more likely to be unemployed.[5]

Stroke policy and clinical guidelines advocate the need for vocational rehabilitation (VR);[6–9] VR involves helping people return to/remain in work, and helping those in work who are struggling[10] as well as exploring alternatives to pre-stroke job roles or unemployment.

Community stroke rehabilitation services increasingly offer VR.[11] However, many stroke survivors fail to access this support. For some their work rehabilitation needs go undetected and hidden disabilities such as visual or cognitive impairments and fatigue are missed.[12,13] This, in combination with impairment, focused (rather than needs led) criteria for accessing community rehabilitation can leave them unable to access VR support.[14] Where they do, this is often time-limited or fails to engage employers.[11] Moreover, supporting return to work (RTW) is not always perceived within the remit of healthcare professionals.[14,15] Stroke survivors themselves sometimes do not realise the impact of stroke on their workability until they attempt to RTW.[13] Without VR support, they may experience job loss, affecting physical, emotional, and financial well-being and quality of life.[16,17]

We developed an Early Stroke Specialist Vocational Rehabilitation (ESSVR) intervention to support RTW after stroke and tested it in a single-centre feasibility trial,[18] followed by a multicentre, definitive randomised controlled trial (RCT) to determine the clinical and cost-effectiveness of ESSVR.[19]

Medical Research Council (MRC) guidance for developing and evaluating complex health interventions[20] calls for iterative, cyclical intervention development, drawing on research evidence, and the lived experiences of the intended intervention end users (service providers and patients). Adequate descriptions of interventions (including their development and implementation) can aid rapid translation into clinical practice.

Aims

This paper describes the development of ESSVR and its delivery in the RETurn to work After stroKE (RETAKE) trial[21] (ISRCTN12464275). Trial results are reported elsewhere.[22]

Objectives

The objectives of the intervention development work were to: (1) identify the support needs, issues and challenges stroke survivors face in returning to work; (2) identify gaps in existing service provision; (3) codevelop and test an intervention for supporting RTW after stroke; (4) identify key intervention features (process, components and mechanisms) to address VR needs; 5) determine whether ESSVR can be delivered, its acceptability to stroke survivor and employer participants and adaptations necessary prior to effectiveness testing; 6) generate a logic model and programme theory to illustrate and explain how the intervention works; 7) describe the intervention delivered in the RETAKE Trial (see *Table 1*).

The intervention development is reported using 'Guidance for reporting intervention development studies in health research'[25] and the intervention description follows Template for Intervention Description and Replication (TiDier)[24] (see *Report Supplementary Materials 1 and 2*).

Methods

The intervention was developed iteratively using a target population approach[26] informed by MRC guidance for developing and evaluating complex interventions.[20] It involved six steps in three stages: (1) initial codevelopment, (2) refinement and (3) testing. The steps were as follows: (1) stakeholder mapping and interviews; (2) expert codevelopment workshops; (3) case studies; (4) feasibility and acceptability testing (reported elsewhere[18]); (5) a systematic review; and (6) description of the intervention delivered in the RETAKE trial (reported elsewhere[22]).

Steps 1–3 occurred prior to the feasibility trial (Step 5). The systematic review was conducted prior to the definitive trial, when developing the RETAKE trial intervention training manual (*Figure 1*).

1. Stakeholder mapping and interview study (Step 1)

We conducted a stakeholder mapping and interview study with service providers (and users) offering support to RTW in Derbyshire. Mixed-methods and soft systems methodology[27] were used, involving non-participant observation, document analysis, stakeholder interviews and an 'engagement event'.

The interview topic guide was informed by the 'CATWOE' mnemonic (see *Report Supplementary Material 3*), a structured framework used in soft systems methodology, to explore stakeholders' perspectives or 'worldview'. This helped to explore relationships between the way services were structured their process and outcomes.

We undertook non-participatory observations of services self-identified as supporting stroke survivors to RTW and informally interviewed 'key stakeholder' service providers in these services. Key stakeholders were those who knew most about how the service supported 'return to work after stroke'. We used snowball sampling to identify other services and key stakeholders. We took detailed field notes and gathered information about the services that was in the public domain, for example patient information

TABLE 1 Objectives and methods

Objectives	Methods	Stage, Step
1. Identify support needs, issues and challenges faced by stroke survivors in returning to work	Stakeholder interview Mapping	Stage 1, Step 1
2. Identify gaps in existing service provision	Mapping	Stage 1, Step 1
3. codevelop and test an intervention for supporting RTW after stroke	Case studies and expert codevelopment workshops	Stage 2, Step 2 and Stage 3, Step 3
4. identify key intervention features (process, components, and mechanisms) to address VR needs	Case studies, codevelopment workshops, feasibility trial interviews and systematic review	Stage 2, Steps 2 and 5 and Stage 3, Steps 3 and 4
5. To determine whether ESSVR can be delivered, its acceptability to stroke survivor and employer participants and adaptations necessary prior to effectiveness testing	Feasibility trial	Stage 3, Step 4
6. Generate a logic model and programme theory to illustrate and explain how the intervention works	Iterative development in discussion with research team, drawing on findings from all stages.	Stages 2 and 3
7. Describe the intervention delivered in the RETAKE trial.	Mixed-method data collection as described in the protocol[21,23] reported using the TiDieR template[24]	Stage 3, Step 6

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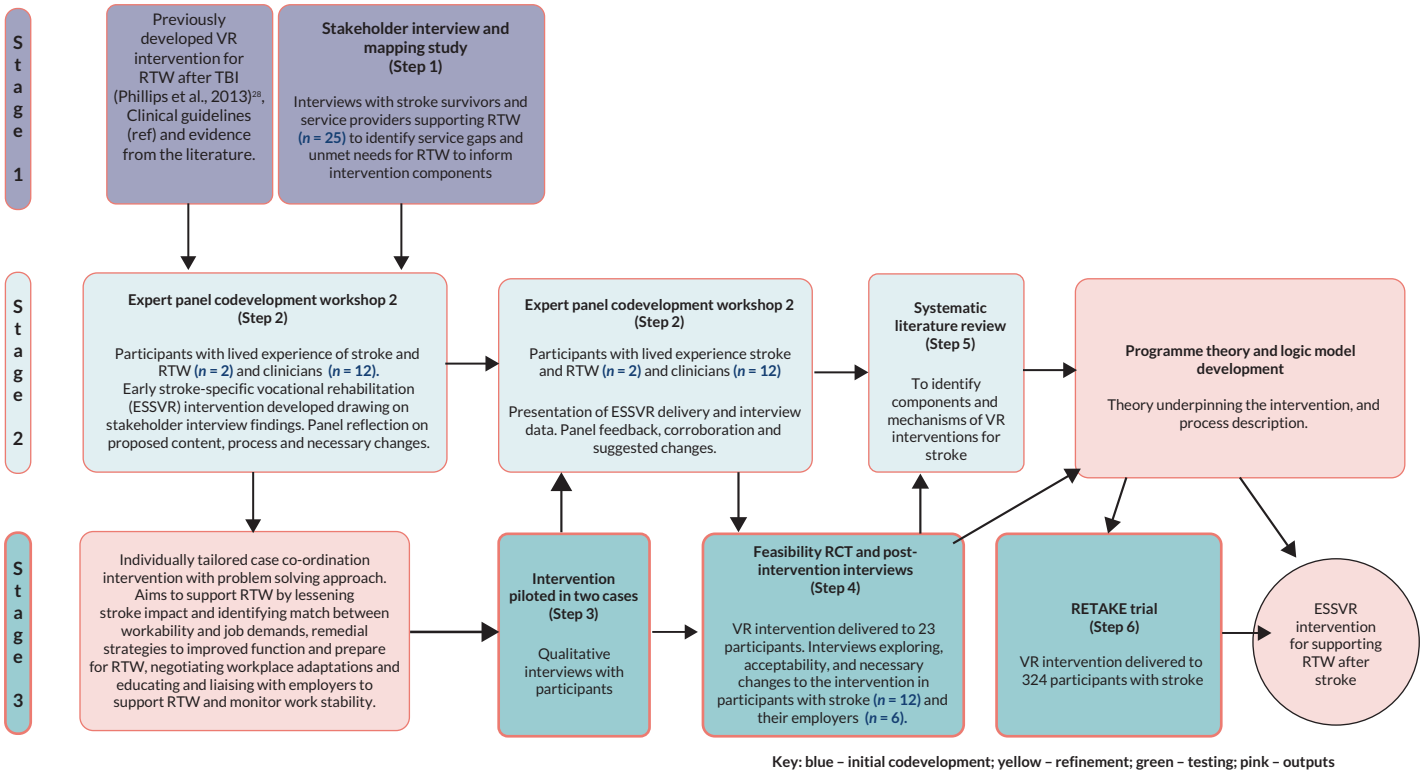

FIGURE 1 Steps and stages involved in ESSVR development.

leaflets, online service descriptions and analysed these alongside the field notes. This enabled us to create an operational definition of each service, explaining what it did for whom. Data from the different sources were triangulated to create a rich picture of existing support for 'return to work after stroke' (e.g. service managers, OTs), in one English county, including identifying unmet needs and gaps in service provision.

We presented Initial findings to invited stakeholders at an engagement event and used their feedback to ratify findings and correct any misinterpretation. This study is described more fully elsewhere.[14]

2. Expert panel codevelopment workshops (Step 2)

An expert panel (n = 14) was formed to guide intervention development. The panel consisted of two stroke survivors with experience of working in the public and private sectors and other local and national experts in stroke and VR. They included 10 experienced occupational therapists (OTs) working in either the UK National Health Service (NHS), private sector or research, an NHS rehabilitation medicine consultant and a speech and language therapist.

The panel met twice to (1) reflect on the initial intervention design, (2) suggest changes based on delivery in two case studies, and (3) signpost to relevant literature and advise on stroke relevant adaptation to a form developed for recording and describing a traumatic brain injury specific VR intervention.[29] This form was subsequently used to record the intervention content delivered in both feasibility[18,30] and definitive RETAKE RCTs.[21]

3. Case studies (Step 3)

The prototype intervention was delivered to two stroke survivors, recruited from an acute stroke unit, aged 16 plus, who were employed at stroke onset. Intervention delivery, documented in three stages (early recovery, graded RTW, job retention) was presented to the expert panel for ratification and feedback. Case study participants were invited to participate in a semi-structured interview with an independent researcher, exploring the impact of stroke, the journey to return work, the timing and content of support received, whether it met their needs and suggested improvements.

4. Feasibility trial (Step 4)

To test the feasibility of delivering ESSVR and measuring its effects and costs we conducted a single site feasibility trial (ISRCTN55406009). Forty-six stroke survivors aged 16 plus who were employed at stroke onset were recruited from an acute stroke unit and randomised to receive either ESSVR in addition to usual care (UC) or UC alone. The primary outcome was paid/unpaid employment 12 months following randomisation. Secondary outcomes

included measures of mood, function, participation, health-related quality of life and resource use, measured using standardised and bespoke postal questionnaires at 3, 6 and 12 months post randomisation. Trial outcomes are reported elsewhere.[18] Perspectives on acceptability were explored in semistructured interviews with 12 stroke survivor and 6 employer participants. Interviews explored intervention timing, employer liaison, workplace accommodations, participants expectations, elements they found useful or not and suggestions for what else might have assisted their RTW.

Following the feasibility trial, we developed a programme theory and logic model to illustrate the intervention process components and our understanding of the mechanisms[23] (see *Report Supplementary Material 4*). *Report Supplementary Material 5* reflects the iterative development and changes made at each stage. *Figure 2* shows the four-stage intervention process.

5. Systematic review (Step 5)

This review aimed to identify the components and underlying mechanisms of efficacious VR interventions for stroke survivors, to inform intervention development prior to the definitive trial. The systematic review protocol is published on PROSPERO (www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42019129884).

Pre-planned searches of CENTRAL, Campbell Database, MEDLINE, EMBASE, CINAHL, Web of Science, HMIC, PsycInfo, IBSS, ERIC and Social Policy and Practice databases was conducted from inception to 28 January 2020. Further studies were identified by hand-searching reference lists of potentially eligible studies and relevant systematic reviews. The search strategy is presented in *Appendix 1*.

Studies of any design describing and evaluating VR interventions, with primary outcomes of RTW or remaining in work (job retention) were eligible for inclusion. To be included, 50% of participants were required to be aged 18 years or over, with stroke diagnosis. We excluded studies (1) not published in English, (2) where the primary focus of the intervention was not work-related, or (3) where the primary outcome was barriers and facilitators to RTW following stroke.

One researcher (RC) searched and two (RC, KP) independently screened titles/abstracts, and assessed full texts for eligibility using EndNote.[31] Disagreements at the screening, study selection, data extraction, and quality

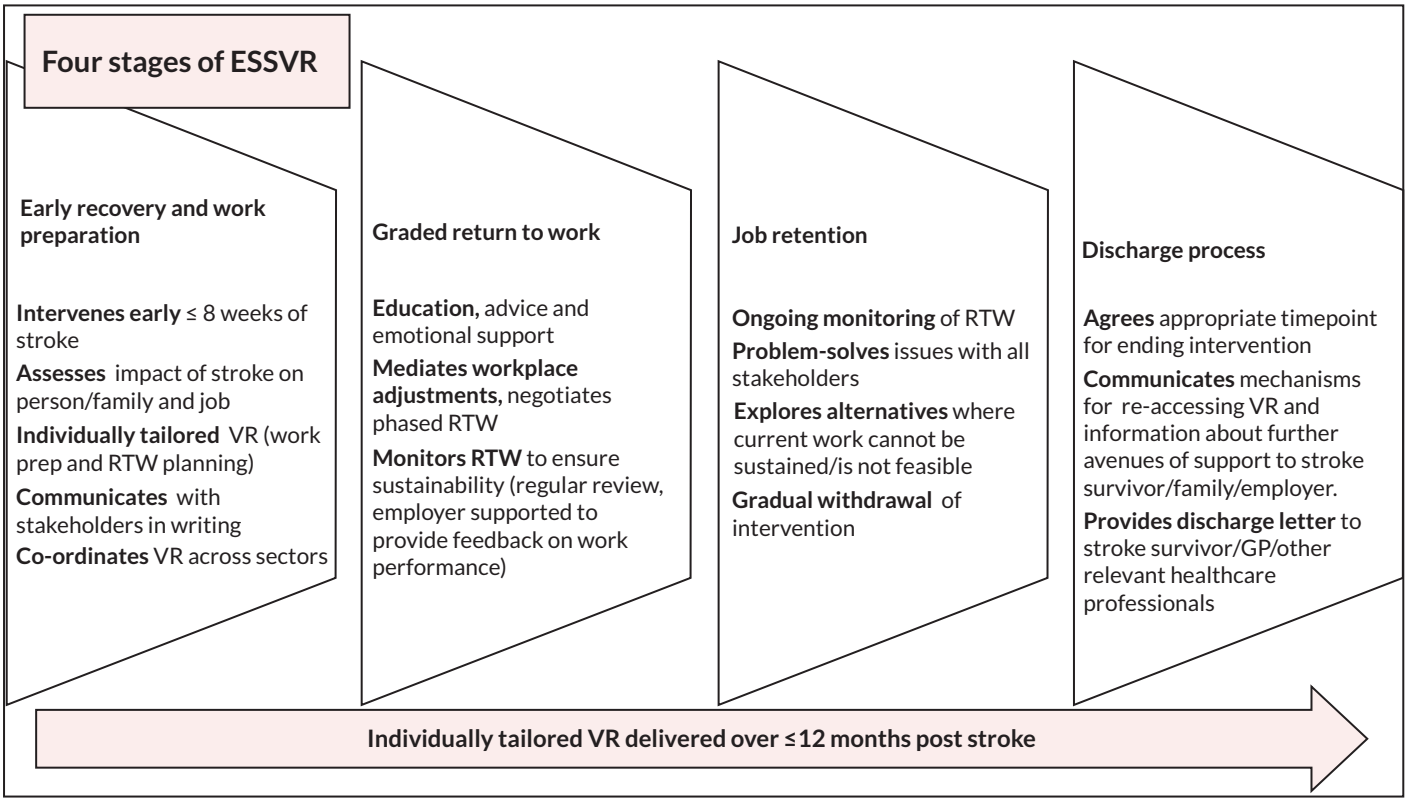

FIGURE 2 The four stages of the ESSVR intervention process. GP, general practitioner.

assessments stages were resolved through discussion with a third reviewer (BB, KR).

Three reviewers (RC, KP and JH) independently extracted data on: (1) author; (2) title; (3) country; (4) intervention aim, components, content, timing and delivery mode; (5) hypothesis, mechanisms of action; (6) implementation fidelity; and (7) delivery context; and (8) measured outcomes: VR components

Mechanisms of action were identified when reviewers attributed importance to a particular intervention component. These were extracted verbatim and mapped to a predefined list of mechanisms suggested in the literature as important for supporting RTW after stroke[32–36] (see *Appendix 2*). Where authors described new previously undefined mechanisms, these were added to the list and marked as new.

Interventions were mapped to one of four VR intervention models described by Tyerman,[37] that is (1) programmes with integrated or added vocational components, (2) VR models adapted for brain injury, (3) case co-ordination or resource facilitation, and (4) consumer directed models involving peer support, goal setting and signposting. Intervention components were extracted using definitions of vocational programme treatment components informed by Hart.[38]

Two reviewers (RC, KP) independently assessed quality using the Critical Appraisal Skills Program tools for cohort studies and qualitative studies[39,40] and Van Tulder's quality assessment system for RCTs.[41] All studies were categorised as low, medium or high quality. For CASP cohort and qualitative tools, without a scoring system, 'Yes' ratings were given two points, 'Can't tell', one point, and 'No', zero points. We then summed scores out of a total of 18 for qualitative and 24 for cohort studies and calculated the percentage. Papers scoring 0–33% were ranked as low quality, 34–66% as medium quality and 67% or over were ranked as high quality (see *Appendix 3*).

Included studies are described narratively by characteristics, components, mechanisms and outcomes.

Data analysis

Service mapping data were coded and analysed using CATWOE (see *Report Supplementary Material 3*). Data were used to create operational definitions of each service and a detailed map of services offering vocational advice or support to stroke survivors in one English county. The map reflected interservice referral pathways, and numbers of stroke patients seen each year.[14]

All interviews were recorded, transcribed verbatim and analysed thematically using NVivo, Version 10[42] 20% of transcripts were independently coded and analysed by a second researcher (KR, ES, MG, JT) to increase rigour and ensure impartiality. In the stakeholder mapping, emerging interview themes were analysed concurrently with data collection, to iteratively inform data collection and deepen our understanding of how the services worked and how/where stroke survivors' work needs were met.

For case study and feasibility trial interviews researchers met to agree a coding framework based on initial interviews, which was used to code remaining transcripts. A third researcher reviewed emerging themes and suggested subcategories and participant and employer commonality. A thematic map was created to combine the themes from trial participants and employers under four main overarching headings, 'intervention content, delivery, outcomes and future'.

7. Definitive evaluation and description of ESSVR delivered in the RETAKE trial (Step 6)

RETAKE was a pragmatic, observer-blind, multicentre RCT in 16 NHS trial centres, with embedded health economic and process evaluations. The aim to determine whether ESSVR was more clinically effective and cost-effective at supporting RTW 12 months after stroke than usual NHS rehabilitation (UC). Participants with new stroke (all severities), aged 18 plus and in paid/unpaid work prior to stroke, were recruited within 12 weeks of stroke and individually randomised, 5 : 4, to receive ESSVR + UC or UC alone. Individually tailored ESSVR was delivered by stroke-specialist OTs over 12 months. UC involved NHS rehabilitation provided by UC teams, including outpatient/community physiotherapy, speech therapy or occupational therapy, psychology and medical follow-up. The primary outcome was self-reported RTW at 12 months post randomisation, defined as a minimum of 2 hours/work/week. Secondary outcomes included measures of mood physical function, participation, productivity, work self-efficacy, health-related quality-of-life and post-stroke confidence.

The ESSVR plus UC intervention was recorded using a combination of OT completed case report forms (CRFs), mentoring records and participant self-reported resource use in postal/online questionnaires at 3, 6 and 12 months post randomisation.

Frequency duration and dose were recorded, for example from OTs' recorded time (minutes) spent on VR activities per intervention session and from their clinical record descriptions of intervention delivered.

Fidelity to ESSVR was assessed as described in the protocol.[23,43,44] Participant adherence was measured using Intervention start and end date, proportion of sessions attended of those prescribed and whether there was an agreed ending. OT adherence and factors affecting adherence were measured using a fidelity checklist.[44] Contextual factors affecting ESSVR delivery were recorded on mentoring records[45] and identified in interviews with OTs, trial participants, employers, and NHS staff as part of embedded case studies.[46]

Results

Stakeholder mapping and interview study

The service mapping identified that 'employment' was not routinely recorded at stroke onset or in the acute stroke unit. Therefore, people with milder stroke were frequently discharged without assessment of stroke impact on their ability to work. The lack of a sanctioned VR pathway resulted in disorganised and patchy provision of RTW support for stroke survivors especially for people geographically dispersed from the acute hospital specialist 'hub'. Cross-sector partnerships were tenuous and provider roles unclear. Access to support relied on service providers tacit knowledge of what was available and brokerage. Competing commissioning priorities meant supporting RTW was seen as 'non-essential'. Most services offering RTW support saw fewer than 10 patients per year. Service providers from all sectors lacked VR training.[45] These findings are reported elsewhere.[14]

The interview study included 25 people (three stroke survivors) involved in supporting RTW after stroke across different health and social care settings, occupational health, the Department for Work and Pension (DWP), education and the independent sector. Eighteen were interviewed formally, seven services were observed as part of the mapping, and the providers interviewed informally during observational visits (*Table 2*). One stroke survivor was recruited from a young stroke support group in the charitable sector, one was employed in the NHS and the third in the independent sector. Employers of two stroke survivors were also interviewed.

In interview analyses, three overarching themes were identified 'service design, delivery and resources', 'the influence of the workplace' and 'stroke survivor factors'. A description of the barriers and example quotes is given in *Appendix 4*. The interviewees highlighted some key design features for ESSVR and prerequisites for OTs involved in delivery: They said the OTs should have specialist knowledge of stroke and VR and the intervention should:

- Adopt a multidisciplinary approach and involve GPs, be individually tailored to the stroke survivor, and flexibly accommodate different stroke disability and work participation needs, intervene in a timely way, and be responsive to changing needs over time.
- Adopt a case management approach to integrate services across the NHS, social care, DWP and education. Case management is defined as 'a collaborative process which assesses, plans, implements, co-ordinates, monitors and evaluates the options and services required to meet an individual's healthcare, educational and employment needs, using communication and available resources to promote quality, cost-effective outcomes'.[47]
- Provide support and information for the stroke survivor's partner, family and employer.

TABLE 2 Characteristics of interview participants (Stage 1)

Interviewees	Formal interviews number	Informal interviews number	Total
Occupational therapists	4	2	6
Stroke survivors	3		3
Stroke co-ordinators	2		2
Clinical neuropsychologists	2		2
Speech and language therapist	1	1	2
Life skills adviser	1		1
Stroke consultant	1		1
Occupational health adviser	1		1
Stroke service commissioner	1		1
Employers	2		2
Disability employment adviser		1	1
Social worker		1	1
Stroke support worker		1	1
Education co-ordinator		1	1
Total	**18**	**7**	**25**

- Provide group peer support to build stroke survivors' confidence and prepare for work return.
- Work preparation to include fatigue management and consider 'invisible' disabilities connected with stroke.

Expert panel

Based on an initial literature search,[18] a prototype intervention was developed and presented to the expert panel in workshop 1. Panel members were asked to identify VR mechanisms and outcomes important to stroke using a 'Context, Mechanism, Outcome' matrix. They were asked to suggest structure and how to embed the VR alongside existing NHS services.

In the second workshop, we presented the two case study findings to the panel. The panel corroborated intervention components but suggested a greater focus on (1) *fatigue management* to ensure stroke survivors' work participation was sustainable; (2) *assessing the impact of comorbid medical conditions, for example diabetes, on fatigue*; (3) *liaison with GPs to discuss advice given about specific medical conditions and the timing of* RTW; (4) *employer engagement* and education with the participants consent, including *providing information;* (5) *work simulation* in the home environment to assess and prepare participants for work return; and (6) liaison *with and referral to existing healthcare services, for example orthoptists*. If direct referral was not possible, then advising participants to request GP referrals. The iterative changes to the intervention are reflected in *Report Supplementary Material 5*.

Drawing on clinical practice and existing literature, the expert panel recommended changes to the proforma developed by Phillips,[29] as described elsewhere.[30] Changes included adding 'upper limb work', 'sensory problems' and 'communication/speech' to the physical rehabilitation section; adding 'physiotherapy' and 'speech and language therapy' to the liaison section; adding 'cycle' and 'works at home' to the section on how people get to work, including 'declined intervention' to the client engagement section, and 'Voluntary work' and 'self-employed' in the outcomes section. New GP fit note categories were suggested (phased RTW, altered hours, amended duties and workplace adaptations).[48]

Case studies

Both participants were admitted for 4 days with a posterior circulation stroke (POCS) resulting in a homonymous hemianopia Participant 1 was a 69-year-old man who prior to stroke had run his own clothing retail business. He had a previous medical history of heart disease, diabetes and myocardial infarction (aged 50) and had previously been treated for kidney cancer. Participant 2 was a 58-year-old woman, who managed a chip shop. She had no previous medical history. More details of intervention delivered in these cases are reported in *Report Supplementary Material 3* and elsewhere.[18]

Only participant 1 completed the intervention. The reason for Participant 2's disengagement from the intervention and study remains unclear. Participant 1 was interviewed by an independent researcher. He suggested the intervention content, timing and duration were appropriate and particularly valued the workability assessment in relation to his job and the continuity of follow-up, as they were receiving no other rehabilitation following the stroke. Further details see *Appendix 5*.

Feasibility and acceptability testing

In 46 participants recruited between September 2010 and December 2011, the intervention was successfully deployed in 22/23 (95.7%) allocated to the intervention. At 12 months, 11 (48%) of the ESSVR intervention participants were in work compared to only 6 (26%) in UC. The effects and costs could be measured but 30.4% of primary and secondary outcome data was missing at 12 m with greater loss to follow-up in UC (39.1%).[18]

Twelve ESSVR intervention participants who were approached agreed to be interviewed and six of eight employers where the participant had consented to employer involvement, were interviewed. Two employers could not be contacted; one had left the company, and another did not respond. Five employers were women, four worked in public sector management and two in the private sector. The characteristic and job roles of stroke survivors' and employers are shown in *Table 3*.

In most cases, interviews followed intervention completion; however, five stroke survivors were interviewed before the end due to the interviewer's availability [mean 72, standard deviation (SD) 48.75, range −70 to 266 days following intervention completion].

Early Stroke Specialist Vocational Rehabilitation delivered in the feasibility RCT was reported as useful and acceptable to stroke survivor participants and their employers. Themes emerging from the interviews are described more fully in *Appendix 6* and elsewhere.[18] The main changes related to providing emotional support,

TABLE 3 Stroke survivor and employer trial participant interviewee characteristics (feasibility trial)

Number	Sex	Age	Job/role at stroke onset	Working/not at 12 m
Stroke survivors				
1	M	55–59	Foreman – private sector – F/T	Yes
2	M	55–59	Self-employed IT consultant – private sector – F/T	Yes
3	M	45–49	Self-employed – owner and only employee of small business – F/T	No
4	M	50–54	Self-employed IT consultant – private sector – F/T	Yes
5	F	45–49	Deputy office manager – public sector – F/T	Yes
6	M	70–74	Self-employed – owner and manager of small business – F/T	No (RTW then retired)
7	M	60–64	Clerical officer – small business – private sector – F/T	Yes
8	F	65–69	Voluntary work – ad hoc/P/T	Yes
9	M	75–79	Voluntary work – P/T	Yes
10	F	75–79	Voluntary work – P/T	No (RTW then retired)
11	F	45–49	Service worker – public sector – F/T	Yes
12	F	55–59	Professional – public sector – F/T	No (RTW then retired)
Employers	***Sex***		***Job role***	
1	F		Office manager – public sector	
2	F		Commercial/logistics manager – private sector	
3	F		Professional/clinical manager – public sector	
4	F		Facilities/non-clinical manager – public sector	
5			Service manager – public sector	
6	F		Human resources manager – private sector	

F/T, full time; P/T, part time.

progress monitoring, continuity and communication and individual tailoring of the intervention in relation to need and timing. A summary of changes to the ESSVR intervention following feasibility evaluation is reflected in *Report Supplementary Material 5*.

In the feasibility trial, ESSVR was ideally situated between and worked across acute and community stroke services. ESSVR involved *in-reach* to the acute stroke unit to identify stroke survivors employed at stroke onset and visit them on wards and *out-reach* to community-based health and employment services (e.g. Disability Employment Advisers at Job Centre Plus), occupational health and human resources, union representatives, disability rights advice and advocacy service (*Figure 3*). The OT was neither embedded in acute nor the community stroke teams but able to work freely across them without service constraints. Intervention commenced between 10 and 53 (mean 30, SD 12) days post stroke. Participants received a mean of 10 (SD 7, range 1–25) intervention sessions. An average session lasted approximately 1 hour. The mean total per participant face-to-face contact time was 9.75 hours.[30]

Systematic review

The process of study selection is shown in *Figure 4*. Nine studies involving 499 participants conducted in the UK, USA, South Africa and Sweden were included in the review. Two were RCTs[18,32] one a retrospective cohort,[49] two cross-sectional observational studies[50,51] four were qualitative. Characteristics of included studies are shown in *Table 4*.

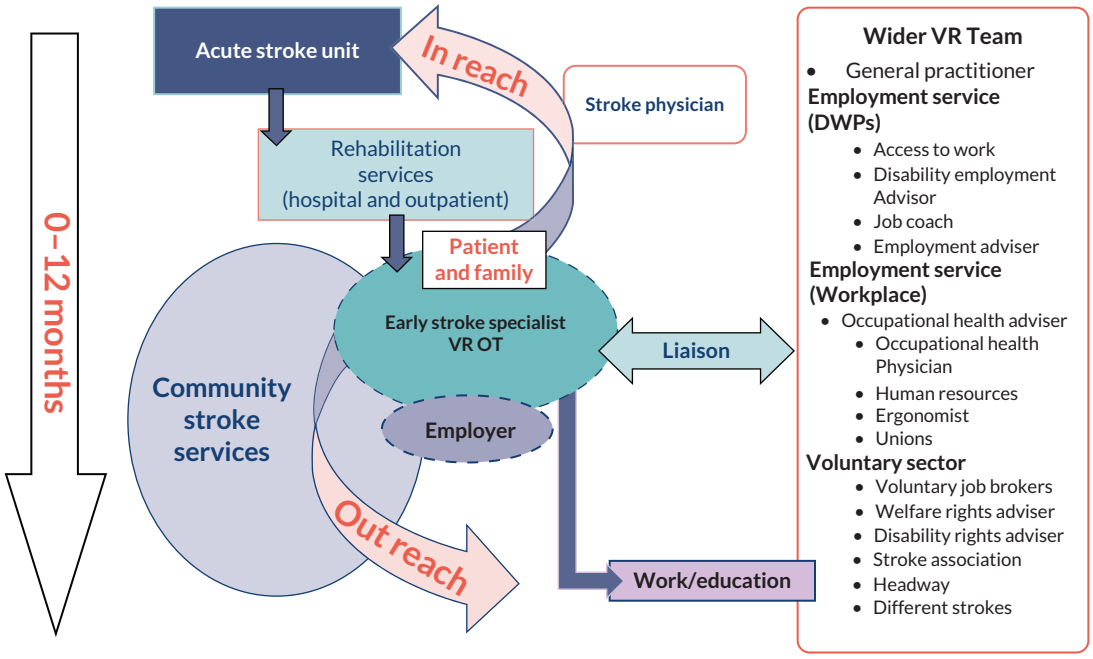

FIGURE 3 Ideal situation of the Stroke specialist VR OT (case co-ordinator) and ESSVR's relationship to other services.

Six studies were rated 'high' quality[18,32,52–53] and three were rated 'medium' quality[49–51] (see *Appendix 3*). As the review only identified two RCTS,[18,32] one of which was a feasibility RCT,[18] questions of effectiveness could not be answered.

Studies described three case co-ordination interventions,[18,32,49,52,54,55] one 'Programme with integrated or added vocational components';[50] one 'VR model adapted for brain injury'[51] and one 'consumer directed' intervention.[53] Most were delivered face to face by a range of healthcare professionals over periods ranging from 6 weeks to 12 months in a variety of healthcare, community and workplace contexts.

Intervention components were similar across studies and countries. Case co-ordination interventions included a broad range of VR components. Vocational assessment, job analysis and vocational counselling or education (providing work knowledge and education; practical problem-solving; setting or adjusting vocational goals) were components of all except one study.[50] Only one intervention incorporated job support,[52,54,55] four included job follow-along,[18,32,49,52,54,55] and five job coaching.[18,32,49,51,52,54,55] Intervention components and outcomes are shown in *Table 4*.

All studies described at least one feature that mapped to our predefined list of mechanisms. Identified mechanisms are shown in *Appendix 2*. 'Work preparation' featured in all interventions, 'Early intervention' and 'Employer engagement' featured in all but two.[50,53]

All except one study[50] attributed importance to certain components. Most identified 'early intervention' and 'employer engagement' as important. Studies highlighted three 'new' mechanisms; 'Multidisciplinary' where employers were included in rehabilitation team, 'Group rehabilitation' providing peer support and 'Supported self-management' (see *Appendix 7*). In interventions that positively influenced work outcomes,[18,32] the mechanisms identified as important were MDT working, individual tailoring, case co-ordination, employer engagement and understanding the impact of stroke on the person and work (assessment of the workplace).

Based on these findings, we developed an initial logic model[23] and programme theory (see *Report Supplementary Material 2*).

Definitive evaluation and description of the intervention delivered in the RETAKE trial

Between May 2018 and March 2022, the RETAKE trial randomised 583 participants to receive ESSVR + UC (n = 324) or UC (n = 259). The ESSVR intervention delivered in RETAKE is summarised using TIDieR Headings.[24] More

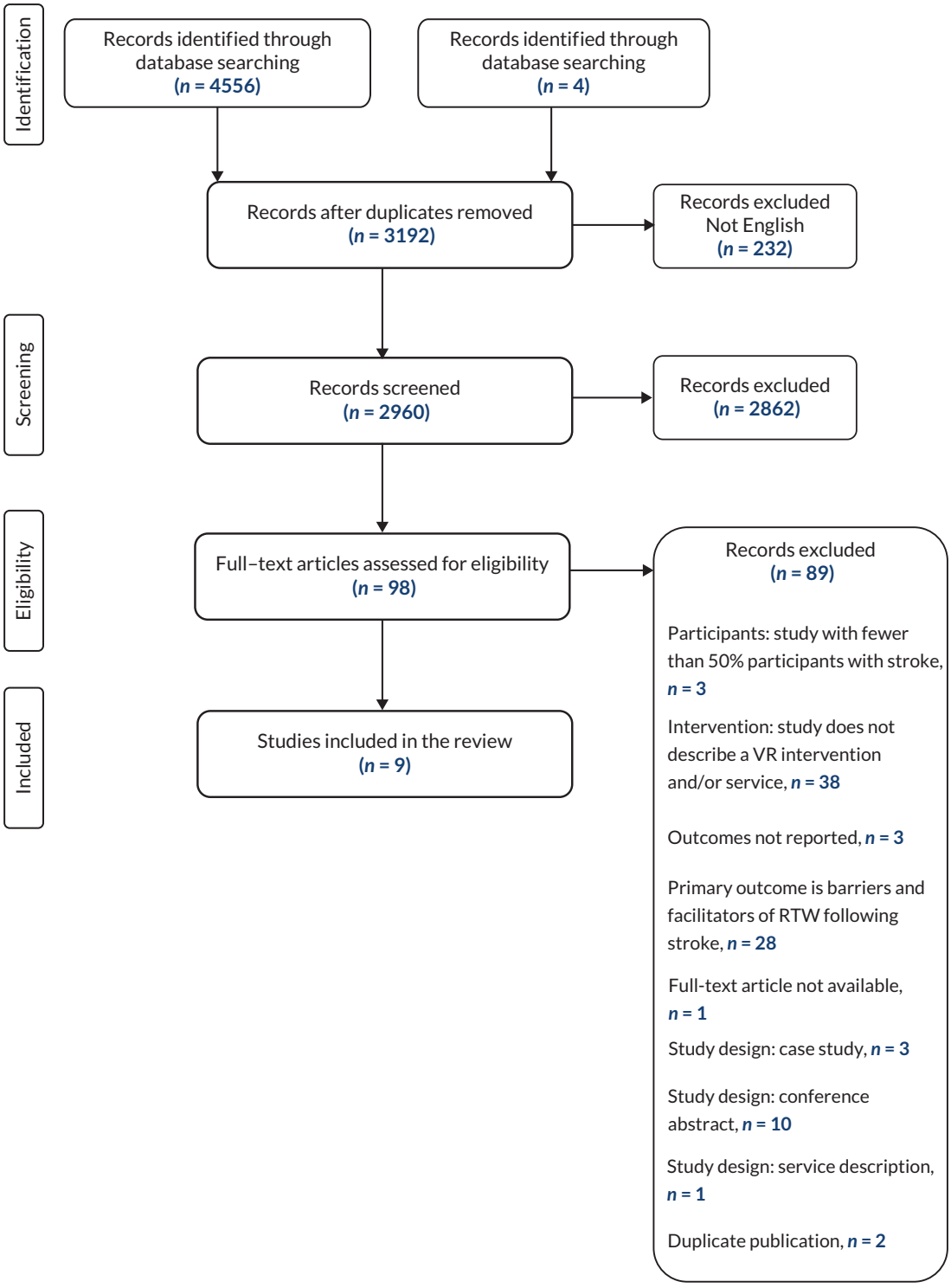

FIGURE 4 PRISMA.

detail can be found in *Report Supplementary Material 2* and elsewhere.[23,43,45,56]

Why

The aim of ESSVR was to support stroke survivors to RTW and prevent job loss by reducing the impact of stroke on workability. The supporting rationale is described in *Report Supplementary Material 2* and elsewhere.[23]

What

Informed by our literature review, clinical guidelines[9,35,36] and our earlier studies,[18,29,30,49,57] ESSVR was designed as a case

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TABLE 4 Characteristics of included studies

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
Phillips *et al.* (2019) **ESSVR**	UK	19	Cohort	• Aged 16 +	**Delivery location:** Hospital stroke rehabilitation services, community settings and workplaces	• Vocational assessment (skills, abilities, preferences)	RTW
		Mean age 62 years (SD 13)		• Admitted with new stroke	**Mode**: Individual delivery face to face, phone, e-mail, text message	• Job analysis	**At 1 year** 9/19 RTW (five full time, two self-employed, two voluntary work)
		74% male		• Working at stroke onset in paid or voluntary work or education	**Staffing:** OT with VR experience	• Vocational counselling/education	**At 6 years**
		58% married		• Intending to RTW or education	**Commences:** 10–53 (mean 30, SD 12) days post stroke.	• Work preparation	5/19 paid work (two full time, one part time, two self-employed)
		Ethnicity not reported			**Duration:** Up to 1 year	• Specific vocational skills training	One full-time education
		Stroke severity not reported			**Dose:** 10 (SD 7, range 1–25) sessions lasting approximately 1 hour	• Case management/advocacy	One voluntary work
						• Work trials	Two retired
						• Job coaching	
						• Developing natural jobsite supports	
						• Job follow-along	
						• Non-VR-specific MDT rehab, medical, education, family	
Grant (2016) **(ESSVR)**	UK	46	Feasibility	• Aged 16 +	**Delivery location:** Hospital stroke rehabilitation services, community settings and workplaces	• Vocational assessment (skills, abilities, preferences)	RTW
		Mean age 56 (12.7) years	RCT	• Admitted with new stroke	**Mode**: Individual delivery	• Job analysis	**3 months**

TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
		78% male		• Working at stroke onset in paid or voluntary work or education	face to face, phone, e-mail, text message	• Vocational counselling/education	9/23 intervention group vs. 9/23 controls RTW
		97.8% White British, 2.2% Black		• Intending to RTW or education	**Staffing:** OT with VR experience	• Work preparation.	**6 months**
		61% married			**Commences:** 10–53 (mean 30, SD 12) days post stroke.	• Specific vocational skills training	12/23 intervention vs. 13/23 controls RTW
		28% higher education			**Duration:** Up to 1 year	• Case management/advocacy	**12 months**
		Stroke severity (NIHSS) 34.8%, minor, 28.3%, moderate, 8.7% severe stroke (missing 28.3%)			**Dose:** 10 (SD 7, range 1–25) sessions lasting approximately 1 hour	• Work trials	11 intervention vs. 6 controls RTW Work Productivity and Activity Impairment **(median)**
						• Job coaching	**3 months**
						• Developing natural jobsite supports	30 intervention group vs. controls 55.9 (95% CI −58.72 to 55.90)
						• Job follow-along Non-VR-specific MDT rehab, medical, education, family	**6 months**
							56.36 intervention group vs. controls 100 (95% CI −117.46 to 30.18)
							12 months
							0 intervention group vs. controls 0 (95% CI −70.79 to 70.79)
							Productivity loss (Work Limitations Questionnaire)
							3 months

continued

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TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
							4.41 intervention group vs. controls 2.16 (95% CI −2.42 to 6.92) **6 months** 1.36 intervention group vs. controls 9.79 (95% CI −13.74 to 3.12) **12 months** 1.38 intervention group vs. controls 4.37 (95% CI −10.22 to 4.26)
Ntsiea *et al.* (2014) **(Workplace Intervention Programme)**	South Africa	80 Mean age 45 (8.7) years 51% male 55% married 7% higher education Stroke seventy and ethnicity not reported	RCT	• 18–60 years of age • Employed in the formal sector at the time of stroke • < 8 weeks since onset of stroke	**Delivery location:** Hospital stroke rehabilitation services and workplaces **Mode**: Individual delivery, face to face **Staffing:** Physiotherapist, OT **Commences:** < 8 weeks post stroke; 6th week sick leave period. Mean 4.6 (1.8) weeks post stroke. **Duration:** 6 weeks **Dose:** Once per week for minimum 4 hours	• Vocational assessment (skills, abilities, preferences) • Job analysis • Vocational counselling/education • Work preparation. • Case management/advocacy • Work trials? • Job coaching • Developing natural jobsite supports • Job follow-along	RTW **3 months** 27% intervention vs. 12% controls (p = 0.13) **6 months** 60% intervention vs. 20% controls (p < 0.001)

TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
						• Non-VR-specific MDT rehab, medical, education, family	
Öst Nilsson *et al.* (2017) **(Re-Work Stroke)**	Sweden	**Study 1**	Qualitative	• 18–63 years of age	**Delivery location:** Rehabilitation clinic and workplaces	• Vocational assessment (skills, abilities, preferences)	Qualitative exploration of how stroke participants experienced the intervention and RTW process.
		7		• Able to communicate in Swedish	**Mode**: Individual delivery, face to face, e-mail, phone	• Job analysis	Increased knowledge and communication at the workplace
		Mean age 52 (40–57)		• In the phase for VR	**Staffing:** Two OTs with ≤ 25 years' experience of acquired brain injury	• Vocational counselling/education	
		71% male		• Employed prior to their stroke	**Commences:** 4.5–14 months (median 7.5) post stroke.	• Work preparation.	
		Stroke severity		• Intended to RTW	**Duration:** 12–36 weeks	• Specific vocational skills training	
		Five mild, two moderate (Bathel)		• On full-time sick leave	**Dose:** Fortnightly visits	• Case management/advocacy	
					Mean 22.4 sessions (range 12–36) of which 2–10 were face to face at the workplace lasting a mean of 11.3 hours per person	• Work trials	
						• Job coaching	
						• Developing natural jobsite supports	
						• Job follow-along	

continued

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DOI: 10.3310/GJKR0715

TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
Ost Nilsson *et al.* (2020) **(Re-Work Stroke)**	Sweden	**Study 2** 11 Mean age 52 Study 3 = 64%	Qualitative	• 18–63 years of age • Able to communicate in Swedish • In the phase for VR • Employed prior to their stroke • Intended to RTW • On full-time sick leave	**Delivery location:** Rehabilitation clinic and workplaces **Mode**: Individual delivery, face to face, e-mail, phone **Staffing:** Two OTs with ≤ 25 years' experience of acquired brain injury **Commences:** 4.5–14 months (median 7.5) post stroke. **Duration:** 12–36 weeks **Dose:** Fortnightly visits Mean 22.4 sessions (range 12–36) of which 2–10 were face to face at the workplace lasting a mean of 11.3 hours per person	• Vocational assessment (skills, abilities, preferences) • Job analysis • Vocational counselling/education • Work preparation. • Specific vocational skills training • Case management/advocacy • Work trials • Job coaching • Developing natural jobsite supports • Job follow-along	Qualitative exploration of how stroke participants experienced the intervention and RTW process. Increased knowledge and communication at the workplace
Öst Nilsson (2019) **(Re-Work Stroke)**	Sweden	**Study 3** 10	Qualitative	• 18–63 years of age • Able to communicate in Swedish	**Delivery location:** Rehabilitation clinic and workplaces **Mode**: Individual delivery, face to face, e-mail, phone	• Vocational assessment (skills, abilities, preferences) • Job analysis	Qualitative exploration of how stroke participants experienced the intervention and RTW process. Increased knowledge and communication at the workplace

TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
		Mean age 51 (40–57)		• In the phase for VR	**Staffing:** Two OTs with ≤ 25 years' experience of acquired brain injury	• Vocational counselling/education	
		70% male		• Employed prior to their stroke	**Commences:** 4.5–14 months (median 7.5) post stroke.	• Work preparation.	
		Stroke severity		• Intended to RTW	**Duration:** 12–36 weeks	• Specific vocational skills training	
		Seven mild, three moderate (Bathel)		• On full-time sick leave	**Dose:** Fortnightly visits	• Case management/advocacy	
					Mean 22.4 sessions (range 12–36) of which 2–10 were face to face at the workplace lasting a mean of 11.3 hours per person	• Work trials	
						• Job coaching	
						• Developing natural jobsite supports	
						• Job follow-along	
Cullen (2015) **(WRS)**	UK	5	Qualitative	• Over the age of 16	**Delivery location:** Clinic setting (workshop), workplaces, community settings.	• Vocational assessment (skills, abilities, preferences)	To understand the impact of the Work Rehabilitation service on their stroke journey
		Mean age 58, 100% male, 71% married		• Neurological diagnosis	**Mode**: Group and individual delivery, face to face,	• Job analysis	The WRS contributed to self-worth, well-being, recovery, and adjustment post stroke
				• Identified goal to return to vocational occupation paid/unpaid or education	**Staffing:** Not specified	• Vocational counselling/education	
					Commences: 4–17 months post stroke	• Specific vocational skills training	
					Duration: 12 weeks (flexible)	• Work trials	

continued

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TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
					Dose: Mean 2 days per week (range 1–5 days per week)		
McMahon and Crown (1998) (**VR**)	USA	200	Observational cross section	• Neurological problems	**Delivery location:** Not specified	• Vocational assessment (skills, abilities, preferences)	RTW
		Mean age 44, 58% male		• Working age and currently employed or seeking employment.	**Mode**: Not specified	• Job analysis	Of 200 participants
		52% White, 35% Black		• Reached a stage in their rehab where they were ready to RTW or retraining	**Staffing: Counsellor**	• Vocational counselling/education	• 30% returned to employment.
		40% married			**Commences:** Not specified	• Work preparation.	• 10% volunteer work
		Stroke severity and education not reported			**Duration:** Not specified	• Work trials	• 1% homemakers
					Dose: Not specified	• Job coaching	• 9% sheltered work • 46% unemployed (includes continues therapy/school/retiring) Occupational status • 14% skilled job • 21% returned to the same employer • 11% went back to the same job • 9% went back to a modified job with previous employer • 12% new job with new employer Financial incentives/ benefits

TABLE 4 Characteristics of included studies (*continued*)

Author (intervention name)	Country and setting	Participants	Study design	Inclusion criteria	Intervention context, staffing, timing, length mode	Components	Reported work outcomes
							• Small increase in people receiving long-term disability benefits • Increase of 50% of people receiving Social Security Disability Income
Mennemeyer *et al.* (2006) **(Equal Pathways to Work)**	UK	121	Observational cross section	• Participated in clinical trial at the medical centre or purchased treatment at their own expense at an outpatient clinic at the same medical centre	**Delivery location:** Research and Clinical settings	Non-VR-specific MDT rehab, medical, education, family	RTW
		Upper extremity group = median 62.6 years ± 14.4, 60% male, 90% European American, 8% African American, 1% Asian			**Mode**: Not specified		Of 121 participants:
		Lower extremity group = median 68.9 ± 11.1, 77% male 94% European American, 6% African American			**Staffing:** OT + Project co-ordinator with a training background + Support workers		• 12% full time
		42% higher education			**Commences:** Not specified		• 13% part time
					Duration: Not specified		• 10% unemployed
					Dose: Not specified		• 2% disability leave • 58% retired • 2% homemaker • 40% retired • 3% student/volunteer/other

CI, confidence interval; NIHSS, National Institutes of Health Stroke Scale; WRS, Work Rehabilitation Service.

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co-ordination model of individually tailored VR delivered in addition to usual NHS rehabilitation. It involved early intervention and ongoing support for community-dwelling stroke survivors for up to 12 months post randomisation.[22]

Early Stroke Specialist Vocational Rehabilitation was delivered in four stages (see *Figure 2*). The initial three-stage Intervention process (early recovery, graded RTW, job retention) is described below and elsewhere.[18] The ideal situation of the OT and ESSVR's relationship with other services depicted is depicted in *Figure 3*. A fourth stage, 'discharge', was added to the model following fidelity assessment in the RETAKE trial.[43]

Stage 1 involved assessment of the impact of the stroke on the stroke survivor, their job, role and responsibilities, and a detailed job analysis. Different tools were introduced to OTs during training, but none were prescribed. This was followed by the development of a RTW plan, the use of strategies to lessen the impact of stroke (e.g. pacing to manage fatigue and prepare the stroke survivor for a RTW), work simulation activities (tailored to the person and their job role), and education for stroke survivors, their families, and employers. Participants were encouraged to keep workplace communication channels open.

Stage 2 involved planning and implementing a phased RTW. This involved negotiating a realistic time frame and any reasonable adjustments with employers, a worksite visit, and providing information and education to employers about the effects of stroke, its impact on the individual and potential to influence work participation. There was emphasis on cross-sector communication. The OT case-co-ordinated the rehabilitation across all sectors and liaised with NHS healthcare, employers, and other workplace service providers such as occupational health to reduce overlap and ensure consistency in RTW aims. They liaised directly or indirectly (by e-mail/letter) with employers, where permitted by stroke survivor participants, to negotiate/recommend workplace adjustments, offering and providing mediation or advocacy if difficulties arose.

Stage 3 took place following work return and involved monitoring the RTW by implementing regular reviews with a focus on sustaining work. The OT (and line manager where involved) offered feedback on progress and suggested workplace and role modifications, to ensure sustainability if needed. This sometimes involved considering work alternatives where RTW was unsuccessful. Monitoring and review continued for up to 12 months according to need and complexity and was gradually withdrawn.

Throughout stages 1–3, participants received informal psychological support from OTs. Emerging issues were dealt with flexibly and referrals made for more formal support as required.

Stage 4 involved the discharge process. The OT communicated in writing with the stroke participant, family and employer, providing information on how to re-access ESSVR (if discharged before 12 months post randomisation), or information on or referral/signposting to other available support (if discharged at 12 months post randomisation) if required.

The intervention was delivered in addition to the participant's usual stroke rehabilitation. This varied depending on local provision and individual participants' needs. The OT liaised with UC healthcare professionals to agree roles and ensure VR was provided by the RETAKE OT.

RETAKE intervention delivery summary

Of 324 participants allocated to the intervention, 309 (95.4%) commenced the intervention with a total 2945 sessions recorded. Across all sessions attended, a median of 3 [interquartile range (IQR) 1–4, range 1–14] of a maximum 16 intervention components were delivered in each session.

Of Stage 1 intervention components, almost half of all sessions addressed current issues [1275 (45.8%) sessions in 282 (95.3%) participants], while work preparation [1092 (39.3%) sessions in 258 (87.2%) participants], fatigue management [903 (32.5%) sessions in 230 (77.7%) participants], psychological [713 (25.6%) sessions in 195 (65.9%) participants] and physical components [601 (21.6%) sessions in 191 (64.5%) participants] were all addressed in over a fifth of sessions.

Of Stage 2 intervention components, RTW with and without direct employer contact were delivered in 305 (11.0%) and 739 (26.6%) of sessions, in 107 (36.1%) and 204 (68.9%) participants, respectively. Overall, OT contact with the employer took place for 109 (36.8%) participants a median of 39 days (IQR 21–83, range 3–379) after the first session, and an employer visit took place for 74 (25.0%) a median of 49 days (IQR 28–119, range 9–420) after the first session.

Of Stage 3 intervention components, monitoring job retention and job redirection were delivered in 584 (21.0%) and 114 (4.1%) of sessions, in 175 (59.1%) and 45 (15.2%) participants, respectively.

At Stage 4, of those who commenced the intervention, 35 (11.3%) were referred for ongoing rehabilitation at

the point of intervention discharge, of whom most were referred to other healthcare services (24, 68.6%), with < 10 participants referred to each of social care services, employer services, or voluntary organisations. Only three participants re-engaged with the intervention after initial discharge and within 12 months of randomisation. Discharge dates indicated that 294 (95.1%) of 309 participants who commenced the intervention were discharged from the intervention.

Who

The intervention was delivered by qualified HealthCare Professions Council (HCPC) registered OTs, recruited from 16 sites and 21 NHS Trusts in England and Wales. OTs were embedded in a range of services, including acute, community and the independent sector. They were recruited if they had experience of working with people with stroke and/or other neurological conditions and community rehabilitation experience. Some had prior VR experience.

Sixty OTs were trained (see *Appendix 8*, *Table 5*) and 46 between 19.2.18 and 10.11.21 in 17 separate 2-day and seven 1-day refresher training sessions. More details of the training and mentoring are reported in *Appendix 9* and elsewhere 46; data were available for 58; 49 were involved in ESSVR delivery with 48 delivering the majority of sessions for at least one RETAKE participant (median 6 participants, up to a maximum 16 participants). This included one mentor who stepped in when an OT was redeployed during the pandemic. For demographics and other characteristics of the OTs involved in ESSVR delivery, see *Appendix 8*, *Table 5*.

While intended to be in groups of 4–6 OTs, mentoring for the *N* = 48 main OTs, sessions comprised a median of two (range 1–3) OTs to mentor and the median number of sessions attended was 13 (IQR 8–20).

How

Early Stroke Specialist Vocational Rehabilitation was delivered face to face or via telerehabilitation (videoconference or phone call) on a 1-to-1 basis, with additional time spent in liaison (letters, phone and videoconference calls) with patients, employers, family or other stakeholders. It was intended that most progress Stage 3 monitoring was by telephone.

Where

Of 324 participants allocated to ESSVR, 309 (95.4%) commenced the intervention. Of those with available data (*n* = 299), most intervention sessions were delivered via telerehabilitation (*n* = 1414, 51.7% sessions for *n* = 243, 81.3% participants), in participants' homes (*n* = 982, 35.9% sessions for *n* = 246, 82.3% participants) or workplaces (*n* = 175, 6.4% sessions for *n* = 67, 22.4% participants). Other locations included hospital (*n* = 112, 4.1% sessions for *n* = 52, 17.4% participants) and community settings (*n* = 53, 1.9% sessions for *n* = 31, 10.4% participants).

When and how much

The intervention commenced a median 38 days (IQR 23–56, range 6–216) post stroke and median 9 days post randomisation (range 0–198, IQR 6–13) and continued for up to 12 months following randomisation. Reasons for delayed first visit included delayed therapist training, unable to make contact initially, RETAKE e-mail errors

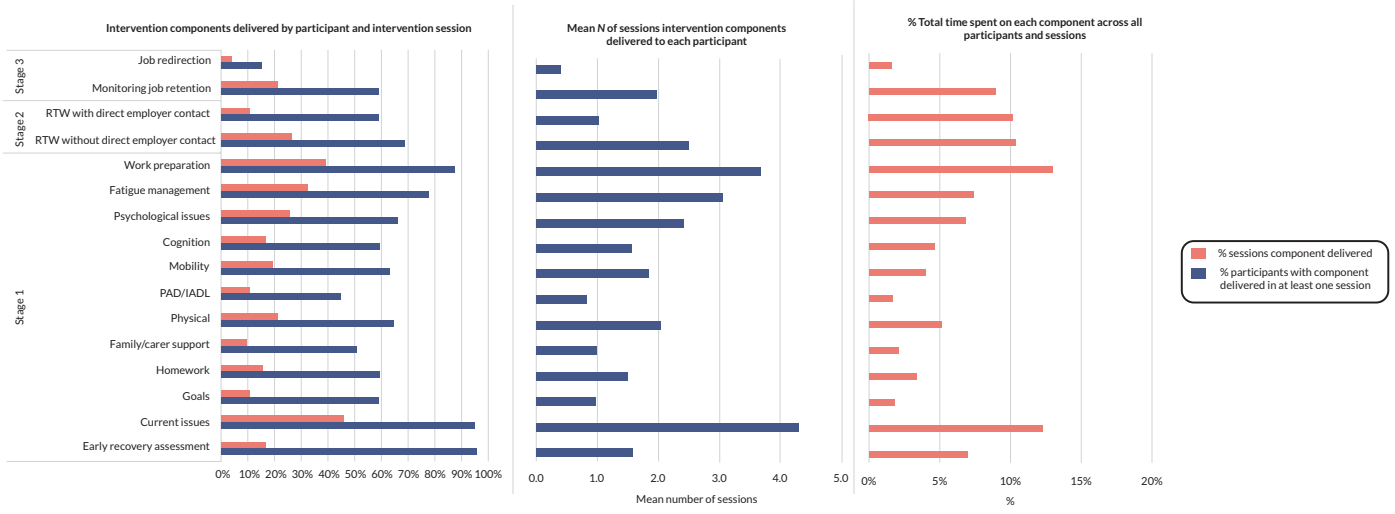

FIGURE 5 Intervention component delivery summary bar chart.

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(*n* = 2), neurosurgery (*n* = 1), OT annual leave and large RETAKE caseload.

Duration and frequency of sessions were determined by individual participant's needs and the OT. Participants attended a median of seven intervention sessions (IQR 4–12, range 0–37), with discharge from ESSVR at a median 10.3 months (IQR 5.5–12.0, range 0–15.4) post randomisation. The number and frequency of sessions and intervention duration for all participants are shown in *Figure 6*.

A summary of the intervention received can be found in *Figure 5* and *Appendix 8*, *Table 8*.

Modifications

During the pandemic ESSVR was adapted for online delivery and OTs were offered additional training in how to deliver ESSVR remotely. However, only 11/17 OTs involved in the trial following the pandemic-related recruitment pause attended this training. In some sites, OTs continued to visit participants at home wearing personal protective equipment in accordance with local NHS Trust protocols.

There were 1100 sessions (65.5%) delivered face to face pre-coronavirus disease (COVID), with the remaining 579 (34.5%) sessions pre-COVID delivered by telephone or online. During the furlough period there was a shift to non-face-to-face sessions, with 585 (82.6%) sessions delivered by telephone or online during this time period and only 123 (17.4%) delivered face to face. Post-furlough period, once the lockdown restrictions had eased, showed a slightly lower proportion of non-face-to-face sessions (71.6% *n* = 250), with 99 (29.3%) sessions delivered face to face.

Tailoring

The ESSVR intervention was tailored in duration and frequency according to individual need over 12 months. This is illustrated by the wide-ranging number of sessions, components delivered and time per participant (see *Appendix 8*, *Tables 9* and *10* and *Figures 7* and *8*) and by referrals made for other services in 35 cases (12.4%), including health care (26 cases), social care in three cases, ongoing employment services (4), voluntary organisations (8) or other (3).

In the fidelity analysis, we found that stroke-, family-, work-, and socioeconomic-related factors impacted whether certain individual ESSVR components, could be delivered, requiring RETAKE OTs to tailor and individualise ESSVR delivery.[43]

Qualitative data suggested very little differences between intervention delivery across sites or the need for site specific tailoring.

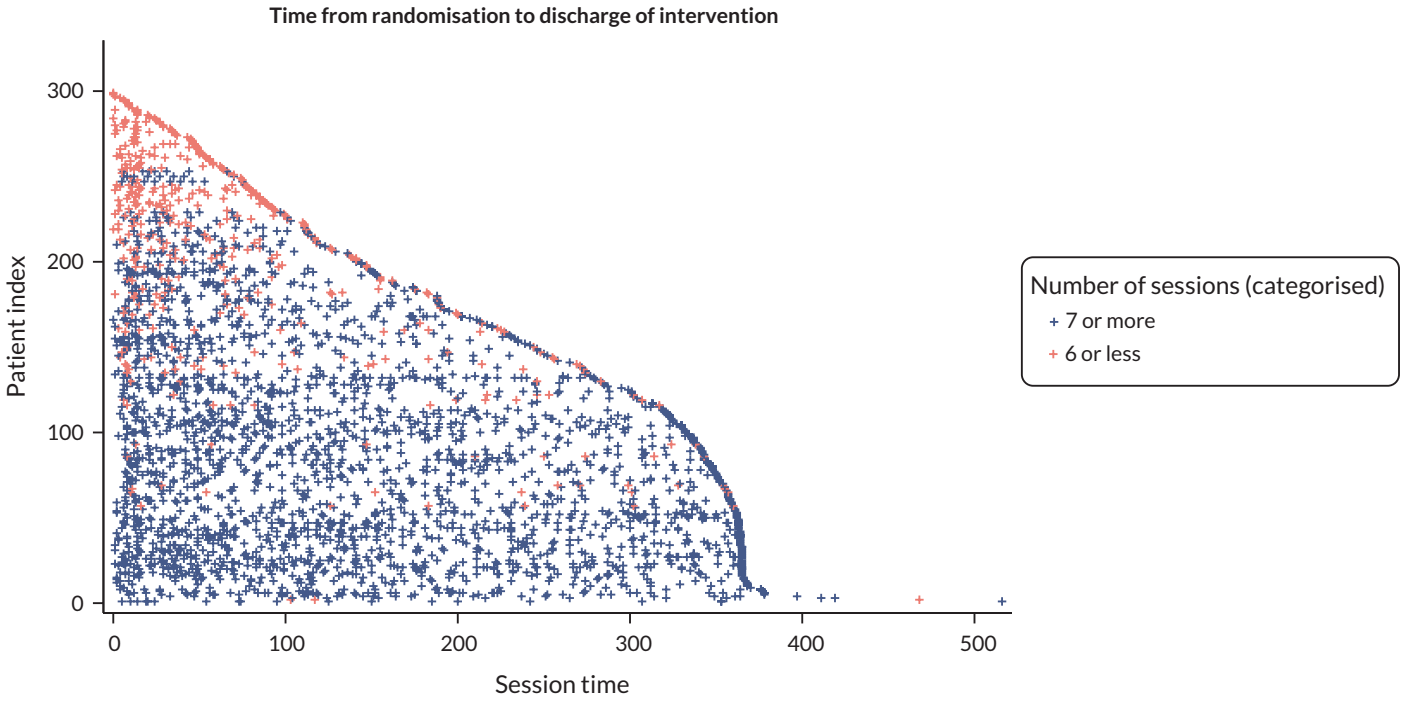

FIGURE 6 Duration of intervention (days). Note: In 189 participants reported to have RTW during intervention delivery, a median of 4 sessions (IQR 2–17, range 1–25) were attended prior to RTW of a total median 9 (IQR 6–15, range 1–37).

How well

The intervention was reported as completed for 172 (56%), and intervention compliance achieved for 244 (75.3%) participants. Of 135 (44%) where the intervention was reported as not completed, 44 (32.6%) had reached the full 12 months maximum input, 22 (16.3%) had a mutually agreed ending of the intervention and 6 (4.4%) had a therapist-led discontinuation and were classed as compliant; while 18 (13.3%) withdrew from the intervention, 24 (17.8%) became uncontactable, 12 (8.9%) did not commence, and the reason was other or unknown for 9 (6.6%) participants, all of whom were classed as non-compliant.

Early Stroke Specialist Vocational Rehabilitation was delivered with fidelity; 309 (95%) participants commenced the intervention as planned and had at least one session. Reasons for the intervention not commencing were participant withdrawal (3), unable to contact (3), other or missing reasons.

Participant adherence was good. There was little difference between the number of sessions offered [mean 9.6 (SD 7.46), range 0–39] and attended [mean 9.0 (SD 7.16), range 0–37]; however, 24 (7.8%) participants who commenced the intervention became uncontactable, 18 (5.8%) withdrew, 9 (2.9%) did not attend all planned sessions for other or missing reasons, and 17 (5.5%) were missing all intervention data. A total 244 (75.3%) participants were therefore classed as compliant and 80 (24.7%) as non-compliant. The average duration based on the time from randomisation to last session was a median 8 months (IQR 3.4–11.4, range 0–17).

It started early, as intended a median 38 days (IQR 23–56, range 6–216) post stroke and continued for up to 12 months following randomisation.

OT contact with employers only occurred for 109 (36.8%) participants and an employer visit took place for 74 (25.0%) participants. 26% of participants did not consent for OT contact with their employer and 10.2% preferred to self-manage their RTW (see *Appendix 8*, *Tables 9* and *10*), making it difficult for OTs to mediate timing of the participant's RTW, employment role or workplace adjustments, or monitor RTW.[58]

Fidelity assessment data indicate that components involving other stakeholders (e.g. the stroke survivors' family, other healthcare providers and employers) were delivered with lower rates of fidelity than those centred on the stroke survivor. Fidelity results are reported more fully elsewhere.[43]

Interview data suggest contextual factors affecting intervention delivery were self-employment (in some cases, participants returned to work very early due to financial pressures and/or to ensure continuation of their business, either prior to OT involvement or against OT advice) and conflicting advice between employment based occupational health services (acting on behalf of the employer) and the OTs advice. Other factors included more severe stroke and participants enduring including mobility, cognitive or communication impairments problems that could not be accommodated in the workplace.[46,58] At an organisational level, problems including poor inter-organisational communication and increased travel time and costs arose where OTs were employed by a different NHS Trust to that responsible for providing UC. Having more than one OT involved in ESSVR provision, facilitated opportunities for peer support and workload sharing.[46,58]

Discussion

We developed a RTW intervention for stroke survivors using a multi-stage population-based approach, following MRC guidance.[20] ESSVR was codeveloped with RTW experts, drawing on primary research on RTW experiences and the unmet needs of stroke survivors. Together, these helped to ensure intervention components addressed real-life problems faced by stroke survivors attempting to RTW. The intervention was found useful and acceptable when initially piloted and feasibility tested in 25 stroke survivors; only one person withdrew[18] The most valuable ESSVR features cited in both the feasibility study and definitive trial[46,56,58] were colocation, early intervention, case co-ordination, employer engagement and the continuity of support, particularly emotional support. Even people who had made a good functional recovery valued progress monitoring and feedback indicating that it reassured and gave them confidence, in the absence of any other support.[46,56,58] The clinical and cost-effectiveness of ESSVR is reported elsewhere.[22,59]

ESSVR components

In the development we drew on available evidence and clinical guidelines[9,35,36,60] and systematically reviewed the literature to identify features of effective interventions supporting RTW post stroke. We sought to identify and include mechanisms that might influence work outcomes. However, intervention development commenced in 2012, when the VR evidence base for stroke survivors was sparse.[34,61] Only one RCT was identified, a South African study involving 80 participants.[32] The review corroborated ESSVR components and identified additional features of VR interventions for example group activities, providing

peer support and, those empowering stroke survivors to self-manage stroke symptoms and (re)access support.

Early Stroke Specialist Vocational Rehabilitation was designed as an individually tailored job retention intervention to support stroke survivors who were working prior to their stroke to resume work with an existing employer. It includes both remediation, that is strategies to promote recovery and prepare for RTW and adaptation, for example negotiating changes to the stroke survivor's work environment, role or responsibilities. It also included influencing changes in employer and coworker knowledge to enhance their understanding of stroke. The intervention features were consistent with best available evidence for people with acquired brain injury that is work-directed interventions combining education and coaching[33] and NICE guidelines[36] indicating the need for early VR intervention, and employer engagement.

The VR model behind ESSVR

It was intended that a VR-trained OT would case manage/co-ordinate ESSVR across health and social care, education, employment, and voluntary sectors, starting during acute inpatient rehabilitation and continuing beyond the RTW to ensure work was sustained. Thus, facilitating the exchange of knowledge and information across different sectors, by crossing the 'work/health' divide. We called this colocation. Case management has been identified as effective in increasing RTW odds following myocardial infarction[62] and in people with disabilities.[63,64] Colocation is a feature of Individual Placement Support, an effective intervention for people with mental health problems and other long-term conditions[65,66] It has successfully featured alongside case management in VR interventions for people with acquired brain injury[67–70] and polytrauma.[71]

In the RETAKE trial, 35 stroke survivors were referred onto other services for additional support, possibly indicating the need for alternative provision for some people with severe stroke who take more than 12 months to recover or are unable to return to an existing job. A different VR model may be more appropriate. For example, interventions that start later and include retraining and job brokerage elements, and a greater focus on exploring work alternatives. Supported Employment programmes[72] where the brain injured person is placed in a competitive job with a Job Coach, providing one-to-one on-site training, vocational counselling and support may be appropriate in these cases. Unfortunately, these interventions have not been formally evaluated for stroke survivors[66] indicating a need for further research.

Early Stroke Specialist Vocational Rehabilitation scope

Early Stroke Specialist Vocational Rehabilitation was designed to start during acute rehabilitation to (a) identify those employed at stroke onset and encourage open conversations with employers and (b) challenge misconceptions or beliefs UC healthcare providers might hold about the stroke survivor's ability or need to RTW.[13] Stroke survivors may be encouraged to retire by well-meaning healthcare professionals on the assumption that they cannot return to the same job role and responsibilities. There may be reluctance to discuss work, particularly with people with more severe strokes or communication difficulties[12,13] due to uncertainty about recovery.

When this research commenced, work, was frequently left late in the rehabilitation process, until functional recovery had plateaued.[73] Qualitative research exploring barriers and enablers to RTW after stroke indicates that healthcare providers and rehabilitation itself can hinder RTW.[13,73,74] Rehabilitation is often too short, lasting < 6 months,[11] or does not address work needs, failing to support those with greater stroke impairment who need longer to recover, or whose occupational sick pay allowance extends to 12 months. This was supported by our own findings indicating people with milder stroke received little support and those with hidden disabilities, such as visual, hearing, and cognitive impairments were frequently missed or not assessed in acute rehabilitation.[14,18] ESSVR was designed to last up to 12 months so that stroke survivors received timely support, in line with their recovery. Those who RTW were monitored to ensure work was stable and no further adaptations were needed and could re-refer for help if required. However, in our feasibility trial, no one referred themself to the OT and in RETAKE only three self-re-referred suggesting these aspects of self-management were not encouraged, not working or not needed. Although self-management has been found to improve self-efficacy, ADL, satisfaction and community reintegration,[75–78] it is a little understood concept in relation to post-stroke VR and an area that warrants further research.

Implementation fidelity in the RETAKE trial

In RETAKE, the intervention was delivered with fidelity. However, our findings suggest OTs struggled to cross service boundaries (colocation) and engage with employers. Direct OT contact with employers only occurred for 36.8% and employer visits for 25% of participants. Only 119 (40.3%) participants permitted direct contact with their employer. However, some agreed to indirect engagement, for example in the form of a letter from the OT, or role-playing conversations with employer representatives such

as line managers or human resources. Some 10.2% of participants preferred to self-manage employer liaison. It is possible that many participants in this trial were able to self-advocate and negotiate their own RTW with indirect support from the OT. However, challenges in engaging employers are consistent with our other research in TBI[57,79] and MS.[80] Strategies for overcoming these challenges featured in the RETAKE training for OTs.[44] However, the reasons for the limited employer engagement remain unclear. Stroke survivors may be unwilling to disclose their stroke to their employer[81] for fear of discrimination – one of the primary reasons people with MS relinquish work prematurely[82] – or the risk of being overlooked in career development opportunities.

The lack of joined up and constantly changing health and social care, welfare and employment service landscape makes colocation and employer engagement particularly important but increasingly difficult to implement. It is possible that interventions that target employers directly are required in addition to those directed at the patient. eHealth interventions directly targeting the patient, or employer have demonstrated benefits for employee productivity and well-being and employer mental health knowledge in people with mental health conditions.[83] Employers were also particularly difficult to recruit for interview.[56] As we only recruited line managers of participants who had consented to their involvement, perceptions of ESSVR were positively biased towards the intervention. Therefore, the value of ESSVR to employers more broadly or how it can be integrated alongside in house occupational health and human resources remains unclear and an area for future research. Further research is also needed to better understand what training OTs need to address the employer engagement challenges. For example, learning to communicate using market discourse and negotiation skills to assist in framing themselves as an employer resource and to act as a knowledge broker between the worlds of health and employment.[84]

Occupational therapists also struggled to work with participants in a monitoring capacity for up to 12 months (59%), and with discharge processes. It is possible that the OTs did not perceive participants needed ongoing monitoring. This may reflect the participant sample and the low threshold for our RTW definition, agreed with PPI partners. Half of the participants recruited to the RETAKE trial had no or only mild residual impairments in mobility, cognitive or expressive language and few had comorbidities such as mental health or musculoskeletal problems or cardiac conditions that might impact on their ability to work, suggesting a mild-moderate severity sample. Moreover, 59.4% of participants in UC were in work 12 months post randomisation. However, interviews with the RETAKE OTs suggest delivering a 12-month intervention in the context of UC provision service that rarely extended beyond 6 months was particularly challenging.[45]

Compliance was defined following discussions with our expert panel and NHS OTs who regarded attending 70% of prescribed intervention as 'good', similar trials[85] and the findings of our FRESH feasibility trial[57] where the agreed ending was often unclear or poorly documented. Compliance was good; only 1 participant in the feasibility trial and 18 in retake withdrew (5.8%). However, 24 disengaged and 12 did not start, possibly pinpointing a group not needing this specialist support.[57,85] However, further research is needed to confirm this.

Early Stroke Specialist Vocational Rehabilitation in RETAKE also differed from the feasibility trial.[30] Most was delivered by telerehabilitation (telephone or online) rather than in person. This was not our intended delivery approach and appears to have been driven by the pandemic and OTs adapting ESSVR to participants' needs. Dealing with current issues consumed most of the ESSVR time, followed by work preparation, fatigue management and informal psychological support, which referred to time spent addressing confidence, mood, anxiety, adjustment, or relationship issues. This may be pandemic-related, reflecting (1) changes in employer behaviour, towards facilitating workplace accommodations including flexible home-based working; (2) changes in OT behaviour, including widespread implementation of telerehabilitation in the NHS and (3) the challenges trial participants were facing, for example furlough, home schooling. Not only did the pandemic affect the participants access to health care,[86] it also led to increased societal anxiety,[87,88] and COVID-19-related fatigue,[89] in addition to that expected in stroke.[90]

Patient and public involvement

Two PPI partners joined the expert panel to inform intervention development and corroborate interview findings. One additional PPI member acted in an advisory capacity during the development work. In the RETAKE trial seven PPI were involved from grant preparation, through to dissemination. Involvement included commenting on research design (two PPI co-applicants), development and adaptation of participant-facing materials/data collection

tools, trial management (two PPI) and troubleshooting (two PPI Trial Steering Committee members). PPI also contributed to analysis and dissemination of findings through regular meetings with the research team. A description of how PPI shaped the research can be found in the synopsis.[91]

Equality, diversity and inclusion

Both case study participants were White, one male and one female, both had suffered mild–moderate strokes resulting in visual impairment. In the feasibility trial, participants had a mean age of 56 years (12.7 SD), 98% were White and 78% male; 37% had suffered moderate or moderate to severe stroke and 56% pursued further or higher education 19. RETAKE trial participants, who were in work at stroke onset, had a mean age of 54 (11.12) years and were predominantly male, (69%) and White (83.7%) (7.8% were Black, 4.6% Asian and 3.8% mixed or other) and 41.7% had a higher education qualification. Most (82.8%) had had an ischaemic stroke and most had either none (50%) or only one (38.8%) post-stroke impairment in mobility (36%), communication (17.3%) or cognition (9.1%) indicative of a mild-to-moderate severity sample.[22]

Strengths and limitations

Our intervention development process had many strengths. ESSVR components were based on the best available evidence, including stroke survivors' lived experience of stroke and the RTW journey. While the initial piloting only involved two stroke survivors, feasibility testing assured us that it could be delivered in a way that was acceptable to stroke survivors and their employers.[18] An expert panel informed final decisions for ESSVR component inclusion. However, this was limited to NHS clinicians and only two stroke survivors. Broadening out the range of expertise by including occupational health and human resources may have led to a more nuanced understanding of employer engagement challenges and how to address these.

Our interviews included stroke service users and providers from multiple sectors and healthcare professions enabling a rich understanding of stroke survivors' unmet needs, service provider perspectives and the stroke rehabilitation delivery context. However, few were from the private sector or employment-based services. Interviewing more employers might have lent greater insight into employer perspectives and needs and issues employers perceive as important.

We focussed our systematic review on RTW interventions for stroke survivors. Greater understanding of the underlying mechanisms of RTW interventions might have been gained by focusing broadly on RTW interventions for people with a range of health conditions and employers.[92] Nevertheless, ESSVR was valued by stroke survivor and employer recipients and treating OTs.[58]

ESSVR is a complex intervention, as such it is context dependent.[20] The COVID-19 pandemic affected the delivery mode and the healthcare and employment contexts in which ESSVR was delivered. It is unclear whether these changes impacted its effectiveness.

Conclusion

We developed an ESSVR intervention to support RTW following stroke. We followed a rigorous multi-stage population-based approach, involving multiple stakeholders and the lived experience of working age stroke survivors. We drew on the best available evidence at the time. Following feasibility and pilot testing it was delivered by 48 OTs across 21 sites to 309 participants in the RETAKE trial. While it was delivered with fidelity and adherence was good, the intervention differed in content and delivery mode to the feasibility trial. More sessions were delivered via telerehabilitation, particularly during and after the pandemic and most of the time was spent dealing with current issues. More time was spent on fatigue management and informal psychological support than in the feasibility trial, possibly reflecting the impact of the pandemic and furlough on stroke survivors' lives. Evaluation of the effectiveness of ESSVR is reported elsewhere.[22]

Further research should explore OTs' willingness, and the challenges faced in engaging employers and participant reluctance to permit this. Also, consider alternative mechanisms for crossing health-employment boundaries including stroke survivor self-manged and eHealth interventions.

Consistent with other stroke VR studies,[5,93,94] few participants in our research were women or of Black, Asian or other minority ethnicity and people with visual, communication and cognitive impairments were underrepresented. Further research is needed to understand the VR needs of these underserved groups given the known disparities in and increased risk of worse outcomes associated with social determinants of health, for example income, education and employment.[95]

Additional information

CRediT contribution statement

Kathryn A Radford (https://orcid.org/0000-0001-6246-3180): Conceptualisation (lead), Formal analysis (supporting), Funding acquisition (lead), Investigation (equal lead), Methodology (lead), Project administration (lead), Supervision (lead), Visualisation (lead), Writing – Original draft (lead), Writing – reviewing and editing (lead).

Mary I Grant (https://orcid.org/0000-0001-5827-5451): Conceptualisation (supporting), Formal analysis (supporting), Funding acquisition (supporting), Investigation (equal lead), Methodology (supporting), Resources (lead), Writing – reviewing and editing (supporting).

Jain A Holmes (https://orcid.org/0000-0003-2465-102X): Formal analysis (supporting), Investigation (supporting), Methodology (supporting), Resources (supporting), Writing – reviewing and editing (supporting).

Julie Phillips (https://orcid.org/0000-0001-7213-2801): Methodology (equal lead), Resources (equal lead).

Kathryn Powers (https://orcid.org/0000-0001-7276-7073): Formal analysis (supporting), Investigation (supporting), Methodology (supporting), Resources (supporting), Writing – reviewing and editing (supporting).

Rachel L Chambers (https://orcid.org/0000-0001-6945-5028): Formal analysis (supporting), Investigation (supporting), Writing – reviewing and editing (supporting).

Kristelle Craven (https://orcid.org/0000-0003-4728-6213): Formal analysis (supporting), Investigation (supporting), Writing – reviewing and editing (supporting).

Brian Bell (https://orcid.org/0000-0001-8577-7430): Formal analysis (supporting), Writing – reviewing and editing (supporting).

Christopher McKevitt (https://orcid.org/0000-0002-5290-4613): Conceptualisation (supporting), Funding acquisition (supporting), Supervision (supporting), Writing – reviewing and editing (supporting).

David Clarke (https://orcid.org/0000-0001-6279-1192): Conceptualisation (supporting), Formal analysis (lead), Investigation (equal lead), Project administration (equal lead), Supervision (equal lead), Writing – reviewing and editing (supporting).

Amanda Farrin (https://orcid.org/0000-0002-2876-0584): Funding acquisition (equal), Writing – reviewing and editing (supporting).

Diane Trusson (https://orcid.org/0000-0002-6995-1192): Formal analysis (supporting).

Caroline Watkins (https://orcid.org/0000-0002-9403-3772): Funding acquisition (supporting), Writing – reviewing and editing (supporting).

Audrey Bowen (https://orcid.org/0000-0003-4075-1215): Funding acquisition (supporting), Writing – reviewing and editing (supporting).

Ellen Thompson (https://orcid.org/0000-0002-8004-2619): Formal analysis (supporting), Visualisation (supporting), Writing – Original draft (supporting), Writing – reviewing and editing (supporting).

Alexandra Wright-Hughes (https://orcid.org/0000-0001-8839-6756): Formal analysis (equal lead), Project administration (equal lead), Supervision (equal lead), Visualisation (equal lead), Writing – Original draft (supporting), Writing – reviewing and editing (supporting).

Members of the RETAKE Research Group (bold included as authors)

Prof. Kate Radford (CI)

Prof. Amanda Farrin

Prof. Caroline Watkins

Prof. Christopher McKevitt

- Prof. Rory O'Connor
- Prof. Tracey Sach
- Dr Sara Pyne
- Helen Risebro
- Rory Cameron
- **Prof. Audrey Bowen**
- **Dr David Clarke**
- **Dr Katie Powers**
- **Alexandra Wright-Hughes**
- **Ellen Thompson**
- **Florence Day**
- **Dr Diane Trusson**
- **Dr Julie Phillips**
- **Dr Jain A Holmes**
- **Kristelle Craven**

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Former members

- Vicki Mclellan
- Suzanne Hartley
- Ivana Holloway
- Bonnie Cundill
- Sara Clarke
- Prof. Marion Walker
- Abigail Statham
- Kristina Kroller
- Rebecca Lindley

RETAKE patient and public involvement partners

- Dr Judith Stevens
- John Murray
- Margaret Cheng
- Tony Boyce
- Isabella Iyama
- Martin Coult

Occupational therapist mentors

- Ruth Tyerman
- Yash Bedekar
- Jane Terry
- Jo Hurford

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Patient data statement

This work uses data provided by patients and collected by the NHS as part of their care and support. Using patient data is vital to improve health and care for everyone. There is huge potential to make better use of information from people's patient records, to understand more about disease, develop new treatments, monitor safety, and plan NHS services. Patient data should be kept safe and secure, to protect everyone's privacy, and it is important that there are safeguards to make sure that they are stored and used responsibly. Everyone should be able to find out about how patient data are used. #datasaveslives You can find out more about the background to this citation here: https://understandingpatientdata.org.uk/data-citation

Data-sharing statement

Data supporting this work are available on reasonable request. All requests will be reviewed by relevant stakeholders, based on the principles of a controlled access approach. Requests to access data should be made to CTRU-DataAccess@leeds.ac.uk in the first instance.

Ethics statement

The stakeholder interviews, mapping study, codevelopment, piloting and feasibility trial were approved by Leicestershire, Northamptonshire, and Rutland Research Ethics Committee (reference 10/H0406/21). The RETAKE trial was approved by East Midlands – Nottingham 2 Research Ethics Committee (reference 18/EM/0019) on 5 February 2018. All data were stored in accordance with the Data Protection Act (1998) and University of Nottingham (Sponsor) Research Governance procedures.

Information governance statement

The collaborating institutions are committed to handling all personal information in line with the UK Data Protection Act (2018) and the General Data Protection Regulation (EU GDPR) 2016/679.

Under the Data Protection legislation, the University of Nottingham and the University of Leeds are the joint Data Controllers, and you can find out more about how we handle personal data, including how to exercise your individual rights and the contact details for our Data Protection Officer here: www.nottingham.ac.uk/utilities/privacy/privacy.aspx; https://ctru.leeds.ac.uk/privacy-cookies/how-we-use-personal-data/

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About this article

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List of supplementary materials

Report Supplementary Material 1
Guided checklist for ESSVR intervention development

Report Supplementary Material 2
Description of the ESSVR intervention delivered in the RETAKE trial following TiDiER

Report Supplementary Material 3
Soft Systems Methodology CATWOE mnemonic with example questions; adapted from Checkland and Scholes

Report Supplementary Material 4 Logic model illustrating the intervention process components and mechanisms

Report Supplementary Material 5
Iterative development of ESSVR resulting from primary research data collection, piloting and feasibility testing reflecting changes

Supplementary material can be found on the NIHR Journals Library report page (https://doi.org/10.3310/GJKR0715).

Supplementary material has been provided by the authors to support the report and any files provided at submission will have been seen by peer reviewers, but not extensively reviewed. Any supplementary material provided at a later stage in the process may not have been peer reviewed.

The supplementary materials (which include but are not limited to related publications, patient information leaflets and questionnaires) are provided to support and contextualise the publication. Every effort has been made to obtain the necessary permissions for reproduction, to credit original sources appropriately, and to respect copyright requirements. However, despite our diligence, we acknowledge the possibility of unintentional omissions or errors and we welcome notifications of any concerns regarding copyright or permissions.

List of abbreviations

CI	confidence interval
CRF	case report form
DWP	Department for Work and Pension
IQR	interquartile range
MRC	Medical Research Council
OT	occupational therapist
POCS	posterior circulation stroke
RCT	randomised controlled trial
RETAKE	RETurn to work After stroke
RTW	return to work
SD	standard deviation
UC	usual care
VR	vocational rehabilitation

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Appendix 1 Systematic review search strategy

Source	Database/provider	Search name/details
MEDLINE	OVID	(exp work/ or exp employment/ or exp work capacity evaluation/ or rehabilitation, vocational/ or sheltered workshops/ or retirement/ or vocational education/ or absenteeism/ or job satisfaction/ or vocational guidance/ or career mobility/ or exp occupations/ or "return to work".tw. or sick leave/) AND exp *stroke/)
EMBASE	OVID	(*Stroke/ or stroke patient/) AND (exp Work/ or exp Employment/ or exp vocational rehabilitation/ or retirement/ or employability/ or work resumption/ or job adaptation/ or "return to work".tw. or exp vocational education/)
IBSS	ProQuest	
AMED	OVID [2019 search via NICE Healthcare Databases Advanced Search (HDAS)]	(Stroke/ or cerebral haemorrhage/ or cerebral infarction/ or cerebral ischemia/ or cerebrovascular accident/) AND (exp employment/ or rehabilitation vocational or retirement/ or (return to work). ti,ab)
HMIC	OVID	(stroke.tw.) and (job or work or employ$ or vocational$ or career$ or occupation$.mp)
Social Policy and Practice	OVID	(stroke.tw.) and (job or work or employ$ or vocational$ or career$ or occupation$.mp)
ERIC	OVID	(stroke.tw.) and (job or work or employ$ or vocational$ or career$ or occupation$.mp)
CINAHL	EBSCO	((MM "Stroke") AND (SU employment or SU work or SU occupational or SU career or SU reemployment or SU job or SU employee or SU retirement or SU unemployment or SU vocational or SU employability)) EXC Medline records
PsycInfo	EBSCO (2019 search through NICE HDAS)	((MM stroke) and (SU employment or SU work or SU occupational or SU career or SU reemployment or SU job or SU employee or SU retirement or SU unemployment or SU vocational or SU employability))
WEB OF SCIENCE		stroke.ti. and (return to work or vocational rehabilitation)
REVIEWS ONLY		
The Cochrane Library	Wiley	MeSH explode all trees: (work or employment or rehabilitation, vocational or occupations) OR MeSH this term only (work capacity evaluation or sheltered workshops or retirement or vocational education or absenteeism or job satisfaction or vocational guidance or career mobility or sick leave) OR return to work.tw AND MeSH explode all trees (stroke or intracranial hemorrhages)
The CAMPBELL database		Stroke (keyword)

Appendix 2 Author-identified important components for supporting RTW after stroke mapped to mechanisms

Author-identified important components	Mechanism	Description	Evidence from literature
Involvement/co-operation from both provider, employee and employer (including coworkers)	**Employer engagement**	Liaison with employers to facilitate a RTW. The relationship is maintained over time, creating a close working alliance. Monitoring and feedback to employer and patient on work performance and work goals.	McMahon and Crown (1998)[51] Öst Nilsson *et al.* (2017)[54] Öst Nilsson *et al.* (2020)[55] Öst Nilsson (2019)[52] Grant (2016)[18]
Specialist in stroke providing VR – accounting for the wider impact of stroke and appropriate goal setting and tailoring Person-centred, individualised – tailored service	**Individual Tailoring**	Individual tailoring of intervention components to meet patient and employer needs; tailoring intervention to the context, for example not all patients have an employer or permit employer engagement. Patients may not have a job.	Grant (2016)[18] Cullen (2016)[53] Öst Nilsson *et al.* (2017)[54] Öst Nilsson (2020)[55]

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Author-identified important components	Mechanism	Description	Evidence from literature
Early intervention – to organise all rehabilitation around the ultimate goal of RTW	**Early intervention**	Screening and early identification of stroke patients employed at time of stroke ensures early advice provided to patient and other involved members of the healthcare team, thus preventing decisions about relinquishing work based on severity symptoms/recovery. Ensures those likely to need support in returning to work are identified early in rehabilitation pathway to allow a co-ordinated approach to job retention, and careful planning of RTW. Ensures patients are asked about employment early on; people with less severe stroke are not missed. Promotes a co-ordinated approach. Prevents ill-informed advice from HCPs. Work is recognised as a health outcome after stroke by the healthcare team. Those requiring little input may be signposted for self-management.	McMahon and Crown (1998)[51] Phillips *et al.* (2018)[49]
Responsive and flexible intervention – at the right time for the patient + available to those unable to return to formal paid or voluntary work	**Responsive and Re-accessible**	Provides longer-term monitoring, responding to changing needs (intensity, duration, components). Feedback on work performance and life goals. Patient can easily re-access/self-refer to the service as health needs (stroke-related/comorbidities) or employment needs (context/employer/job) change over time	Cullen (2016)[53] Grant (2016)[18] Phillips *et al.* (2018)[49]
Case co-ordinated throughout the intervention – including clear communication with employer in respect of expectations, responsibilities, to create a realistic plan together	**Case management/ co-ordinated effort**	The OT acts as a case co-ordinator, involving other people/agencies in providing support. Open communication between all stakeholders ensures those involved in supporting the RTW process remain informed and the patient receives consistent advice. The stroke patient and other stakeholders are included in all communication and fully engaged in the RTW plan.	Grant (2016)[18] Öst Nilsson *et al.* (2017)[54] Öst Nilsson (2019)[52]
Multidisciplinary team; where the employer is part of the rehabilitation team.	**Colocation**	Crossing employment sector-health sector divide. Involves the physical transfer of information, and sharing of knowledge and skills between sectors. Can occur in numerous ways; for example meetings that cross organisational boundaries, for example employment sector representatives participate in clinical meetings; therapist visits workplace; multi-stakeholder communication, for example letters/reports; patient acts as conduit of information; providing support for the stroke patient in the workplace.	McMahon and Crown (1998)[51] (24) Grant (2016)[18] Öst Nilsson *et al.* (2020)[55] Öst Nilsson (2019)[52]
'Mapping' individuals' occupational performance and skills	**Identifying injury impact**	Assessment of physical, cognitive and psychological function to identify stroke impact on the person's role as a worker. Identification of personal (e.g. beliefs and attitudes) and environmental factors (workplace factors e.g. employer attitudes) that may influence work outcomes.	McMahon and Crown (1998)[51] Öst Nilsson (2019)[52]

Author-identified important components	Mechanism	Description	Evidence from literature
Assessments of the workplace Work trials	**Understanding impact on work**	Assessment of the job tasks, role and environment to evidence the intervention plan. Identifies impact of external factors or constraints to work. Raises employer awareness of stroke and helps them think about physical and psychological aspects of the employee's role and modifications needed to support the patient's RTW. Identifies workplace factors likely to influence work outcomes (e.g. physical environment, employer attitude).	Ntsiea *et al.* (2014)[32] McMahon and Crown (1998)[51]
Work preparation – in the workplace and simulated work environments for assessment and practice of work tasks	**Work preparation**	The patient re-establishes work skills and increases work capacity by engaging in work-related tasks a prior to RTW. Tasks may include real or simulated work tasks inside or outside of the workplace. For example, re-establishing work routines by simulating the working day.	Cullen (2016)[53] Öst Nilsson (2019)[52] Ntsiea *et al.* (2014)[32]
Not described by authors	Recommends specialist equipment. Provides assistance with travel to work. (Accommodating Injury at work)	Changes to work tasks, equipment, travel to/from work and the work environment to accommodate disability and optimise the work environment for the stroke patients' successful return. May involve supernumerary support from coworkers. Therapist negotiates workplace accommodations with employer, drawing on legislation.	
Supported self-management to equip in wider participation in the community/society, including signposting	No match		Cullen (2016)[53] Öst Nilsson *et al.* (2017)[54]
Multidisciplinary team with; employer as part of the rehabilitation team	No match	Involves healthcare professionals working together to support people with complex care needs identified through risk stratification and case finding.	McMahon and Crown (1998)[51] Grant (2016)[18] Öst Nilsson *et al.* (2020)[55] Öst Nilsson (2019)[52]
Group interventions providing rehabilitation + social elements + peer support	No match		Cullen (2015)[53]

Appendix 3 Quality assessment of included papers

Author	Quality appraisal tool	Percentage (%)	Rating
Phillips *et al.* (2018)[49]	Cohort	64.58	Medium
Grant (2016)[18]	RCT	76.32	High
Ntsiea *et al.* (2014)[32]	RCT	68.42	High
McMahon and Crown (1998)[51]	Observational cross-sectional	50.00	Medium
Mennemeyer *et al.* (2006)[50]	Observational cross-sectional	50.00	Medium
Öst Nilsson *et al.* (2017)[54]	Qualitative	94.44	High
Õst Nilsson *et al.* (2020)[55]	Qualitative	100	High
Õst Nilsson (2019)[52]	Qualitative	88.89	High
Cullen (2016)[53]	Qualitative	100%	High

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Appendix 4 Barriers to return to work identified in interviews with stroke survivors and service providers (phase 1)

Theme	Description of barriers	Example quotes
Service design, delivery and resources	Support for RTW after stroke was restricted by capacity issues in existing neurological rehabilitation services. Out-patient rehabilitation was impairment focused with a 3-month waiting list. People with more severe stroke or a need for two therapies were prioritised over people with milder strokes were often unable to access rehabilitation following dis-charge. Visible disabilities, for example mobility impairments were more likely to be treated. Referral to existing services relied on a mixture of formal and informal 'networks' (in health, the DWP and charitable sector) rather than properly planned care pathways. It relied on people in the network knowing what was available and making referrals. As a result, stroke survivors risked slipping through the net. A hub and spoke model meant there was geographical variation in access to support with more stroke specialist expertise in the acute hospital hub and limited community stroke or VR service provision. Some providers saw VR as an integral part stroke reha-bilitation, but others believed RTW was not a priority for commissioners not the job of health services.	'The turnover is so fast in the acute stages, and I find this particularly with younger stroke patients, they're sent home because they're, you know, walking about and they can feed and dress themselves. They are independent from that point of view but actually they've got a lot of high-level cognitive deficits so when they try to go back to work, they haven't got the concentration or their memory is not so good, they can't process things as well. And of course, that impacts hugely on their working'. RTW-SI-D-116:166 'He wasn't ever on our waiting list or anything, he somehow got missed, so he went back (to work) unsuccessfully'. RTW-SI-D104:125 'Our actual operational policy is that we are a resource of information, a specialist resource for other areas and we do have other therapists ring up for advice... there are areas that haven't got neuro services'. RTW-SI-D-104:630
Influence of the workplace	Employer size and workplace policies influenced access to occupational health and VR services. Opportunities for redeployment and retraining were greater in larger companies. However, occupational health assessment was often limited to short (10-minute) telephone assessment and better suited to people with musculoskeletal injuries, and other illnesses where the person was cognitively intact and able to self-advocate, rather than complex neurological conditions like stroke. These OH providers did not liaise with other stake-holders involved in supporting a person to RTW. There were concerns that stroke survivors risked being managed out of work or pressurised into retirement on medical grounds, without the opportunity to recover, engage in VR and return later. Self-employed people tended to rush back to work as soon as possible, often for financial reasons.	'When I say we do telephone assessments, we call them "call-backs" rather than telephone calls because we, our day is split into four hundred minutes clinical time so ten call backs, forty minutes ago, through-out the working day, twenty minutes to do the actual assessment, twenty minutes to do the actual report. If we need any further time outside that, it's in our time'. RTW-SID-115:1009, 1041 '[W]e've had a few people here who were at work and had a stroke, then before they knew it they'd been signed off... medical retirement and they end up losing their job, and then six months after that they think, "oh actually I think I could have done my job", in a way it's a bit too late'. RTW-SI-D-106:135 '[T]hat's a very common problem that comes up, we have a lot of people who are self-employed and of course they drive themselves back to work quite quickly if at all able'. RTW-SI-D116:213
Stroke survivor factors	Stroke survivors and service providers highlighted reduced confidence, poor motivation, low self-esteem, reduced, anxiety and depression as barriers to work return and may influence engagement with VR. Similarly, cognitive or significant speech and language diffi-culties might make accessing VR difficult as some healthcare professionals may consider RTW too challenging. Partners and family members could influence RTW and or engagement with VR by either being over protective and preventing or pushing the stroke survivor RTW prematurely for financial reasons.	'[W]e've got a young person in our service at the minute who could potentially get back to work but her anxiety is such a state.. she cries if we talk about work'. RTW-SI-D-104:165 'I realise now, I must have been depressed but no one ever picked up on it, you know, just stripped of my personality completely... my confidence had gone completely'. RTW-SI-D-103:39 'Especially if you get someone back and there are cognitive problems. Cognitive problems are a big issue to overcome'. RTW-SI-D-102:362 'I've got some people who can't, like the relatives will almost reinforce the fact that they 'oh he can't get back to work, he's not well'. RTW-SI-D-104:865

Theme	Description of barriers	Example quotes
Service design, delivery and resources	**Key design features** Stroke Specialist and VR knowledge were seen as essential in facilitating RTW and seeking work alternatives. A multidisciplinary approach with the involvement of GPs. The stroke survivors work status needs to be given higher priority by clinicians while the person is still in hospital. Appropriate timing of VR is important, with flexibility to accommodate early intervention for mild stroke and later intervention for people with more severe disability. Predicting the right time was recognised as challenging. The intervention needs to be both flexible and responsive. Review appointments with the stroke consultant could trigger referral. One interviewee proposed commissioning VR services using a lead provider model which would involve one organisation being commissioned to provide and co-ordinate the service on the understanding that they build in collaboration with other organisations. This interviewee saw 'return to work' as an intervention that required an integrated effort from the NHS, social care, the DWP and education. Another suggestion was sharing resources with the traumatic brain injury service order to make more efficient use of available resources. Adopting a case management approach as per the traumatic brain injury service was seen as beneficial.	'Just going out there, it's all coming from me, they'll not seem to be getting anything from it and then all of a sudden it just clicks into place, timing'. RTW-SI-D-105:359
Influence of the work place	Employers and line managers need support and education about stroke effects and what to expect in terms of recovery, to facilitate successful RTW. Concerns about legal issues were raised. It was considered important to the stroke survivors' written consent before any communication with the workplace took place. Improved communication between occupational health and NHS rehabilitation service providers was felt necessary.	'I think that employers need to be aware of what to expect from the post-stroke patients. She (my manager) had no idea'. RTWSI-D-103:683 'Yes, I think (we need) someone to talk to, to make sure we are doing the right thing. Because you know, what do we really know about someone having a stroke, not an awful lot'. RTW-EMP02:40 'The way I handled it, I let her (employee with stroke), get herself well. I didn't investigate what actually happened to her and nor 85 was I given any instruction as to what her capabilities was when she came back to work...but should I have gone and found out myself, that's what I question'. RTW-EMP-11:97, 229
Stroke survivor factors	An individually tailored approach involving work preparation, managing invisible disabilities like fatigue. One interviewee said that expectations of services have to be managed carefully, particularly if the stroke survivor does not have insight into their condition as this will influence the feasibility of returning to work. Peer support/mentorship from other stroke survivors was advocated, for example group work. Education and support for partners and families of stroke survivors in preparation for RTW was seen as a vital part of VR by some service providers.	'Quite often we get a referral for the carer who is struggling, doesn't understand, not coming to terms, feeling angry because, you know, they've lost their supporter, almost their own carer. Their whole life changes'. RTW-SI-D-108:650

Appendix 5 Case study participant data and Interview feedback

Participant 1 was a 69-year-old man admitted for 4 days with a POCS resulting in a homonymous hemianopia. Prior to stroke, he ran his own clothing retail business. He had a previous medical history of heart disease, diabetes and myocardial infarction (aged 50) and had previously been treated for kidney cancer. He received help with fatigue management, graded RTW, work preparation (graded exercise programme including 'jobs around the house' to increase stamina) education on compensation strategies for hemianopia, stroke association information on driving and work and different strokes booklet 'work after stroke: information for family and friends'.

Participant 2 was a 58-year-old woman admitted for 4 days with a POCS resulting in a homonymous hemianopia, who managed a chip shop. She had no previous medical history. Following assessment of the impact of the stroke on the person and work role, the intervention involved providing information including Stroke Association leaflets on fatigue, visual problems and driving after stroke; different Strokes information booklets on 'Work after Stroke: Information for Family and Friends'; education on compensatory strategies for hemianopia; and work preparation including strategies for increasing confidence and building stamina by walking outside, going to shops and using public transport and building concentration (using a computer). The VROT wrote a letter to the employer via the participant making recommendations about RTW including lighter duties, taking breaks, hours of work and transport to work and included Different Strokes 'Work after Stroke – Information for Employers' and information on Access to work information. VROT advised on a phased RTW, which was implemented, and progress was monitored in fortnightly meetings to discuss hours, ability to fulfil work duties and fatigue levels. The patient disengaged from the intervention prior to an agreed ending. More details of the two cases and intervention delivered are reported elsewhere.[18]

Most valued aspects of the intervention	Description	Example quotes
Content:	The participant affirmed the intervention involved the right mix of support and guidance with respect to visual problems, driving, fatigue and work return.	'Well, I think in essence I think that the thing I got from it was that there was somebody there that you could discuss things with, that had a little bit of experience as to what you were going through. That was really the essence of it'.
Employer engagement:	Although self-employed, the participant thought employer liaison would be useful for educating employers about the physical and mental impact of stroke and its' impact on the work role.	*'I think that is an area (liaison with employer) where it could be very effective because there is nothing out there at the moment is there? Nothing at all'.* *'I think it is a good idea if somebody somewhere was doing it (assessment of capability to do the job). I think that is probably one of the benefits, one of the biggest benefits of this thing really'.*
The value of a phased return:	Due to previous experience of medical ill health, the participant was already familiar with the concept of a phased return but felt the stroke was different in that he was surprised by the level of fatigue experienced. He described the importance of taking it easy during the first month and accepting help from family members in running the business, then building up his hours, days and duties at work gradually.	
Intervention delivery:	The participant felt the timing and duration of intervention were appropriate. He had had no other NHS post-stroke support but appreciated the support and follow-up from the OT. The participant suggested siting the service outside the NHS (or within the NHS with a ring-fenced budget) to enhance its effectiveness.	*'I really didn't get any follow up from anywhere else'.* *'Well, if it was a bit more independent, then it would probably be more aggressive and more effective, but I don't think, but then maybe you can do that within the NHS I don't know. It depends on the management style doesn't it and who is running it and all of that sort of stuff'.*

Appendix 6 Themes emerging from the feasibility trial stroke and employer participant interviews

Focus	Themes	Example quotes
Intervention content Support, provision of information education and feedback, communication with the workplace, perceptions of assessment, the value of a phased return	Emotional support was highly valued by both trial participants and employers. Having someone to talk to with stroke specific knowledge who could offer feedback on recovery and progress with VR, validated the impact of stroke on the individual, which stroke survivors found reassuring. The informal psychological support gave participants confidence.	(OT)'s been very supportive, and she has kept in touch to see that it hasn't actually got me down and I've remained positive and she has checked that from the emotional point of view that that's been. And to be quite honest I don't think I could have got through without (OT). 'And when it all started my husband said to me, when all this was going on occy health and the managers he said do you know really OT's the best thing that's happened to you. With all the support that I've had from her'. (RTW12) 'Because I think you need somebody in the early days, somebody that you can talk to, somebody that – again, you can voice these fears and irrational emotions and things. And I think to go from being discharged from hospital to your six-month stage and not having any intervention I think would be very difficult for some people'. (RTW5) 'X (research OT) was very good from the psychological aspect, so there was lots of things that I was really struggling with, like walking up and down the stairs, just when I went out for the first time on my own, because I couldn't drive I had to take public transport and getting on and off a bus was such a challenge because of the weakness in my leg. And I talked to X about that, and she was really good. Just being there, someone to talk to, and someone to explain all these irrational fears and what I thought was perhaps silly, X was saying, no, that's perfectly natural, that's a natural reaction'. (RTW5) 'The confidence to do it I think'. (RTW8) 'So I think having that support there from (research OT) was quite useful for me and as to how we were going to manage it as well'.
	Trial participants described how they, their employers and families had been given booklets, useful websites, and verbal information about the impact of stroke and advice/education on how to manage specific difficulties experienced (e.g. pacing strategies to manage fatigue). They described how this was offered in a timely way and tailored to their individual needs. Employers also valued the information, indicating that they would have found sourcing information difficult if the therapist had not been involved. Some explained that they would have only had information obtained from the internet and been uncertain about its validity.	'I think probably at the first meeting with X (research OT) she gave me a whole raft of papers about stroke and how it affects you and tiredness. And I was tired'. (RTW2) 'I felt that she (OT) knew what she was talking about and if she didn't know then she would research it and have an answer for me next time she came you know like doing that neuroplasticity and stuff'. (RTW8) 'And that's why (OT) came with me (to the workplace to meet managers). Because she was – she'd got the professional aspect of it, she understood stroke and she understood the sort of – the effects it has on people and how strokes vary. So your typical image of a stroke person is somebody in their 70s or 80s that have their arm crooked, in a wheelchair, can't speak, drooling, face dropped. That's the stereotype. And having (OT) there it was good for her to explain the sort of professional side and how strokes vary and how they – depending on which side of the brain they hit and where in the brain they hit. So that was good'. (RTW5) 'I know even if she didn't know, she could point me in the right direction, you know. It's having – and then I can explain to the research OT, it's having those signposts available that helps a lot because even, okay, I can go and do a search on Google, but trouble is, it gives you so many choices, where do you go? Which one do you take as the right one, you know, whereas if you speak to somebody who's had that experience and, like I say, definitely oh right, yeah, need to go there, speak to such and such, and this is what you do. And that's a great help, definitely, yeah'. (RTW3)

Focus	Themes	Example quotes
		'I mean (research OT) did give me quite a lot of documentation about understanding stroke, which was useful because I read in there 316 that obviously it can cause extreme tiredness. It can go on for 18 months or even more or longer and all the different things. So that was very useful because I didn't know what – really what a stroke holds other than it can be very devastating. It can take people's speech. It can take the use of your limbs and what have you. But I didn't understand the other things, the recovery part. So I think (research OT) was very useful in the fact that she gave me the information that I needed what I've got to expect, what we needed to realise, what our expectations could be of her coming back to work'. (E1)
	The importance of the therapist providing ongoing and regular feedback on progress in the journey back to work was highlighted.	'Well knowing that there is somebody that they don't just see it as a stroke and make you realise that you're getting on, you can get on and get things back and that you are in control really'. (RTW12) 'It was really mainly aimed at what progress had I made since she last saw me that would enable me to go back to work'. (RTW9) 'And I'd keep reporting what had happened in the last month or two weeks since we last met and she says, "Yes, that's good, but try doing this and trying doing that". Yeah'. (RTW4)
	The importance of keeping channels of communication open with the workplace and liaison to negotiate phased RTW and workplace accommodations was highlighted by employers	'We used to have meetings and things were discussed or any issues I'd got or she'd (employee) got. And sometimes the service manager would be involved in the meetings. And then we would always get written documentation back from X (OT), which obviously I've got all of that in her (employees') file'. (E1) 'No I didn't ring her (OT) because I knew when she was going to give me a ring and I was just making notes for the telephone conversation, or I knew when she was coming in and then I'd say it in front of everybody anyway if I'd got a concern with X (employee) and he would be there when I said it, so he was well aware what my concerns were'.(E2) 'She (research OT) phoned me when X (trial participant) was off sick and explained where she was and what she was doing with X and about how she was working closely with X. And from then onwards we would keep in touch regularly. If I was unable to get in touch with X I would speak to the research OT and she was always sort of giving me updates on how X was actually doing'. (E3) 'Otherwise if we hadn't had the research OT I don't think we would have had good communication and I think that would have broken down'. (E3) 'She was very good at coordinating was the research OT because there was a couple of times I could not get in touch with X and I could get in touch with the research OT and it was like a case of can you get in touch with X. This needs to happen. So she was very good at coordinating and like a go-between as well'. (E3)
	Assessment	'She asked me what my job entailed. She came to look at the workstation that I work at, and where – she did do a sort of assessment, an ergonomics assessment of my desk, and where the files were in relation to where I was sitting and things that I would need around me, she did an assessment of my area of work. And said, we need to change this, and we need to do this. And then she'd go – she went to see (manager) and said, I think we should change the position of this, and can we move these? So she did that before I came back to work, she wanted to instigate these changes ready for when I came back. But at home we didn't really do any practical type things'. (RTW5) 'She thought I'd got cognitive problems and she was having me assessed for that'. (RTW11) 'Well, I think she certainly did a lot of research within the office to see where she sat, the sort of jobs that she was doing. She was involved in how she was going to get to work, obviously because there's that issue, the journey to work from work. Yes, she was, again, quite a bit of input to see what sort of things that she was doing. Was it appropriate? you know, obviously because she does do a desk job so it is'. (E1)

Focus	Themes	Example quotes
	Value of a phased RTW and flexible accommodations	'And I just went back one day a week to start off with and then built up to three, four, five. And by the end of, no the start of July I was able to work full time. I did full time in July and August, we were very busy, but then work dropped off a little bit so I've taken the opportunity to go back to four days a week and that's where I am currently. And I do it as three full days and two half days. And they're very accommodating. They let me do the full days in the office and half days from home'. (RTW4) 'At the end of the day I think probably both (research OT) and I both felt we weren't either of us given much input with it (return to work plan) because she'd already done her own schedule! And although we did say, and we did have to pull her back a bit because (OT) seemed to think it was a bit too much too soon, and so she (trial participant) agreed to make some adjustments to it, which I agreed to, and I thought was just – it was just not doable after what she'd been through, but I don't think she realised herself, or she wasn't prepared to'. (E1) 'After building – extending my working day and then going from three days to four days, and then I did do five days, but short days. So, I think I did something like 9 until 3. But doing five days, 9 until 3, was too much. So then I spoke to (OT), I said, I'm really struggling, I'm finding it really hard. So then (OT) came in and we sat with my managers again and said, actually, can we re-negotiate this?'. (RTW5)
Intervention delivery Continuity, timing of intervention, duration of intervention, accessibility of OT knowledge and qualities of the OT, individualised intervention, integration and liaison with other services	Continuity of the intervention from in-patient stroke unit to home and then into the workplace was perceived as a positive feature.	'My main memory of the time spent on it (intervention) is positive, I enjoyed being part of it, I enjoyed the continuity of seeing X in the hospital and then out at home. And she was very encouraging, and it did help me all the way through to, yes, to keep improving'. (RTW4)
	Timing of the intervention was considered appropriate but for one person with a severe stroke and with cognitive difficulties it was perceived as too early.	'Well, I think it (intervention) ought to be offered because it's very good, especially the first couple of weeks when you're on your own afterwards, somebody comes in and talks to you, helps you'. (RTW1) 'I mean myself personally I'm happy to help with anything like this so I'd probably have said yes at any time that the research OT had approached me. But thinking about it, it was only really in the last week of my six weeks in hospital that I was anywhere coherent in any way that, you know, I could feel that I could give good information'. (RTW4) 'So, I'd always had sort of unspoken targets that I wanted to meet. I suppose just in the back of my mind that kept me going really. But I think as I progressed and saw how slow the process was to get back because of how severe the stroke was and me not realising in the early days that it had been so severe, I sort of obviously started changing those long-term goals, thinking okay, maybe, hopefully next year. Or then, even now, I'm not thinking of next year now. I'm thinking probably the year after'. (RTW3) 'Just to say that I think whilst it was good to have (OT) introduce herself very early on, to actually talk about going back to work was not priority. So I think maybe the explanation and what they're hoping to achieve is good, but then maybe take a back seat for a month or two'. (RTW5)

Focus	Themes	Example quotes
	The intervention duration was tailored to individual needs. Most people appeared satisfied but one felt it could have been shorter and another said it was not long enough to support a RTW. This was connected in each case to stroke severity. One employer would have liked liaison with the research OT to have started earlier and involvement to be sustained over a longer period.	'Yes, as I say, I mean certainly the last couple of visits from (OT) certainly weren't necessary, but having said that, they were still very nice to have. But for other people, yes, maybe you need a lot longer'. (RTW2) 'I think it'd have been useful if (the research OT) had have come on board early on'. (E6)
	Employer engagement, monitoring and review Employers explained that liaison with the research OT had been brief, and they perceived the OT to be checking whether they were following the correct legal procedures and providing reassurance that they were doing the right thing for their employees.	'It (a review following return to work) would have been useful yes because if there'd have been any issues or anything that I, because when they first came back obviously there were in an HR environment so we were very sort of cotton woolly and are you okay and you know, this is what you need and I was conscious that I didn't want to over stretch her but on the same, I didn't want to be condescending either'. (E6)
	Individualised intervention – the many ways in which the intervention was tailored to individual needs.	'I'm sure it's like district nursing. People are individual so you have to tailor what you're doing. So, I think X (the research OT) met my needs what was right for me when she could be doing something completely different with another person. But for what I needed and because the sensory thing has been my biggest problem then you know she helped with that'. (RTW12)
	Integration and liaison with other services. The OT liaised with other services (part of UC), referred to them, for example clinical psychology and co-ordinated care, with respect to RTW in complex cases. Examples of cross sector working included the OT involving a disability rights adviser from the charitable sector to support a trial participant at RTW planning meetings and when she accompanied another trial participant to an appointment with a disability employment adviser.	'Yes, I think the research OT was and still is involving everybody'. (RTW11) 'As I say, the majority of the support has been from X (research OT), but I've also had Y (out-patient OT) there and the intermediate care. So from my point of view, I've had a lot of support'. (RTW5) 'In the workplace, the research OT attended occupational health appointments and meetings with human resources and trade union representatives on some occasions as part of the intervention. 'I think Y (trial participant) went to the doctor's and the doctor was going to sign her back to work and X (research OT) then, obviously she can't be signed back to work. She has to go through occy (occupational) health and she (research OT) was very good at sorting that out as well'. (E4) '[T]hinking about it, it felt like I'd got a union member there saying well you know well why is she not getting this money and why's she not like…? I felt she was checking to make sure I wasn't fiddling her out of any money. That's a bit how it felt'. (E6) 'Well the impression I got of her was the professionalism she was demonstrating I thought she would have been you know, she'd have been on me like a rat up a drain basically if something was going wrong'. (E5) 'And I did get the reassurance that I was actually doing the right thing for the colleague. That was what I thought but I wasn't, you know I'm not a doctor or nurse'. (E6)
	Accessibility Participants and employers perceived the research OT to be accessible via phone and e-mail and this appeared to be linked with feeling supported.	'She was always available if I needed her, either via email or I could ring her'. (RTW5) 'She explained what she was going to do and if I had any problems. Not to be scared to get on the phone or get in touch with her somehow'. (RTW7) 'She (research OT) has said I can ring her, so I have got that and I have certainly got her card. And I do feel comfortable at doing that if I needed to'. (E1)

Focus	Themes	Example quotes
	Ending intervention by gradually withdrawing was mostly acceptable. 'I have to say, that wasn't made clear to me. I thought she was totally there just for my member of staff. But actually, I did feel that, at the end, at the end of it, I realised that actually I could have fed into it if I needed to. But then how much do you put onto one person? You know, you've got to – you know, but again sometimes managers do need support in getting these people back in'. (E1) Participants also felt their partners and family members could access support from the research OT.	'It was too much for her, (research OT) pulling back, and it was the year, so they need to either be doing it before or not'. (E1) 'Yeah, tailor' (interviewer). 'Yeah, I think so. But that was just for that person. Other people, it might not affect them like that'. (E1) 'She has tailored it off and I'm aware of that and I'm happy for her to do that'. (RTW11) 'Yes and she wasn't too pushy, wasn't too much in your face. But she said if you need me or if you feel that maybe you need my help or maybe (your wife) needs my help as well. Cause she involved you (wife) in conversations'. (RTW7)
Intervention outcomes Influence of intervention on outcomes. Influence of stroke on outcomes.	Participants expressed views on how the intervention influenced their journey back to work. Some felt they returned to work sooner due to the intervention, others felt they would have rushed back and failed to sustain their RTW without the intervention. Some felt the outcome would have been the same without intervention and others (stroke survivors and their employers) felt they would not have returned to work without the intervention (RTW11 and E4). Most were aware that the research OT had helped them identify a realistic RTW date which involved challenging their own perceptions at times. For one participant the stroke impacted on his ability to return to his previous job and so he was considering alternatives (RTW3). Another participant decided to retire as he felt he was not able to do job to the standard he had previously achieved due to the physical and cognitive impact of the stroke (RTW 6).	'I don't think I'd have got there as quickly. I think I would have got there, returned a bit later'. (RTW4) 'I'd have got back but I probably, I'd have pushed myself to go back probably too soon if they let me'. (RTW7) 'It's a very difficult journey, and I don't think people appreciate how hard it can be sometimes. And that's what I'm saying about if I had not had the intervention, how would I have coped with coming back to work and all that, the challenge of coming back to work, the challenge of learning to walk again, the emotional and the psychological side of it. And I just think for some people that would be too much. I don't think they would ever get back to work'. (RTW5) 'I wouldn't be back at work today without X (research OT)'. (RTW11) 'But I don't know how, if they would have returned as quickly as what X (RTW11) has done because of the support that she was getting from the research OT'. (E3) 'And in the early days I felt I wanted to go back to the gardening. But as time's progressed, that's – my mind's changed a little about that because one, it's a very physical job, and we don't know how – what my stamina's going to be like. And being able to sit, take a back seat for a while and see how awkward the British weather is and what I just have to deal with, I've looked out some days and I'm thinking thank god I'm not out there working. And slowly I've moved away from wanting to go back outside and think well, one, I'd like – I probably ought to go back into a paid job, employment that gives me more security and out of the elements'. (RTW3) 'The coordination was terrible. Even now I have difficulty – although I'm not left-handed, moving this left hand round properly. Like if I'm winding a perm or something like that'. (RTW6) 'Yes. And I still forget things. I mean, last night I was supposed to – I have a little netbook I'm supposed to key into it every day. I forgot my user number last night, and I've been thinking about it, 340 and I still don't know what it is. I get these blank spots which I never used to. So I think that's one of the reasons I had to pack that up'. (RTW6)

Focus	Themes	Example quotes
Intervention future Who should receive intervention? When should intervention be delivered? Suggested improvements for future intervention. Who should fund the intervention?	A few participants who had had minor strokes valued the intervention but did not feel they needed it. Whereas others felt it should be available to all stroke survivors. There was a sense that early intervention helped to keep the door to an employer open, increase the impetus and give a sense of direction to the journey back to work. Suggested improvements included more formal assessments and objective feedback on improvement. And more detailed information about post-stroke fatigue. There were mixed views about who should and could fund this kind of RTW service in the future.	'So, there was very little that I actually need, well I needed nothing, but it was very pleasant to have the research OT to talk to and get the feedback from her on how I was doing'. (RTW2) 'I think it's something that everybody who has had a stroke should take the benefit of somebody who's impartial but is able to stand up for you when you feeling at your lowest'. (RTW7) 'I think you should do more formal type assessments somewhere along the line. Of what people's abilities are at that point in time. I'd like to know how I was improving'. (RTW8) 'The tiredness, the cause of it, how long it's likely to last and what you can do to stop it lasting that long'. (RTW10) 'Ah…that's a good one! I think that…having gone through it now…oh I'm going to have to say the NHS'. (E2) Because even now I'm not so sure that we would as a company have paid for it, which is a bit unfair and then you can't put it onto the patient because they've had the stroke'. (E2) 'But you do – I mean it was there when we needed it. We didn't know it was there previous but it's been very, very helpful – but as to whether the company would pay, I mean I don't know whether it was a small amount towards it, maybe, because if it's going to get that person who they want to continue to employ back into a position that they can do their job then it's got to benefit the company hasn't it?' (E2) 'In an ideal world it should be the NHS!'. (E1)

Appendix 7 Mechanisms of VR interventions

Author	VR programme	Early intervention	Identifying injury Impact	Understanding impact on work	Individual tailoring	Work preparation	Colocation	Accommodating injury at work	Coordinated effort	Employer engagement	Responsive	Reaccessible	Collective understanding
Programmes with integrated or added vocational components													
Mennemeyer *et al.* (2006)	Equal Pathways to Work					✔							
VR models adapted for stroke survivors													
McMahon and Crown (1998)	VR	✔	✔		✔	✔	✔	✔	✔	✔			✔
Case co-ordination/resource facilitation models													
Phillips *et al.* (2018)[49] and Grant (2016)[18]	ESSVR	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Ntsiea *et al.* (2014)[32]	Workplace Intervention Programme	✔	✔	✔		✔	✔	✔		✔	✔		✔
Öst Nilsson *et al.* (2017)[54] Öst Nilsson *et al.* (2020)[55] Öst Nilsson (2019)[52]	Re-Work Stroke	✔			✔	✔	✔	✔		✔	✔		✔
Consumer-directed approach													
Cullen (2016)[53]	Work Rehabilitation Service		✔	✔		✔					✔		

Appendix 8 RETAKE intervention summaries

TABLE 5 Therapist characteristics

	All therapists (*n* = 58)	Main therapists (*n* = 48)
Gender		
Male	4 (8.5%)	2 (5.3%)
Female	43 (91.5%)	36 (94.7%)
Missing	11	10
Clinical role		
Staff OT	34 (72.3%)	29 (76.3%)
Occupational therapy team leader	7 (14.9%)	5 (13.2%)
Service lead/therapy manager	2 (4.3%)	2 (5.3%)
Other	4 (8.5%)	2 (5.3%)
Missing	11	10
AfC band		
Band 6	25 (53.2%)	20 (52.6%)
Band 7	22 (46.8%)	18 (47.4%)
Missing	11	10
WTE spent on this role		
Mean (SD)	1.1 (0.75)	1.1 (0.80)
Median (range)	1.0 (0, 4)	1.0 (0, 4)
Missing	20	17
N	38	31
Professional qualifications		
Occupational therapy	47 (100.0%)	38 (100.0%)
Postgraduate qualification	9 (19.1%)	8 (21.1%)
Other	7 (14.9%)	5 (13.2%)
Missing	11	10
Overall length of professional experience (years)		
Mean (SD)	16.5 (7.69)	16.5 (7.61)
Median (range)	17.0 (2, 32)	17.0 (2, 32)
Missing	11	10
N	47	38
Length stroke rehabilitation experience (years)		
Mean (SD)	9.9 (7.31)	10.7 (7.23)
Median (range)	9.0 (0, 32)	10.0 (0, 32)
Missing	12	10
N	46	38

continued

TABLE 5 Therapist characteristics (*continued*)

	All therapists (*n* = 58)	Main therapists (*n* = 48)
Length VR experience (years)		
Mean (SD)	3.9 (4.07)	4.5 (4.10)
Median (range)	2.0 (0, 12)	5.0 (0, 12)
Missing	22	17
N	36	31
At least 2 years of clinical experience		
Yes	39 (84.8%)	33 (86.8%)
No	7 (15.2%)	5 (13.2%)
Missing	12	10
Theoretical knowledge of vocational rehab		
Yes	29 (63.0%)	23 (60.5%)
No	17 (37.0%)	15 (39.5%)
Missing	12	10
Experience of VR		
Yes	32 (71.1%)	29 (76.3%)
No	13 (28.9%)	9 (23.7%)
Missing	13	10
Experience managing and working independently		
Yes	47 (100.0%)	38 (100.0%)
Missing	11	10
Health research experience		
Yes	9 (19.6%)	6 (16.2%)
No	37 (80.4%)	31 (83.8%)
Missing	12	11
GCP training		
Yes	11 (23.9%)	9 (24.3%)
No	35 (76.1%)	28 (75.7%)
Missing	12	11

TABLE 6 Therapist mentoring – session level

	Sessions (*n* = 303)
Session method	
Telephone/teleconference	232 (77.3%)
MS Teams	68 (22.7%)
Other	0
Missing	3
Average number of attendees per session	2.5 (1.44)
Mean (SD)	2.0 (1, 10)
Median (range)	(1, 3)
IQR	0
N	303
Average number of non-attendees	0.8 (1.21)
Mean (SD)	0.0 (0, 6)
Median (range)	(0, 1)
IQR	0
N	303
Number of sessions each component was delivered (non-mutually exclusive)	
Clinical issues and actions	222 (77.4%)
ESSVR implementation and actions	172 (62.5%)
Trial-related issues and actions	200 (70.4%)
Details of any therapist issues	202 (70.1%)
Any other issues or comments	157 (53.2%)

TABLE 7 Therapist mentoring – therapist level

	Is therapist a main therapist?		
	Yes (*n* = 48)	No (*n* = 10)	Total (*n* = 58)
Number of therapists who attended at least one session			
Yes	47 (97.9%)	8 (80.0%)	55 (94.8%)
No	1 (2.1%)	2 (20.0%)	3 (5.2%)
Average number of sessions attended per therapist			
Mean (SD)	14.6 (9.16)	2.6 (2.32)	12.6 (9.54)
Median (range)	13.0 (0, 39)	2.5 (0, 8)	10.5 (0, 39)
IQR	(8–20)	(1–3)	(6–18)
N	48	10	58

TABLE 8 Intervention summary

	Total (*n* = 324)
Participant commenced intervention	
Yes	309 (95.4%)
No	15 (4.6%)
Reason no initial intervention visit	
Participant withdrawal	3 (37.5%)
Unable to contact	3 (37.5%)
Other	2 (25.0%)
Missing	7
Intervention completed	
Yes	172 (56.0%)
No	135 (44.0%)
Missing	17
Reason intervention not completed (% out of participants not completed)	
Reached 12 month maximum input	44 (32.6%)
Participant withdrew from intervention	18 (13.3%)
Mutually agreed ending of intervention	22 (16.3%)
Discontinuation of treatment – therapist-led	6 (4.4%)
Uncontactable	24 (17.8%)
Unknown	5 (3.7%)
Participant did not commence intervention	12 (8.9%)
Other	4 (3.0%)
Participant intervention compliance (derived)[a]	
Yes	244 (75.3%)
No	80 (24.7%)
Referral for ongoing rehab made at point of discharge	
Yes[b]	35 (11.8%)
No	247 (83.2%)
N/A – intervention did not commence	15 (5.1%)
Missing	27
Service referred to for ongoing rehab (not mutually exclusive) (% of participants referred for ongoing rehab)	
Healthcare service	24 (68.6%)
Social care service	3 (8.6%)
Employer service	3 (8.6%)
Voluntary organisation	8 (22.9%)
Other	3 (8.6%)

a Participant classed as compliant if: intervention completed, reached 12 month maximum input, mutually agreed ending of intervention, discontinuation of treatment – therapist-led.
b Of those referred for ongoing rehab services, 32 were intervention compliers (18 completed the intervention, 11 had reached the 12-month maximum intervention input, 3 had a mutually agreed ending) and 3 were intervention non-compliers (2 had withdrawn from the intervention, 1 had a therapist-led discontinuation).

TABLE 9 Timing and duration of Intervention summary

	Participant compliant?		
	Yes (*n* = 244)	No (*n* = 80)	Total (*n* = 324)
Intervention commenced within 2 weeks of randomisation			
Yes	205 (84.0%)	52 (65.0%)	257 (79.3%)
No – commenced but not within 2 weeks	39 (16.0%)	13 (16.3%)	52 (16.0%)
Not commenced	0	15 (18.8%)	15 (4.6%)
Participant still in intervention up to:			
3 Months post randomisation	206 (84.4%)	24 (30.0%)	230 (71.0%)
6 Months post randomisation	166 (68.0%)	14 (17.5%)	180 (55.6%)
12 Months post randomisation[a]	108 (44.3%)	3 (3.8%)	111 (34.3%)
Time from randomisation to commencement of intervention (days)			
Mean (SD)	12.2 (17.22)	11.8 (12.10)	12.1 (16.25)
Median (range)	9.0 (0.0, 198.0)	8.5 (0.0, 70.0)	9.0 (0.0, 198.0)
IQR	6.0–13.0	5.0–14.0	6.0–13.0
Missing	0	14	14
N	244	66	310
Time from stroke onset to commencement of intervention (days)			
Mean (SD)	44.0 (26.58)	37.4 (20.98)	42.6 (25.61)
Median (range)	39.0 (7.0, 216.0)	34.0 (6.0, 99.0)	38.0 (6.0, 216.0)
IQR	25.0–57.0	20.0–53.0	23.0–56.0
Missing	0	14	14
N	244	66	310
Time from randomisation to last session (months)			
Mean (SD)	8.1 (3.96)	3.8 (3.07)	7.4 (4.17)
Median (range)	9.6 (0.0, 17.0)	2.7 (0.0, 12.0)	8.0 (0.0, 17.0)
IQR	4.6–11.7	1.6–6.2	3.4–11.4
Missing	0	28	28
N	253	43	296
Time from randomisation to discharge (months)			
Mean (SD)	9.1 (3.56)	6.3 (3.77)	8.7 (3.75)
Median (range)	11.0 (0.0, 15.4)	6.4 (0.9, 13.3)	10.3 (0.0, 15.4)
IQR	6.6–12.0	2.6–9.3	5.5–12.0
Missing	0	30	30
N	244	50	294

a Participants still in intervention at 10.5 months classed as still in intervention at 12 months.

TABLE 10 Session attendance information

	Is participant compliant?		
	Yes (*n* = 244)	No (*n* = 80)	Total (*n* = 324)
Number who attended a first session			
Yes	244 (100.0%)	55 (78.6%)	299 (95.2%)
No – intervention not commenced	0	15 (21.4%)	15 (4.8%)
Missing[a]	0	10	10
Number of offered sessions			
Mean (SD)	11.0 (7.50)	4.9 (5.06)	9.6 (7.46)
Median (range)	9.0 (1.0, 39.0)	3.5 (0.0, 23.0)	8.0 (0.0, 39.0)
IQR	5.5–15.0	1.0–8.0	4.0–13.0
Missing	0	10	10
N	244	70	314
Number of sessions attended			
Mean (SD)	10.4 (7.18)	4.1 (4.49)	9.0 (7.16)
Median (range)	9.0 (1.0, 37.0)	3.0 (0.0, 21.0)	7.0 (0.0, 37.0)
IQR	5.0–14.0	1.0–6.0	4.0–12.0
Missing	0	10	10
N	244	70	314
Number of sessions attended			
None	0	15 (21.4%)	15 (4.8%)
One	9 (3.7%)	8 (11.4%)	17 (5.4%)
2–6	73 (29.9%)	30 (42.9%)	103 (32.8%)
7–12	92 (37.7%)	11 (15.7%)	103 (32.8%)
13–24	59 (24.2%)	6 (8.6%)	65 (20.7%)
> 24	11 (4.5%)	0	11 (3.5%)
Missing	0	10	10
Number of offered and not attended sessions			
Mean (SD)	0.6 (1.10)	0.8 (1.50)	0.6 (1.20)
Median (range)	0.0 (0.0, 8.0)	0.0 (0.0, 8.0)	0.0 (0.0, 8.0)
IQR	0.0–1.0	0.0–1.0	0.0–1.0
Missing	0	10	10
N	244	70	314
Percentage of offered sessions attended			
Mean (SD)	94.7 (9.14)	67.2 (39.87)	88.5 (23.38)
Median (range)	100.0 (50.0, 100.0)	87.5 (0.0, 100.0)	100.0 (0.0, 100.0)
IQR	90.5–100.0	44.4–100.0	87.5–100.0

TABLE 10 Session attendance information (*continued*)

	Is participant compliant?		
	Yes (*n* = 244)	No (*n* = 80)	Total (*n* = 324)
Missing	0	10	10
N	244	70	314
Percentage of sessions attended out of offered[b]			
Intervention did not commence/missing attendance information	0	25 (31.3%)	25 (7.7%)
< 30%	0	1 (1.3%)	1 (0.3%)
≥ 30% and < 70%	7 (2.9%)	13 (16.3%)	20 (6.2%)
≥ 70%	237 (97.1%)	41 (51.3%)	278 (85.8%)

a Intervention commenced, missing session data.
b Compliance definition originally intended to be based on the proportion of sessions attended out of offered; however due to high % of sessions attended out of offered, compliance was instead derived as based on intervention completion and reasons for non-completion. Plots of the number of sessions attended by the percentage of sessions attended out of offered, and by intervention completion and compliance are shown in *Figure 8*.

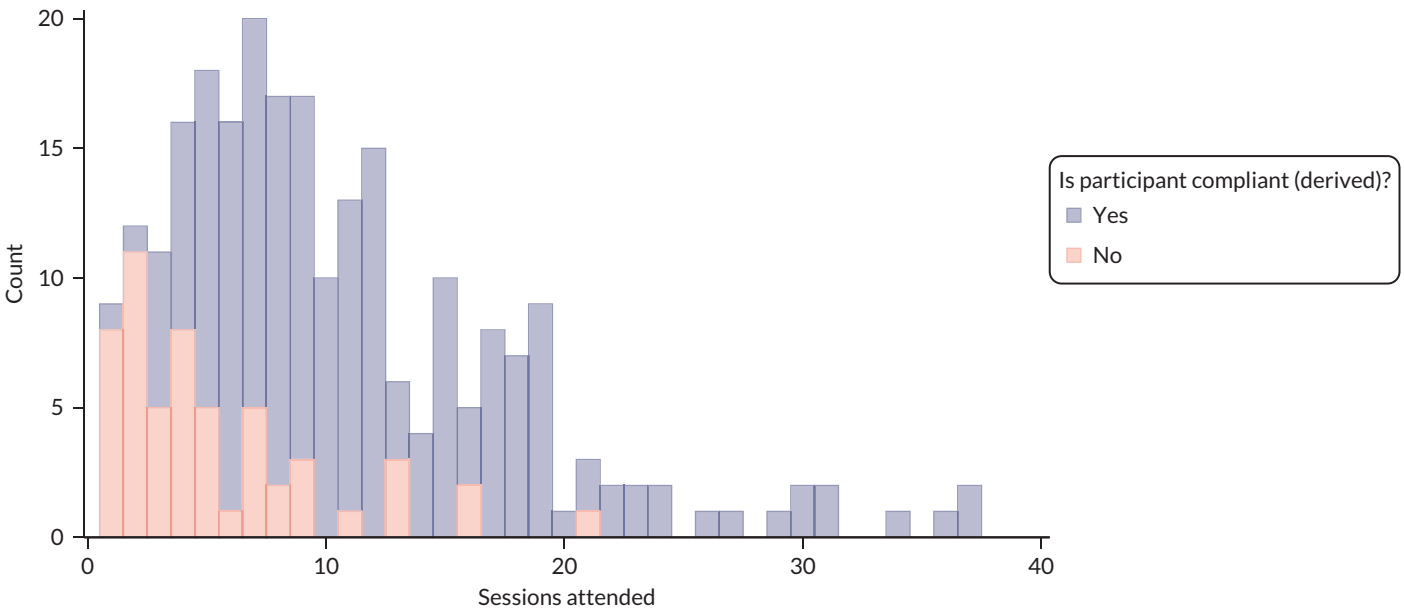

FIGURE 7 Histogram of the number of ESSVR sessions offered and attended by participants compliance status.

TABLE 11 Intervention withdrawals

	Total (*n* = 324)
Withdraw from intervention	
Yes	18 (5.6%)
No	306 (94.4%)
Time to withdrawal from date of randomisation (days)	
Mean (SD)	137.6 (107.67)

continued

TABLE 11 Intervention withdrawals (*continued*)

	Total (*n* = 324)
Median (range)	99.0 (3.0, 351.0)
IQR	67.0–231.0
Missing	0
N	18
Time to withdrawal from date of randomisation (months)	
Mean (SD)	5.1 (3.39)
Median (range)	3.5 (1.0, 12.0)
IQR	3.0–8.0
Missing	0
N	18
Number of sessions before withdrawal	
Mean (SD)	4.5 (3.76)
Median (range)	3.0 (1.0, 13.0)
IQR	2.0–8.0
Missing	3
N	15

TABLE 12 Location of intervention sessions

	Total participants[a] N = 309	Total sessions N = 2945
ESSVR session location		
Home	246 (82.3%)	982 (35.9%)
Work	67 (22.4%)	175 (6.4%)
Community	31 (10.4%)	53 (1.9%)
Non-face to face	243 (81.3%)	1414 (51.7%)
Hospital	52 (17.4%)	112 (4.1%)
Missing	10	209

a Participant summary based on session/s taking place in each location for at least one ESSVR session of those commencing intervention.

TABLE 13 Location of intervention sessions – by participant and timing of recruitment relative to COVID

	Recruited pre-COVID < 31 March 2020	Recruited during furlough scheme < 30 September 2021	Recruited post furlough > 30 September 2021	Total participants *N* = 309
ESSVR session location				
Home	212 (88.7%)	21 (65.6%)	13 (46.4%)	246 (82.3%)
Work	64 (26.8%)	1 (3.1%)	2 (7.1%)	67 (22.4%)
Community	26 (10.9%)	2 (6.3%)	3 (10.7%)	31 (10.4%)
Non-face to face	188 (78.7%)	31 (96.9%)	24 (85.7%)	243 (81.3%)
Hospital	45 (18.8%)	6 (18.8%)	1 (3.6%)	52 (17.4%)
Missing	2	2	6	10

Note
Location of sessions are not mutually exclusive.

TABLE 14 Location of intervention sessions – by session and timing of session relative to COVID

	Sessions pre-COVID < 31 March 2020	Sessions during furlough scheme < 30 September 2021	Sessions post furlough > 30 September 2021	Missing session date	Total sessions N = 2945
ESSVR session location					
Home	809 (48.2%)	87 (12.3%)	86 (24.6%)	0	982 (35.9%)
Work	150 (8.9%)	22 (3.1%)	3 (0.9%)	0	175 (6.4%)
Community	42 (2.5%)	5 (0.7%)	6 (1.7%)	0	53 (1.9%)
Non-face to face	579 (34.5%)	585 (82.6%)	250 (71.6%)	0	1414 (51.7%)
Hospital	99 (5.9%)	9 (1.3%)	4 (1.1%)	0	112 (4.1%)
Missing	35	31	3	140	209

TABLE 15 Employer engagement (of those commencing intervention)

	Total (*n* = 309)
Participant consented to contact employer	
Yes	119 (40.3%)
No[a]	79 (26.8%)
N/A – no employer	10 (3.4%)
N/A – self-employed	57 (19.3%)
N/A – employer liaison self-managed by participant	30 (10.2%)
Missing	15
Contact with employer took place	
Yes	109 (36.8%)
No	187 (63.2%)
Visit with employer took place	
Yes	74 (25.0%)

TABLE 15 Employer engagement (of those commencing intervention) (*continued*)

	Total (*n* = 309)
No	222 (75.0%)
Time from first session to first contact with employer (days)	
Mean (SD)	68.0 (72.63)
Median (range)	39.0 (3.0, 379.0)
IQR	21.0–83.0
N	109
Time from first session to first visit with employer (days)	
Mean (SD)	85.0 (84.92)
Median (range)	49.0 (9.0, 420.0)
IQR	28.0–119.0
N	74

a No reasons for lack of contact were provided. CRF options were: participant furloughed due to COVID-19, participant has been made redundant due to COVID-19, employer is currently closed due to COVID-19. This question was introduced post COVID-19, and no other reasons were provided.

TABLE 16 Employer engagement – other types of contact

	Total (*n* = 309)
Was there contact with the employer reported during intervention sessions?	
Yes	107 (35.8%)
No	192 (64.2%)
Missing	10
Method of contact with employer (not mutually exclusive)	
Telephone	50 (46.7%)
E-mail	29 (27.1%)
Face to face	70 (65.4%)
Other	22 (20.6%)
Was there contact with the employer during additional activity?	
Yes	84 (28.2%)
No	213 (71.7%)
Missing	12
Method of contact during additional activity (not mutually exclusive)	
Clinical notes	74 (88.1%)
E-mail	57 (67.9%)
Call	36 (15.5%)
Text	10 (11.9%)
Letter	64 (76.2%)
Other	13 (15.5%)

This article should be referenced as follows:
Radford KA, Grant MI, Holmes JA, Phillips J, Powers K, Chambers RL, *et al*. Development and description of Early Stroke Specialist Vocational Rehabilitation delivered in the RETAKE trial [published online ahead of print April 1 2026]. *Health Technol Assess* 2026. https://doi.org/10.3310/GJKR0715

TABLE 17 Additional activity – participant level

	Total (*n* = 309)
Was additional activity undertaken for the participant?	
Yes	296 (95.8%)
No	13 (4.2%)
Number of times additional activity was undertaken	
Mean (SD)	15.9 (13.13)
Median (range)	13.0 (0.0, 78.0)
IQR	6.0–22.0
Missing	0
N	309
Who was involved (not mutually exclusive)	
Therapist	181 (61.1%)
Participant	197 (66.6%)
Relative/friend/carer	41 (13.9%)
Employer	83 (28.0%)
Health and social care service(s)	131 (44.3%)
Other involved	95 (32.1%)
Method of activity (not mutually exclusive)	
Clinical notes	167 (56.4%)
Letter	141 (47.6%)
Telephone call	177 (59.8%)
E-mail	171 (57.8%)
Text	50 (16.9%)
Other method	90 (30.4%)
Purpose of activity (not mutually exclusive)	
Administrative	199 (67.2%)
Liaison	208 (70.3%)
Session preparation	75 (25.3%)
Other purpose	43 (14.5%)

TABLE 18 Intervention components delivered – participant and session level

	Participant level (*n* = 309)	Total attended sessions (*n* = 2945)
N components delivered per session		
Mean (SD)	N/A	3.3 (2.25)
Median (range)		3.0 (1.0, 14.0)
IQR		1.0–4.0
Missing		163
N		2782
Intervention component		
Stage 1 – recovery and work preparation		
Early recovery assessment	283 (95.6%)	469 (16.9%)
Current issues	282 (95.3%)	1275 (45.8%)
Goals	116 (39.2%)	287 (10.3%)
Homework	176 (59.5%)	438 (15.7%)
Family/carer support	151 (51.0%)	290 (10.4%)
Physical	191 (64.5%)	601 (21.6%)
PADL/IADL	133 (44.9%)	242 (8.7%)
Mobility	187 (63.2%)	545 (19.6%)
Cognition	176 (59.5%)	469 (16.9%)
Psychological issues	195 (65.9%)	713 (25.6%)
Fatigue management	230 (77.7%)	903 (32.5%)
Work preparation	258 (87.2%)	1092 (39.3%)
Stage 2 – graded RTW		
RTW without direct employer contact	204 (68.9%)	739 (26.6%)
RTW with direct employer contact	107 (36.1%)	305 (11.0%)
Stage 3 – job retention or redirection		
Monitoring job retention	175 (59.1%)	584 (21.0%)
Job redirection	45 (15.2%)	114 (4.1%)
Missing	13	163

IADL, Instrumental Activities of Daily Living; PADL, Personal Activities of Daily Living.

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TABLE 19 Intervention components delivered – participant and session level

		Participant-level summary				Session-level summary						
		Total number of sessions each component was delivered in per participant					Time (minutes) spent on each component per session					
	Total participants with component delivered in at least one session (*n* = 309)	Mean (SD)	Median (range)	IQR	*N*	Total sessions with component delivered (*n* = 2782)	Mean (SD)	Median (range)	IQR	*N*	Missing	Total time spent on component
Intervention component												
Early recovery assessment	283 (95.6%)	1.58 (1.03)	1 (0, 6)	(1–2)	296	469 (16.9%)	19.09 (13.80)	15 (1, 90)	(10–30)	467	2	8914
Current issues	282 (95.3%)	4.31 (4.03)	3 (0, 31)	(2–6)	296	1275 (45.8%)	12.27 (9.61)	10 (0, 90)	(5–15)	1273	2	15626
Goals	116 (39.2%)	0.97 (2.08)	0 (0, 17)	(0–1)	296	287 (10.3%)	8.05 (5.19)	5 (0, 40)	(5–10)	284	3	2287
Homework	176 (59.5%)	1.48 (2.11)	1 (0, 15)	(0–2)	296	438 (15.7%)	9.72 (5.33)	10 (2, 40)	(5–10)	436	2	4238
Family/carer support	151 (51.0%)	0.98 (1.49)	1 (0, 12)	(0–1)	296	290 (10.4%)	9.09 (6.66)	10 (1, 56)	(5–10)	288	2	2619
Physical	191 (64.5%)	2.03 (2.77)	1 (0, 24)	(0–3)	296	601 (21.6%)	11.01 (9.64)	10 (1, 90)	(5–10)	599	2	6597
PADL/IADL	133 (44.9%)	0.82 (1.44)	0 (0, 15)	(0–1)	296	242 (8.7%)	8.85 (7.61)	5 (1, 60)	(5–10)	241	1	2133
Mobility	187 (63.2%)	1.84 (2.37)	1 (0, 14)	(0–3)	296	545 (19.6%)	9.49 (10.63)	5 (0, 120)	(5–10)	543	2	5156
Cognition	176 (59.5%)	1.58 (2.25)	1 (0, 13)	(0–2)	296	469 (16.9%)	12.64 (11.8)	10 (1, 70)	(5–15)	467	2	5901
Psychological issues	195 (65.9%)	2.41 (3.27)	1 (0, 21)	(0–3.5)	296	713 (25.6%)	12.34 (11.8)	10 (0, 150)	(5–15)	711	2	8775
Fatigue management	230 (77.7%)	3.05 (3.42)	2 (0, 20)	(1–4)	296	903 (32.5%)	10.43 (6.46)	10 (1, 45)	(5–10)	901	2	9400
Work preparation	258 (87.2%)	3.69 (3.53)	3 (0, 18)	(1–5)	296	1092 (39.3%)	15.21 (12.45)	10 (0, 150)	(10–20)	1091	1	16,599
RTW without direct employer contact	204 (68.9%)	2.5 (3.22)	2 (0, 19)	(0–3)	296	739 (26.6%)	18 (13.44)	15 (0, 90)	(10–20)	735	4	13,235
RTW with direct employer contact	107 (36.1%)	1.03 (2.02)	0 (0, 12)	(0–1)	296	305 (11.0%)	42.51 (31.06)	35 (5, 180)	(20–60)	305	0	12,965
Monitoring job retention	175 (59.1%)	1.97 (2.57)	1 (0, 20)	(0–3)	296	584 (21.0%)	19.63 (15.16)	15 (1, 90)	(10–30)	583	1	11,444
Job redirection	45 (15.2%)	0.39 (1.29)	0 (0, 15)	(0–0)	296	114 (4.1%)	18.25 (16.15)	15 (1, 120)	(10–20)	113	1	2062
Missing	13											

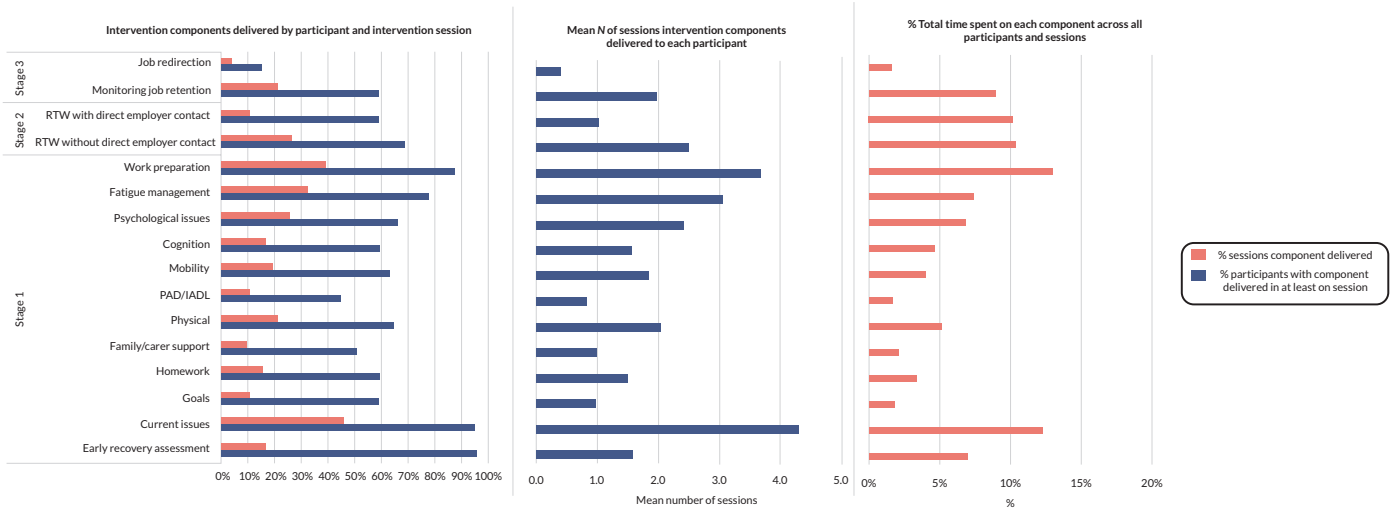

FIGURE 8 Intervention component delivery summary bar chart.

TABLE 20 RTW Status as recorded on intervention forms and primary outcome by participant intervention compliance

	Is participant compliant?		
	Yes (*n* = 253)	No (*n* = 71)	Total (*n* = 324)
Did participant report RTW at any point during intervention delivery?			
Participant returned to work	173 (68.9%)	16 (35.6%)	189 (63.9%)
Intends to RTW	63 (25.1%)	24 (53.3%)	87 (29.4%)
No longer intends to RTW	15 (6.0%)	5 (11.1%)	20 (6.8%)
Missing	2	26	28
Time to RTW from randomisation (days)			
Mean (SD)	117.8 (109.04)	82.2 (77.26)	114.8 (107.02)
Median (range)	82.0 (0.0, 468.0)	46.5 (0.0, 230.0)	76.0 (0.0, 468.0)
IQR	31.0–177.0	34.0–129.5	31.0–174.0
Missing	0	0	0
N	173	16	189
Number of sessions until RTW			
Mean (SD)	5.4 (4.99)	4.2 (3.56)	5.3 (4.89)
Median (range)	4.0 (1.0, 25.0)	2.5 (1.0, 12.0)	4.0 (1.0, 25.0)
IQR	2.0–7.0	1.5–6.5	2.0–7.0
Missing	0	0	0
N	173	16	189
Primary outcome: participant reported having RTW at 12 months post randomisation			
Yes	137 (65.6%)	28 (58.3%)	165 (64.2%)
No	72 (34.4%)	20 (41.7%)	92 (35.8%)
Missing	44	23	67

This article should be referenced as follows:
Radford KA, Grant MI, Holmes JA, Phillips J, Powers K, Chambers RL, *et al*. Development and description of Early Stroke Specialist Vocational Rehabilitation delivered in the RETAKE trial [published online ahead of print April 1 2026]. *Health Technol Assess* 2026. https://doi.org/10.3310/GJKR0715

TABLE 21 Number of sessions attended by RTW status as reported in intervention delivery and primary outcome

	Number of sessions attended				
	Mean (SD)	Median (range)	IQR	Missing	*N*
Did participant report RTW at any point during intervention delivery?					
Yes	10.8 (7.10)	9.0 (1.0, 37.0)	6.0–15.0	0	189
No	7.2 (6.33)	5.0 (1.0, 37.0)	2.0–9.0	25	110
Total	9.4 (7.04)	8.0 (1.0, 37.0)	4.0–13.0	25	299
Primary outcome: participant reported having RTW at 12 months post randomisation					
Yes	10.1 (6.91)	9.0 (1.0, 37.0)	5.0–14.0	12	153
No	9.4 (7.52)	8.0 (1.0, 37.0)	4.0–12.0	8	84
Missing	7.7 (6.48)	5.5 (1.0, 27.0)	2.0–11.0	5	62
Total	9.4 (7.04)	8.0 (1.0, 37.0)	4.0–13.0	25	299

TABLE 22 Referral to rehab services by primary outcome

	Referred to rehab (*n* = 35)
Primary outcome: participant reported having RTW at 12 months post randomisation	
Yes	10 (43.5%)
No	13 (56.5%)
Missing	12

Appendix 9 Summary of ESSVR training package components

Training package element	Training material/session title	Content	Mode	Delivered by
RETAKE prerequisite materials	Tom case study	Non-mandatory case study with questions relating to supporting RTW	Word doc – therapists typed into and emailed back. *Answers provided trainers an indication of VR awareness to aid personalisation of teaching*	Training leads (JH and JP)
	Stroke and VR papers	Coole C, Radford K, Grant M, Terry J. Returning to work after stroke: perspectives of employer stakeholders, a qualitative study. *J Occupat Rehab* 2013;**23**:406–418 Grant M, Radford K, Sinclair E,Walker M. Return to work after stroke: recording, measuring, and describing occupational therapy intervention. *Br J Occupat Ther* 2014;**77**(9):457–465	Pdf copies of papers provided via e-mail. *OTs requested to read both papers to orientate them to experiences of employers and components of stroke VR*	
2-day training workshop *Adaptation due to COVID: live online training via MS Teams. 2 ½ days to allow for more frequent breaks*	Introductions	Study team, mentors, OTs – getting to know peers. Introduction to the training package, manual, mentoring and competency test	Discussion, networking, presentation slides	JH, JP, KR, YB, JT, RT, JHu
	RETAKE intervention manual	Navigation to intervention manual to allow early familiarisation.	Hard copy documents provided in ring binder; additional documents sent via e-mail. *Adaptation due to COVID: Manual and documents emailed/posted to OTs prior to workshop*	JH and JP
	RETAKE	Study overview and supporting evidence, OT role in RETAKE, research contamination	Didactic presentation with question and answer (Q&A) session, reflecting on OTs' current practice. *Adaptation due to COVID: Recorded presentation sent to OTs prior to workshop. Requested OTs watch.*	Chief Investigator (KR), training leads (JH, JP)
	The RETAKE VR intervention process	• **Stage 1:** early recovery and work preparation • **Stage 2:** graded RTW • **Stage 3:** job retention	Mix of didactic presentations, workshop, case study, Q&A	JH and JP

This article should be referenced as follows: Radford KA, Grant MI, Holmes JA, Phillips J, Powers K, Chambers RL, *et al.* Development and description of Early Stroke Specialist Vocational Rehabilitation delivered in the RETAKE trial [published online ahead of print April 1 2026]. *Health Technol Assess* 2026. https://doi.org/10.3310/GJKR0715

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Training package element	Training material/session title	Content	Mode	Delivered by
		• **Stage 4**: discharge process		
	Documenting the trial intervention	Introductions to paper-based CRFs – using case scenarios Discussion of site-based data storage	Mix of didactic presentations, workshop, case study, Q&A Small groups/pairs	
	Competency assessment – case study 'Kate'	Mandatory case study with questions relating to supporting RTW and RETAKE processes	Printed case vignette. OTs provided handwritten responses to questions. Trainers supported with queries. *Adaptation due to COVID: emailed case study, OTs typed answers and emailed back*	
Adapted telerehabilitation element due to COVID	Delivering RETAKE via telerehabilitation	A walk through the methods and resources for online intervention delivery, video examples	Mix of didactic presentation with Q&A – live online meeting	Chief Investigator, training leads (KR, JH, JP)
RETAKE refresher training – 1 day. *Adaptation due to COVID: live online training via MS Teams. ½ day*	Brief re-introductions	Study team, mentors, OTs – getting to know peers	Discussion, networking	Training leads (JH and JP)
	Trial update	Providing latest news on the trial data collection, good news stories	Didactic presentation with Q&A	
	Sharing successes and learning	Reflective task: What have I learned so far? What have been the difficulties? What has been helpful? Tips for others Sharing best practice letters and reports	Group interaction activity (post-it notes, flip charts), discussion.	
	Competency test – case study 'Kate v2.0'	Mandatory case study with questions relating to supporting RTW and RETAKE processes	Printed case study provided. OTs completed handwritten answers. Trainers supported any queries. *Adaptation due to COVID: emailed case study, OTs typed answers and emailed back*	n
	'What's next?' discussion	Facilitated discussion of today's issues raised: What might you do differently after today? Has your practice changed and how?	Group discussion	
Mentoring	Monthly mentoring for all OTs delivering ESSVR	OTs attended mentoring for 1 hour each month with an assigned mentor	Discussions: Individual study participant, implementation, contamination, therapist issues	All mentors

Lead trainers: JH, Dr Jain Holmes, JP, Dr Julie Phillips; Mentors and cotrainers: Prof. Kate Radford (CI), YB, Yash Bedekar, JT, Jane Terry, RT, Ruth Tyerman, JHu, Jo Hurford.