CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

Rehabilitation, Recovery and Community Participation Following Stroke

Part Three: *Optimizing Activity and Community Participation following Stroke*

Evidence Tables

Life Roles and Activities Following Stroke

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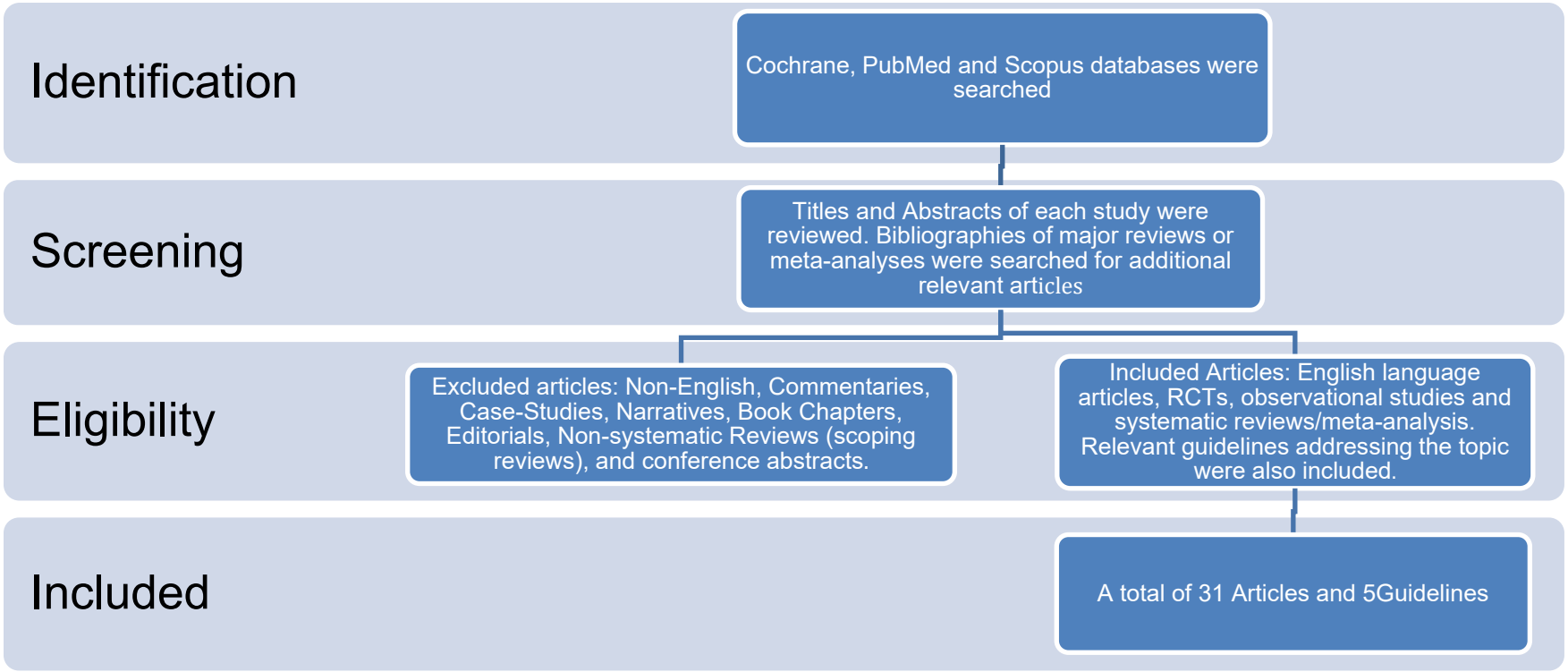
Search Strategy



Cochrane, PubMed and Scopus databases were search using the terms such as: (stroke OR CVD OR cerebrovascular disease) AND (rehabilitation OR intervention OR therapy) AND (Return to Driving OR Driving OR Drive OR Return to Vocation OR return to work OR work OR vocation OR volunteering.“ Titles and abstract of each article were reviewed for relevance. Bibliographies were reviewed to find additional relevant articles. Articles were excluded if they were: non-English, commentaries, case-studies, narrative, book chapters, editorials, non-systematic review, or conference abstracts. Additional searches for relevant best practice guidelines were completed and included in a separate section of the review. A total of 31 articles and 5 guidelines were included and were separated into separate categories designed to answer specific questions.

Published Guidelines

Guideline	Recommendations
National Clinical Guideline for Stroke for the UK and Ireland. London: Intercollegiate Stroke Working Party; 2023 May 4. **Available at:** www.strokeguideline.org. **(selected)**	**4.1.4. Recommendations (Driving)** A People who have had an acute stroke or TIA should be asked about driving before they leave the hospital or specialist outpatient clinic. B People with stroke who wish to drive should: – be advised of the exclusion period from driving and their responsibility to notify the DVLA if they have any persisting disability which may affect their eligibility; – be asked about or examined for any absolute bars to driving e.g. epileptic seizure (excluding seizure within 24 hours of stroke onset), significant visual field defects, reduced visual acuity or double vision; – be offered an assessment of the impairments that may affect their eligibility, including their cognitive, visual and physical abilities; – receive a written record of the findings and conclusions, copied to their general practitioner. C People with persisting cognitive, language or motor disability after stroke who wish to return to driving should be referred for on-road screening and evaluation. D People who wish to drive after stroke should be informed about eligibility for disabled concessions (e.g. Motability, the Blue Badge scheme). **4.1.5 Recommendations (Return to work)** A People with stroke should be asked about their work at the earliest opportunity, irrespective of whether they plan to return. This will enable staff to have a better understanding of their role before having a stroke, and offer the person an opportunity to discuss their thoughts and feelings. B People who need or wish to return to any type of work after stroke should: – be provided with information regarding rights, financial support and vocational rehabilitation. This should include information regarding driving, where appropriate (e.g. in the work role or travelling to work); – be supported to understand the consequences of their stroke in relation to work; – be supported by an appropriate professional with an understanding of the person's work-related needs to discuss with their employer their return to work, at a time that is appropriate, taking account of their job role and the support available. Timing should be mutually agreed between the person with stroke, the employer and the professional delivering vocational rehabilitation. This should include human resources where appropriate; – be supported to identify their work requirements with their employer, with input from occupational health, where available; C Services supporting people with stroke to return to work should ensure that: – there is a co-ordinator (or co-ordinating team or joint cross-agency working) responsible for liaison and support with planning and negotiating return to work with all those involved (including co-workers and managers, where applicable) and who ensures all involved are aware of their roles, responsibilities, and relevant legislation; D Vocational rehabilitation programmes for people returning to work after stroke should include: – assessment of potential barriers and facilitators to returning to work, based on the work role and demands from both the employee's and employer's perspectives; – an action plan for how barriers may be overcome;

Guideline	Recommendations
	– interventions as required by the individual, which may include vocational counselling and coaching, emotional support, adaptation of the working environment, strategies to compensate for functional limitations (e.g. communication, cognition, mobility and arm function), and fatigue management; – collaboration between the person with stroke, their employer and healthcare professional in planning, facilitating and monitoring their return to work. E Healthcare professionals who work with people following stroke should have knowledge and skills about supporting them to return to work, appropriate to the nature and level of service they provide. F Authorised healthcare professionals should provide a statement of fitness to work (e.g. 'fit note') to support people to return to work, including recommended alterations to work patterns, tasks undertaken or environment.
Clinical Guidelines for Stroke Management 2022. Melbourne (Australia): National Stroke Foundation. (Community Participation & Long-term Care	**Return to work** Weak Recommendation • All stroke survivors should be asked about their employment (paid and unpaid) prior to their stroke and if they wish to return to work. • For stroke survivors who wish to return to work, assessment should be offered to establish abilities relative to work demands. In addition, assistance to resume or take up work including worksite visits and workplace interventions, or referral to a supported employment service should be offered.
Winstein CJ, Stein J, Arena R, Bates B, Cherney LR, Cramer SC et al; on behalf of the American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and Outcomes Research. **Guidelines for adult stroke rehabilitation and recovery: a guideline for healthcare professionals from the American Heart Association/American Stroke Association.** ***Stroke* 2016;47:e98–e169**	**Return to Work** - Vocationally targeted therapy or vocational rehabilitation is reasonable for individuals with stroke considering a return to work. (Class IIa. Level C evidence) - An assessment of cognitive, perception, physical, and motor abilities ma be considered for stroke survivors considering a return to work. (Class IIb. Level C evidence) **Return to Driving** - Individuals who appear to be ready to return to driving, as demonstrated by successful performance on fitness-to-drive tests, should have an on-the-road test administered by an authorized person. (Class I. Level C evidence) - It is reasonable that individuals be assessed for cognitive, perception, physical, and motor abilities to ascertain readiness to return to driving according to safety and local laws. (Class IIa. Level B evidence) - It is reasonable that individuals who do not pass an on-the-road driving test be referred to a driver rehabilitation program for training. (Class IIa. Level B evidence) - A driving simulation assessment may be considered for predicting fitness to drive. (Class IIb. Level C evidence)
Classen S, Monahan M, Auten B, et al. Evidence-based review of interventions for medically at-risk older drivers. *Am J Occup Ther* 2014;68:e107-e114	For clients with stroke, we recommend a graded simulator intervention (A) and multimodal training in traffic theory knowledge and on-road interventions (B); we make no recommendation for or against Dynavision, Useful Field of View, or visual–perceptual interventions (I). For clients with visual deficits, we recommend educational intervention (A) and bioptic training (B); we make no recommendation for or against prism lenses (I). (A=strongly recommend the intervention; B=recommend intervention is provided routinely; C= weak evidence that the intervention can improve outcomes; D=recommend not to provide the intervention; I=5 insufficient evidence to recommend for or against the intervention).

Guideline	Recommendations
Topic specific guidelines	
Guerra PG, Simpson CS, Van Spall HGC, Asgar AW, Billia P, Cadrin-Tourigny J, Chakrabarti S, Cheung CC, Dore A et al. **Canadian Cardiovascular Society 2023 Guidelines on the Fitness to Drive.** ***Can J Cardiol*. 2024; 40(4):500-523.**	No recommendations are made regarding stroke. The following topics are covered. 1.Coronary artery disease (CAD): Acute coronary syndrome (ACS), post myocardial infarction (MI), stable angina, and coronary artery bypass graft (CABG) surgery 2. Valvular heart disease 3. Heart failure (HF), transplantation, LVADs 4. Inherited arrhythmia syndromes and cardiomyopathies 5. Rhythm and devices: Cardiac implantable electronic devices (CIEDs), bradyarrhythmias, and tachyarrhythmias 6. Syncope 7. Congenital and cyanotic heart disease
Classen S, Monahan M, Auten B, Yarney A. **Evidence-based review of interventions for medically at-risk older drivers.** ***Am J Occup Ther* 2014;68:e107-e114**	**Driving** For clients with stroke, we recommend a graded simulator intervention (A) and multimodal training in traffic theory knowledge and on-road interventions (B); we make no recommendation for or against Dynavision, Useful Field of View, or visual–perceptual interventions (I). For clients with visual deficits, we recommend educational intervention (A) and bioptic training (B); we make no recommendation for or against prism lenses (I). (A=strongly recommend the intervention; B=recommend intervention is provided routinely; C= weak evidence that the intervention can improve outcomes; D=recommend not to provide the intervention; I=5 insufficient evidence to recommend for or against the intervention).

Evidence Tables

Assessing Fitness to Drive

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Yu et al. 2016 **Korea** **Prospective study**	NA	359 participants from The Psychosocial Outcomes In StrokE (POISE) Cohort Study, aged 18–65 years, with a recent (within 28 days) stroke. Mean age was 52 years.	Demographic, clinical, mental health, cognitive, and disability measures were obtained and used to identify independent predictors of return to driving.	**Primary outcome:** Predictors of return to driving one month following stroke	359 (82%) participants were driving prior to stroke. 26.7% of participants returned to driving after one month. Independent predictors of early return to driving were independence in ADLs (OR=30.1, 95% CI 3.85–234.45, p<0.001), not recalling being told to stop driving (OR=5.55, 95% CI 2.86–11.11, p<0.001) and returning to paid work (OR=3.93, 95% CI 1.94–7.96, p <0.001).
Barco et al. 2014 **USA** **Cross-sectional study**	NA	72 patients who had been driving for at least 10 years prior to stroke with a NIHSS score of 0-13. Mean age was 59 years. Mean time from stroke onset was 8.6 months	Development of a screening battery to predict on-road driving performance. Off-road candidate predictors included measures of vision, cognition and upper and lower-limb motor abilities	**Primary outcome:** (modified) Washington University Road Test Participants were evaluated when the referring physician believed the patient was clinically stable and ready to participate in a driving examination	45 participants passed the road test, 27 failed. A combination of the Snellgrove Maze Test and the Trail Making Test (part A) were the best predictors of passing the on-road test. ROC AUC=0.87, positive likelihood ratio=6.0, 95% CI 1.7-21.1
Hird et al. 2014 **Canada** **Systematic Review**	N/A	22 articles (n=1,413 participants) that assessed driving performance in stroke survivors using cognitive/neuropsychologic measures, on-road tests, and/or simulator technology.	Narrative synthesis	**Primary outcomes:** Method of driving assessment and fitness to drive	In evaluation of fitness to drive, 16 studies included cognitive assessments, 17 studies involved on-road assessments, and 3 involved simulator assessments. 12 studies reported that cognitive test results were predictive of driving, while 5 reported little or no predictive value. Of studies using on-road assessment, of 1,413 stroke patients,52.9% definitely passed, 26.0% definitely failed and 21.1% received conditional

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					passes, passes with restrictions, borderline passes/fails, etc. In 2/3 studies that included simulator performance to assess driving performance, persons recovering from stroke did significantly worse (e.g., more accidents) compared with healthy controls. The authors concluded there is no consensus regarding a valid and reliable driving assessment for physicians currently available.
Devos et al. 2011 **Belgium** **Systematic Review and Meta-analysis**	NA	30 studies (1,919 participants) that assessed fitness to drive in participants following a stroke using an on-road evaluation scored as pass or fail. The median time from stroke onset was 8.8 months. Mean age of participants ranged from 51.4 to 71 years.	Effect sizes (ES) associated with the determinants of driving ability, were calculated and pooled. ES>0.8 were considered clinically significant. Potential candidate variables included socio-demographic, visual and cognitive (perceptual, attention, memory and executive and higher order planning) functions.	**Primary outcome:** Fitness to drive (pass/fail)	Fitness to drive was not influenced by age, side of lesion, time to driving examination, driving experience, comorbidity, gender, education, aphasia, motor function, or by visual, perceptual or attention and memory functions. Fitness to drive was influenced by 5 cognitive measures (Cube Copy, Road Sign Recognition, Compass, Stroke Drivers Screening Assessment (SDSA), and Trail Making Test part B (TMT B). Effect sizes ranged from 0.81-1.54. Predictive accuracies ranged from 0.65-0.76 No off-road tests were found to determine crash risk at follow-up.

Interventions to Improve Driving Skills

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
George et al. 2014 **USA** **Cochrane Review**	NA	4 studies (n=245) including participants with all types of strokes, levels of severity and at all stages post stroke, examining interventions to improve driving skills. Mean time from stroke to recruitment ranged from an average of 53 days to 1.4 years. Mean ages were 54, 66, 67 and 68 years in the included studies.	Interventions examined included driving simulators (n=2) and skills development using the Dynavision device (n=1) and Useful Field of View training (n=1). Control conditions included no intervention (n=2), and active interventions to train perceptual and cognitive skills (n=2). Mean total dose of the interventions was 15 hours, with a mean duration of 7.5 weeks). Sessions lasted an average of 40-60 minutes each.	**Primary outcome:** Performance (pass/fail) during on-road assessment **Secondary outcomes:** Visual attention, reaction time, visual scanning, self-efficacy, executive reasoning ability, and tests of visual perception, functional measures, physical measures of mobility, strength and co-ordination, and death. Assessments were conducted post intervention and at 6 months	No pooled analyses were conducted due to heterogeneity. Based on the results from a single trial, there was no significant difference in the mean on-road scores between groups at 6 months (MD=15.0, 95% CI -4.6 34.6, p=0.13). Participants in the intervention group had significantly higher scores on road sign recognition test (MD=1.69, 95% CI 0.51-2.87, p=0.0051). Results from a single trial included.
Crotty & George 2009 **Australia** **RCT**	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	37 participants, recruited from 4 rehabilitation centres, who were drivers prior to stroke with no visual field impairments, binocular vision of minimum 6/12, and a minimum of 1 month post stroke. Mean age was 66 years. Median of 84 days from stroke onset.	Participants were randomly allocated to receive training with the Dynavision training system to train visuomotor abilities (3 sessions per week for 6 weeks; n=13) or control (waitlist for the 6 weeks; n=13) group.	**Primary outcome:** Assessment of on-road ability at 6 weeks. **Secondary outcomes**: Abilities in Response Time Measures, Visual Scanning Analyzer and Adelaide Driving Self-Efficacy Scale (ADSES).	There was no significant difference in the on-road assessment between groups (p=0.223). There were no significant differences between groups in any of the 3 secondary measures - Abilities in Response Time Measures, Visual Scanning Analyzer and ADSES. Dropouts and loss to follow-up: n=7.
Akinwuntan et al. 2005, Devos et al. 2010 (5-year follow-up) **USA**	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	83 patients admitted to a rehabilitation hospital who were within 3 months of first-ever stroke and had been driving prior to stroke. Mean age was 54 years. Mean time since stroke was 53 days.	Patients were randomly allocated to receive driving simulator-based training in full-sized automatic gear transmission car (15 hours over 5 weeks at 1	**Primary outcomes:** Performance in the on-road test and decision of driving fitness at follow-up. Driving fitness was classified as “fit to drive”,	There were no significant differences between groups for any of the visual or cognitive at baseline, post training or pre-post-training difference, except for significantly greater pre- to post-training improvement in the road sign recognition test

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RCT			hour per day, three times a week; n=42) or standardized training by performing driving related cognitive tasks (control condition, n=41).	"temporarily unfit to drive" or "unfit to drive" **Other measures**: Visual (monocular and binocular vision acuity and the kinetic vision test) and cognitive tests (UFOV test and components of the Stroke Driver Screening Assessment (SDSA)). Assessments were conducted at baseline and 6 months	among participants in the intervention group (p=0.0007). Participants in both groups demonstrated significant improvements from pre to post training assessments. Most subjects improved at least by one decision level. At follow-up, 73% of participants in the intervention group passed their on road assessment and could continue driving, compared to 42% of participants in the control group (p=0.03). Dropouts and loss to follow-up: n=31. **5-year outcomes** More participants who had received simulator training were considered fit to drive at 5-years (60% vs. 48%, p=0.36). 44 patients completed all assessments. 85% of those driving at 6 months continued to drive at 5 years. Among drivers, there was no increased risk of accident vs. pre-stroke; however, there was an increased risk of self-reported traffic tickets (RR=2.88)
Mazer et al. 2003 **USA** **RCT**	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☒	97 patients admitted to a rehabilitation hospital or referred to the driving evaluation who drove prior to stroke and had a desire to return to driving. Mean age was 66 years. Participants were within an average of 66-90 days post stroke.	Patients were randomly allocated to either the 20 training sessions using the Useful Field of Vision (UFOV) software tool, which followed a standard training protocol designed according to participant's pre-test evaluation (n=47) or	**Primary outcome:** On-road driving evaluation (passed, failed, needed driving lessons). **Secondary outcomes:** UFOV, complex reaction timer, Motor-Free Visual Perception Test, Single and Dot Cancellation Tests, Money Road Map	Following the intervention, there was no significant between group difference in the proportion of participants who passed the on-road driving evaluation (39% vs. 32.6%, p=0.54). There were no significant differences between groups for any of the secondary outcomes. Dropouts and loss to follow-up: n=13.

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			using same touch screen as the intervention, but which included computer games that did not require the same aspects of speed of visual processing (n=50).	Test of Direction Sense, Trail Making Tests Parts A and B, Bells test, Charron test, and Test of Everyday Attention Assessments were conducted at baseline and post intervention	

Rates and Predictors of Return to Work

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Cain et al. 2022 **Australia** **RCT** ***AVERT***	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	376 participants from AVERT who were <65 years old and had been employed at the time of their stroke. Median age was 56 years, 78% were men. 79% of participants were working fulltime prior to stroke, a median of 40 hours/week.	Independent predictors of return were work, were identified.	**Primary outcome:** 12-month return to paid work.	By 12 months, 221 (59%) participants had returned to work and were working a median of 40 hours/week. Independent predictors of return to work were younger age (OR for each increased year= 0.94, 95%CI 0.91−0.98), lower stroke severity (OR per each point increase in NIHSS score =0.92,95% CI 0.86−0.99), prior full-time work (OR=2.33,95% CI 1.24−4.40), and lower 3-month disability (the odds of return to work were significantly decreased with each mRS point >1).
Edwards et al. 2018 **Canada** **Systematic Review**	NA	29 studies that included persons, aged 18-64 years recovering from stroke. Mean age ranged from 37 to 55 years. The majority of participants were men.	Descriptive synthesis	**Primary outcomes:** Percentage of persons returning to work and common predictors of RTW	RTW was assessed at time points ranging from hospital discharge to 12 years. Overall frequency of RTW ranged from 7.3%1-74.5%, which included full and part-time work. Timing of RTW post stroke 0-6 months: 41% One year: 53% 1.5 years: 56% 2-4 years: 66% The most commonly cited predictors and associated odds ratio ranges of RTW were: Independence in ADLs (1.0-15.7) Higher cognitive functioning (1.3-15.7) Fewer neurological deficits (0.4-4.7) White-collar job (1.6-3.0) Male (3.2-8.9)
Wang et al. 2014 **USA** **Review**	NA	42 studies published from 1974-2011 that assessed factors associated with return to work following stroke	Factors found to be predictive of RTW were categorized according to the ICF framework	**Primary outcome:** Factors that were positively and negatively associated with RTW based on quantitative and qualitative data.	**Demographic variables:** younger age (<55 years) was positively associated with RTW. The associations between RTW and gender, race, ethnicity, education and marital status remain unclear. LOS may be a negative

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
					predictor of RTW but may be confounded by stroke severity. **Body structures:** side and location of stroke were not good predictors of RTW. **Body functions:** Increasing stroke severity was the factor most strongly (inversely) associated with RTW. **Activity participation**: higher ADL function, the ability to walk and run and a good match between current capabilities and job tasks were positively associated with RTW. **Psychosocial and personal factors**: strong family support, stroke survivors who are realistic and flexible in their vocational goals, value work and are not fearful of failing are more likely to RTW. Depression was a negative factor for RTW. **Environmental factors:** the availability of vocational services, a flexible work environment and disability benefits were all positively associated with RTW. **Job factors:** white collar work, government employer and wages that exceed disability compensation levels are positive predictors of RTW.
Hackett et al. 2012 **Australia** **Prospective study**	NA	441 patients, recruited from 20 hospitals, aged 18-64 years, who had sustained a stroke within the previous 28 days. Patients with aphasia or cognitive impairment were also eligible if a proxy was available. Mean age was 52 years.	Telephone interviews were conducted to collect data on depression, anxiety, cognitive function, cognitive status, instrumental activities of daily living and fatigue. Information on	**Primary outcome**: Returned to paid work at 1-year post stroke.	At the time of the stroke, 218 (52%) and 53 (13%) participants were engaged in full-time and part-time work, respectively. By one-year post stroke, 202 (75%) persons had returned to work. Factors associated with increased odds of RTW work were independence in activities of daily living at 28 days (OR=10.23, 95% CI

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			the details of paid work was also collected. A multivariable model was developed to predict independent factors associated with RTW.		4.11-25.46), male and female without illness that restricted activity before stroke Factors associated with decreased odds of RTW work were no health insurance (OR=0.40, 95% CI 0.18-0.89) and increasing age (OR=0.94, 95% CI 0.90-0.98) Depression post-stroke was not a significant predictor of return to work (OR=2.31, 95% CI 0.87-6.12).
Hannerz et al. 2011 **Denmark** **Prospective study**	NA	19,985 persons included in the Danish Occupational Hospitalization Register who were 20-57 years, had sustained a stroke (ischemic, SAH, ICH) and were gainfully employed in the year preceding hospitalization.	Independent predictors of gainful employment, two years following stroke were sought. Potential variables included, gender, age, diagnosis, calendar year, occupational class self-employment and type of municipality	**Primary outcome:** Return to work at 2 years post stroke	62.1% of participants were employed 2 years post stroke. Factors associated with increased odds of RTW were higher occupational class (compared with persons in elementary occupations). Factors associated with decreasing odds of RTW were: stroke type (SAH OR=0.79, 95% CI 0.7-0.88 and ICH OR=0.39, 95% CI 0.35 to 0.43, compared with cerebral infarction, the reference standard), female (OR=0.79, 95% CI 0.74-0.84) and age 50-57 years (OR=0.61, 95% CI 0.57-0.65, compared with <50 years) and being self-employed (OR=0.87, 95% CI 0.78-0.96).
Trygged et al. 2011 **Sweden** **Retrospective study**	NA	7,081 patients aged 40-59 years who had been discharged from hospital following first-ever stroke (SAH, infarction, ICH) and who worked prior to stroke. Patients with ischemic heart disease were excluded.	The association between return to work (1-4 years post discharge) and income and education variables was examined controlling for age, sex, stroke subtype and length of stay.	**Primary outcome:** Return to work at 4 years post stroke	4,867 (69%) persons returned to work. Independent predictors of RTW were higher levels of education (compulsory vs. University RR=1.13, 95% CI 1.04-1.22) and higher income (1st quartile vs. 4th RR=1.94, 95% CI 1.77-2.12). Compared with patients who had sustained an infarction, patients an SAH were more likely to RTW (RR=1.27, 95% CI 1.17-1.38).

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					Increasing LOS was associated with a decreased likelihood of RTW (RR=0.82, 95% CI 0.80-0.85 per each 10-day increment). Across the different categories of stroke type (infarction, SAH and ICH) the odds of RTW were all significantly increased with increasing levels of education and income.
Saeki et al. 2010 **Japan** **Prospective study**	NA	325 patients recruited from 21 hospitals following first-ever stroke, aged 15-64 years, who were actively employed at the time of stroke. Mean age was 55.1 years.	A multivariable model was developed to predict independent factors associated with RTW. Potential variables included age, gender, stroke subtype, occupation (white- or blue-collar), education level, marriage, previous alcohol consumption, hypertension, side and severity of hemiplegia, higher cortical dysfunctions (aphasia, agnosia, and apraxia), and ability to perform ADLs (evaluated by Barthel Index)	**Primary outcome:** Return to work at 18 months post stroke	138 persons (55%) had successfully returned to work at 18 months. Of the subjects who successfully returned to work, 50% returned to work within 100 days from stroke onset. Independent predictors of RTW were male sex (OR=3.24, 95% CI 1.11-10.96), functional use of the affected hand (OR=4.66, 95% CI 1.40-19.53) and BI scores of 80-100 (OR=2.7, 95% CI 1.08-7.03)

Stroke Survivors' experiences of Return to Work

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Hartke et al. 2011 **USA** **Qualitative study**	NA	12 stroke survivors (8 men, 4 women), mean age of 51 years, recruited by flyers posted in a rehabilitation hospital setting and through personal contact by the second author. Inclusion criteria were ≥ 3 months post stroke, ≥18 years, having returned to work or with intention to RTW, and only mild to moderate cognitive and communication deficits	In-depth interviews, which focused on their prior work experience and their thoughts about or efforts in returning to work. A list of suggested areas of discussion was provided including the purpose and meaning of work in their lives, what they considered to be successful RTW, the risks and benefits of returning to work, reactions of others, and what had helped and hurt their efforts to RTW.	**Primary outcome:** To develop concepts and categories that identify and define important areas of concern for stroke survivors returning to work.	Four participants were unemployed and currently seeking to RTW, 6 were working part-time (3 for less than 6 months), and 2 were working full-time (1 for less than 6 months). 7 major themes were identified: financial, impairments as barriers, interpersonal support, therapy supporting RTW, organizational influences, work or job specific issues, and psychological issues. **Examples** Financial: *"I think the biggest fear from the very beginning was, you know, how are we going to do it? I mean, because I was the main bread winner."* Impairments as barriers: "*I still have problems with numbers...time seems to go really, really fast. It seems to fl y by . . . For the first few weeks, . . . because we have these buildings, the A, B, and C buildings. I would get lost . . . and I recently have moved my office . . . so for the first three days after my move, I couldn't remember where my office was for sure. "* Interpersonal support: "*All the time, my friends always tell me not to go back because they said if you go back, the job is going to kill you. That's what they always be saying . . .They said you had two strokes. You go back, that going to be the third one. After that's going to be the one that kills you."* In contrast, *"My family wanted me to come back because they knew I loved my work. And it was never a question in my family that I should come back".* Therapy supporting RTW: This process also provided specific forms of advice and assistance, as

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					noted in this comment by a survivor returning to administrative work in an office setting: *He told me to start slowly. He came and visited me in the workplace, talked to my boss. . . . I had a conversation about how I should approach things slowly . . . He was the one who suggested that computer for me with the, you know, program that would allow me to speak to the computer . . . He suggested the chair . . .* Work or job-specific issues: Some jobs/employers were more accommodating than others. *I had to go back full blast. I didn't get no special treatment because I had a stroke. As a matter of fact, they loaded more on me...it's nothing light in housekeeping. You can do it or you can't do it.* Psychological issues: Issues that emerged included performance anxiety and motivational and coping issues, willingness to accept limitations imposed by the stroke and their sense of confidence to re-enter the daily work world with them.
Alaszewski et al. 2007 **UK** **Qualitative study**	NA	43 participants, recruited from 3 stroke services, < 60 years, <3 months following their first stroke, without serious speech difficulties or cognitive impairment	After an initial meeting to obtain, a first interview was conducted, ideally within 3 months of the stroke, with additional meeting every 5 months thereafter for 15 months. Participants were invited to record a diary completing entries for a week ea ch month.	**Primary outcome:** To describe participants' perceived barriers to and facilitators of a return to employment	All the participants completed the first interview, 38 completing the second, 34 the third and 33 did all four over the 18-month study period. 12 participants were not working at the time of their stroke. 13 (33%) participants who completed two interviews) had not returned to work during the study period, but expressed a desire to do so. 6 (15%) participants returned to work within 3 months and 9 (23%) participants returned to work immediately after stroke. All participants acknowledged the value and benefit of work and the costs of not working (financial and other aspects). Previous experience of serious illness and disability which had resulted in early retirement or incapacity

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					benefit acted as a major barrier to working. In contrast, some participants had dealt with a major illness previously and tended to treat their stroke as another challenge they could and would deal with. Disability resulting from stroke was identified as a major barrier to RTW. Participants viewed their socio-economic environment, including family friends and work colleagues, as an important factor in their return to work. Those who felt that work colleagues or managers were not supportive and did not recognize and support them, found return to work difficult.

Interventions to Increase Return to Work

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Radford et al. 2025 **UK** **RCT** ***RETurn to work After stroke (RETAKE)***	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	538 participants, recruited from 21 stroke services who were in work at the time of their stroke, who were hospitalized within 2 weeks of stroke onset. Mean age was 54.1 years, 69% were men. Participants were randomized an average of 28 days post stroke.	Participants were randomized to an Early Stroke Specialist Vocational Rehabilitation (ESSVR) group or to a usual care group. Persons in the ESSVR group were treated by an occupational therapist for up to 12 months and received an individualized and tailored program assessing the impact of stroke on the job, educating patients and employers about stroke impact, work preparation and liaison with employers.	**Primary outcome:** Self-reported RTW (≥2 hours/week) at 12 months	Data were available for 454(77.9%) participants at 12 months. 50.6% of participants had no post stroke impairments, 38.8% had one and 10.6% had multiple impairments. ESSVR was not associated with an improvement in the odds of RTW (64.2% vs. 59.4%; adjusted OR=1.12, 95% CI 0.8 to 1.87). There were no significant differences between groups in subgroup analyses (e.g., sex, age, aphasia, cognitive status)
Brouns et al. 2019 **The Netherlands** **Systematic review**	Risk of bias was assessed as low in the 1st study and high in the 2nd.	2 studies including 448 adults recovering from ischemic stroke. Mean ages were 56.8 and 52 years, 64% and 71% were men. Chronicity of stroke was <24 hours and <6 months. Stroke severity was mild-moderate in one study and moderate to severe in the other.	Interventions that aimed to support a return to professional activities, were examined. The first study examined a program of twice-weekly treatment for 3 months, providing 1 hour of neuropsychological services per week, 1 hour of social work services per week, 2 to 4 hours of physical therapy per week, 2 to 4 hours of occupational therapy per week, and speech therapy.	**Primary outcome:** The proportion of participants who successfully returned to work	In the first study, prior to stroke, 123/172 persons were employed. At 3 months post stroke, of 123 participants with competitive employment before ischaemic stroke, 39 (31.7%) were able to return to this status. In the second study, prior to stroke, all participants were employed. After a median of 3 years post stroke, 42.1% in the t-PA group and 33.3% in the non-t-PA group (HR=1.28, 95% CI 0.86-1.91). Treatment with t-PA was associated with higher odds of returning to full-time jobs (OR=2.07, 95% CI 1.21-3.51).

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			The second study examined intravenous t-PA vs. no t-PA.		t-PA was found to be an independent predictor of returning to full-time jobs. The authors concluded there currently is insufficient evidence regarding the effectiveness of interventions to promote return-to-work in patients following ischaemic stroke.
Ntsiea et al. 2015 **South Africa** **RCT**	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	80 participants aged 18-60 years who were employed at the time of stroke, were <8 weeks since stroke onset, with Barthel Index scores of ≥12. Mean age was 45 years. Mean duration from stroke onset was 4.6 weeks.	Participants were randomized to a 6-week individualized workplace intervention program group (n=40) or a control group, which received usual care (n=40). The intervention program included an assessment component, designed to evaluate perception, visual discrimination, sequencing ability, numerical ability, reasoning and language ability, fine and gross motor coordination, eye hand coordination, measurement ability, and colour discrimination. It also included input from the employer or supervisor to discuss and develop a plan to overcome identified barriers.	**Primary outcome:** Return to work rates at 3 and 6 months post stroke **Secondary outcomes:** Barthel Index (BI), Modified Rivermead Mobility Index, Montreal Cognitive Assessment (MoCA) and Stroke Specific QoL Scale	At the time of stroke, 45% of participants were employed in white collar professions, and 55% in blue collar. At 3 months more persons in the intervention group had returned to work (27% vs. 12%, p=0.13). By 6 months, significantly more persons in the intervention group had returned to work (60% vs. 20%, p<0.001). Independent predictors of RTW were participation in the intervention (OR=5.2, 95% CI 1.8-15.0, p=0.002), 6-month BI score (OR=1.7, 95% CI 1.1-2.6, p=0.02), 6-month MoCA score (OR=1.3, 95% CI 1.1-1.6, p=0.02) and left hemiplegia (OR=4.4, 95% CI 1.5-12.5, p=0.005). Persons who returned to work had significantly higher mean SS QoL scores at 6 months compared with those who had not returned to work (227.9 vs. 218.2, p=0.05). There was no significant difference in SS QoL scores between groups at 3 months. Drop-outs and losses to follow-up: n=8
Baldwin and Brusco 2011 **Australia**	NA	6 retrospective studies (n=462) including adults of working age, who were recovering from stroke and had participated in a vocational rehabilitation program	Interventions included vocational counseling, worksite assessment, work trial assessment, job placement services, real or simulated work	**Primary outcome:** Frequency of return to work	Pre-stroke vocational status was reported in 3 studies and varied from 48% to 100%. Return to work after the completion of the interventions was reported in all studies and ranged from 12% to 49%.

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Systematic Review			tasks, physical and occupational therapy and/or the development of a graded return-to work program. Interventions were delivered in the hospital, outpatient clinics and the community and all involved ≥one type of therapist (OT, PT social worker, counselor, vocational rehab specialists		

Abbreviations

CA: concealed allocation	CI: confidence interval	ITT: intention-to-treat
MD: mean difference	mRS: modified Rankin Scale	NA: not assessed
OR: odds ratio	ROC AUC: Receiver operator characteristic curve	

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