EUROPEAN STROKE ORGANISATION

European Stroke Organisation **Vision guideline**

Professor Fiona Rowe

(on behalf of the Vision Guideline group)

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UNIVERSITY OF LIVERPOOL

Disclosures*

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Member of BIOS stroke/neuro-rehab Clinical Advisory Group.

Member of UK intercollegiate stroke working party and guideline development group for UK National Clinical Guidelines for Stroke.

Co-opted topic advisor (Orthoptics) on NICE stroke rehab guidelines for adults.

Cochrane editor and author - Eyes and Vision group

Financial[#]: Fiona Rowe

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* MWP members – please see the publication

[#] All paid to Institution

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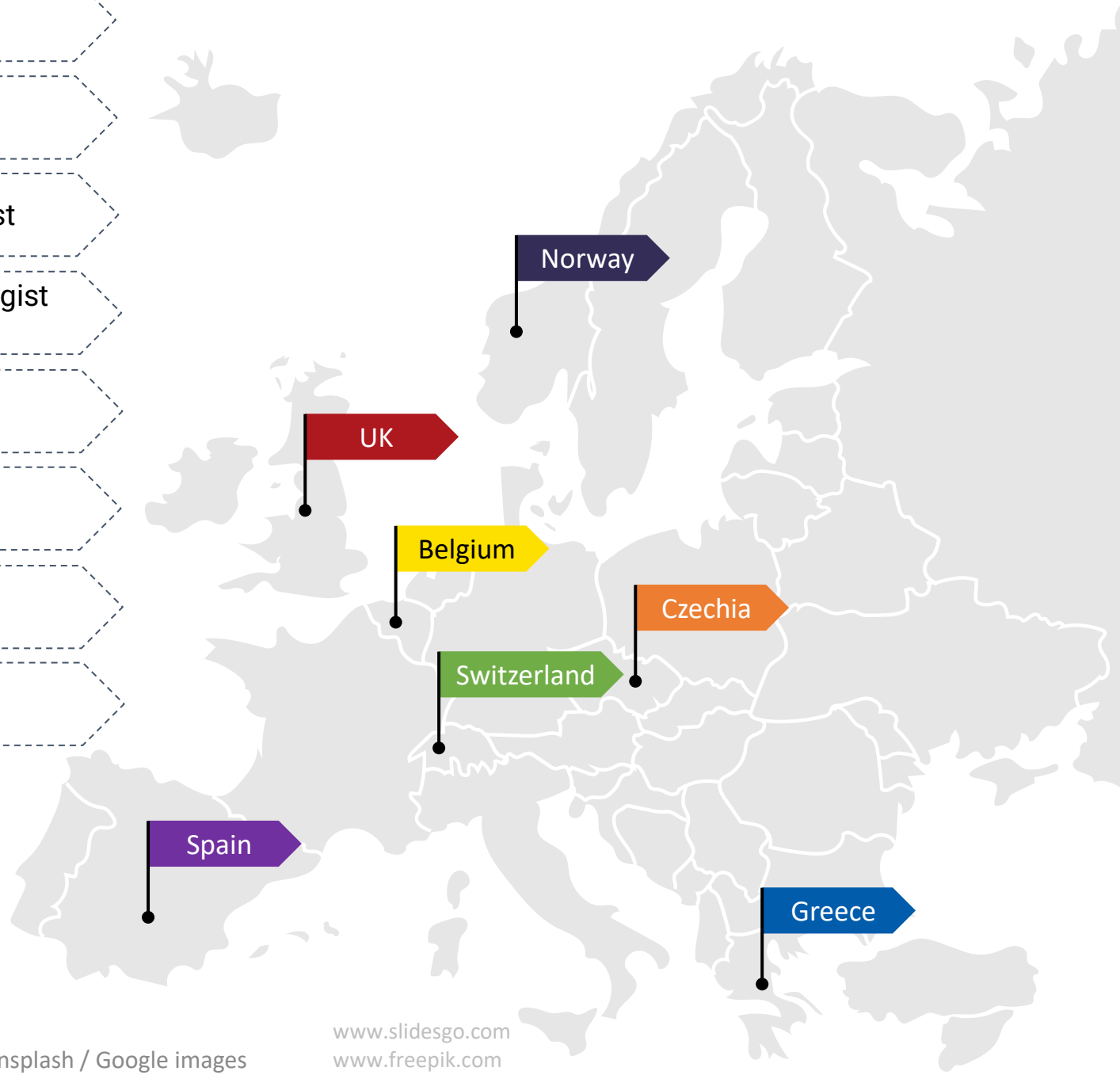


EUROPEAN STROKE ORGANISATION

ESO Vision Guideline - purpose

Provide evidence-based recommendations to assist clinicians in decision-making around diagnosis and treatment of visual problems after stroke

1. Does routine use of vision **screening**, compared to no screening improve detection rate? R

2. Does **early assessment** compared to later assessment improve activities of daily living? E

3-7. Does identification by **vision screening** or specialist eye team compared to routine stroke screen improve detect and/or activities/quality of life?

- Visual field loss E
- Central vision impairment E
- Eye movement E
- Visual neglect E
- Visual perceptual disorders R

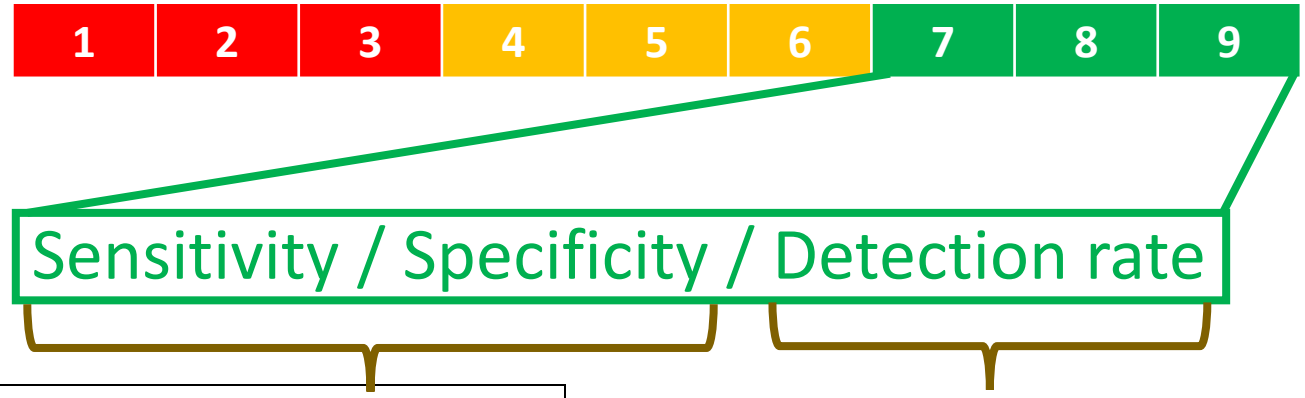
8-13. Does **compensatory, substitutive or restitutive intervention** compared to no intervention improve activities and quality of life?

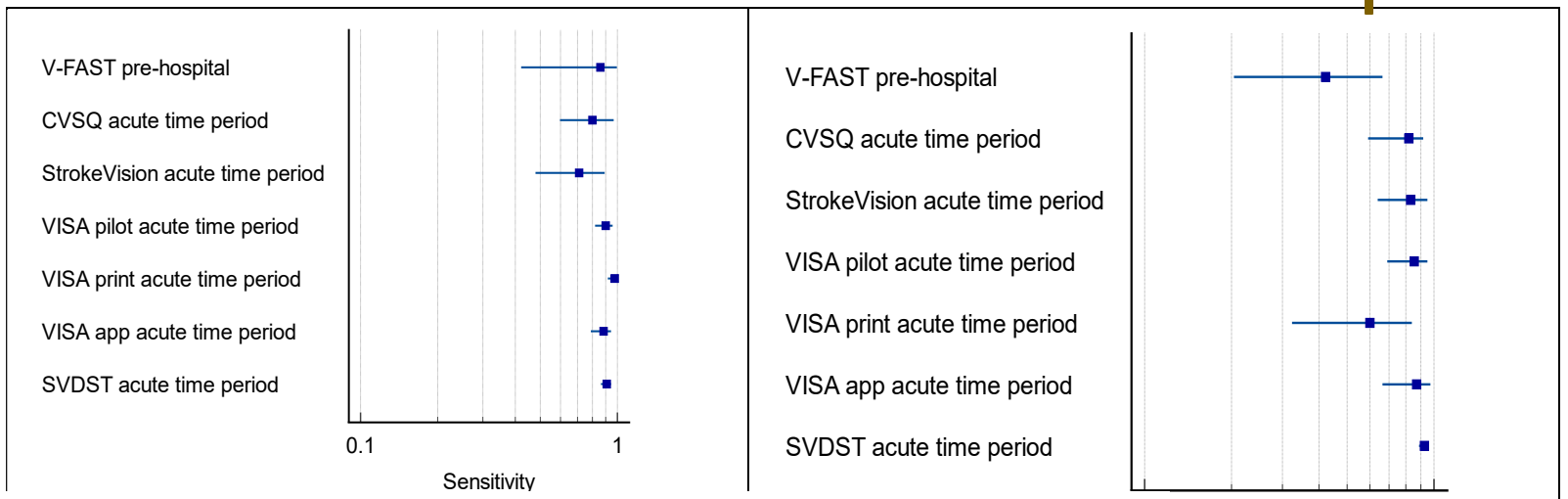
- Visual field loss R
- Ocular stroke R
- Central vision impairment E
- Eye movement R
- Visual neglect R
- Visual perceptual disorders R

R

1. Does routine use of vision **screening**, compared to no screening improve detection rate?

Critical outcomes





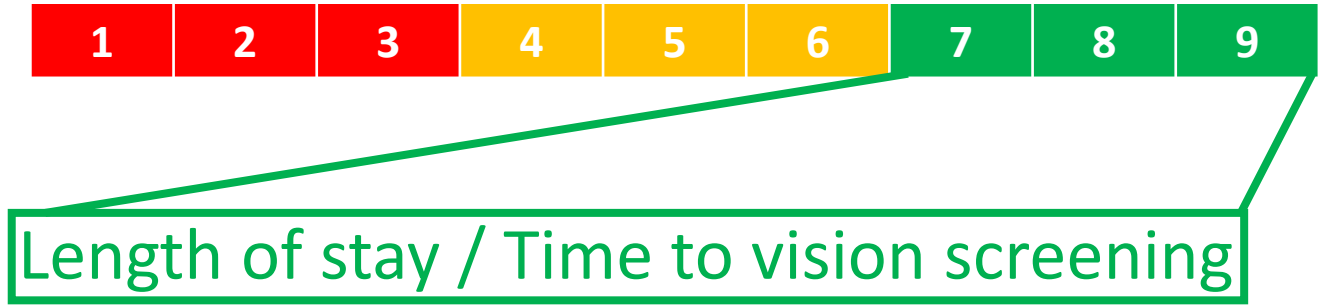
Overall mean rate of 65%

Pre-hospital sensitivity / specificity: 85% and 42%
Averaged sensitivity / specificity: 87% and 82%

E

2. Does **early assessment** compared to later assessment improve activities of daily living?

Critical outcomes



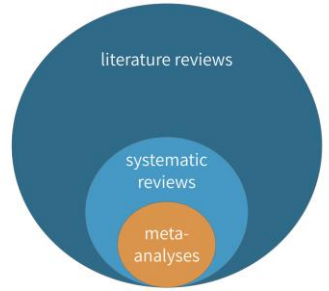
LoS

With visual impairment	Without visual impairment
Average 50 days	Average 13.5 days

Time

Vision screened	Referral to ophthalmology
Within 4 days of onset for >70% of stroke survivors	82% at average 8 days after admission

Questions 3-6: shared searches



3. For adults with visual field loss due to stroke, does identification by **vision screening** or specialist eye team compared to routine stroke screen improve detect and/or activities/quality of life?

4. For adults with central vision impairment due to stroke, does identification by **vision screening** or specialist eye team compared to routine stroke screen improve detect and/or activities/quality of life?

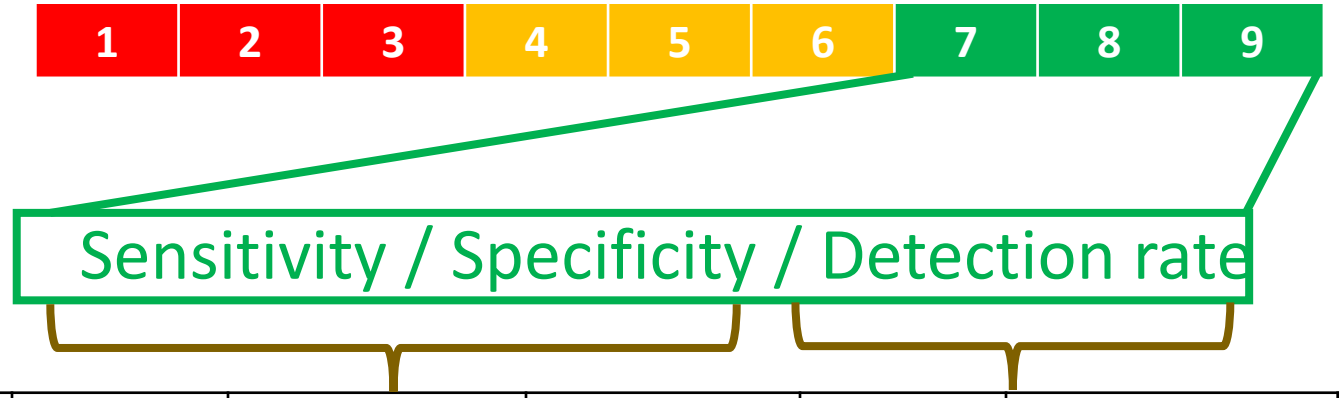
5. For adults with eye movement disorders due to stroke, does identification by **vision screening** or specialist eye team compared to routine stroke screen improve detect and/or activities/quality of life?

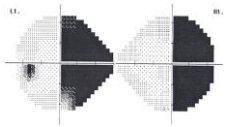
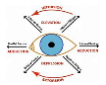
6. For adults with visual perceptual disorders due to stroke, does identification by **vision screening** or specialist eye team compared to routine stroke screen improve detect and/or activities/quality of life?

E

3. Visual field loss 4. Central visual impairment 5. Eye movement disorders 6. Visual perceptual disorders

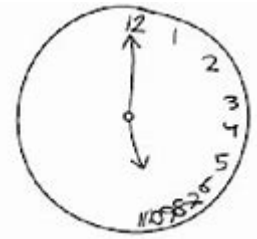
Critical outcomes



Q	Visual impairment		Studies	Sensitivity	Specificity	Studies	Detection rate
3	Visual field 	Acute care	3	83%	82%	15	Mean 40%
		Pre-hospital	1	5%	--		
4	Central vision 	Visual acuity	2	83%	88%	6	Mean 36%
		Symptoms	1	75% / 84%	87% / 79%		
5	Eye movement 	Acute-chronic	3	67%	73%	8	Mean 52%
6	Visual perception 	Symptoms	1	60% / 86%	86% / 91%	7	5.5% - 57%

R

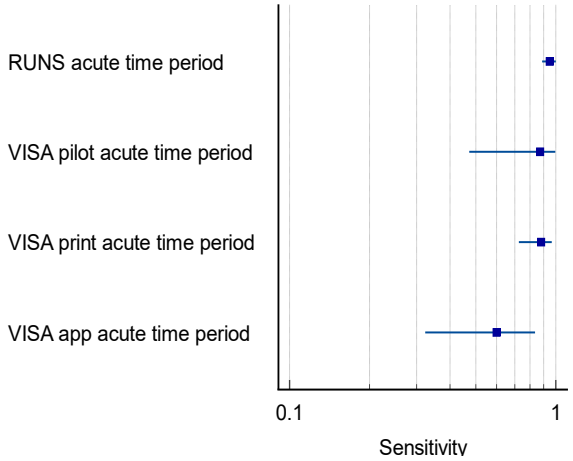
7. Visual neglect

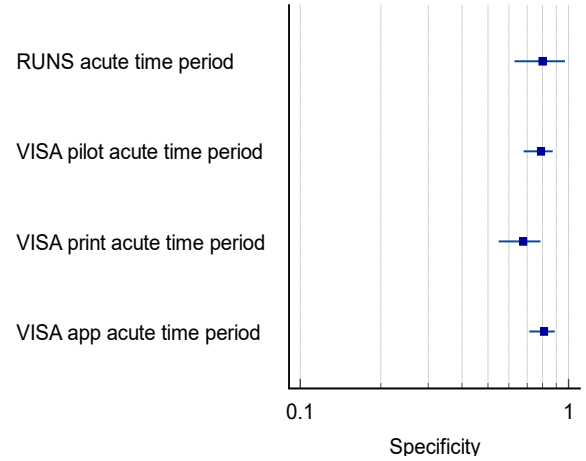


Critical outcomes

1	2	3	4	5	6	7	8	9

Sensitivity / Specificity / Detection rate





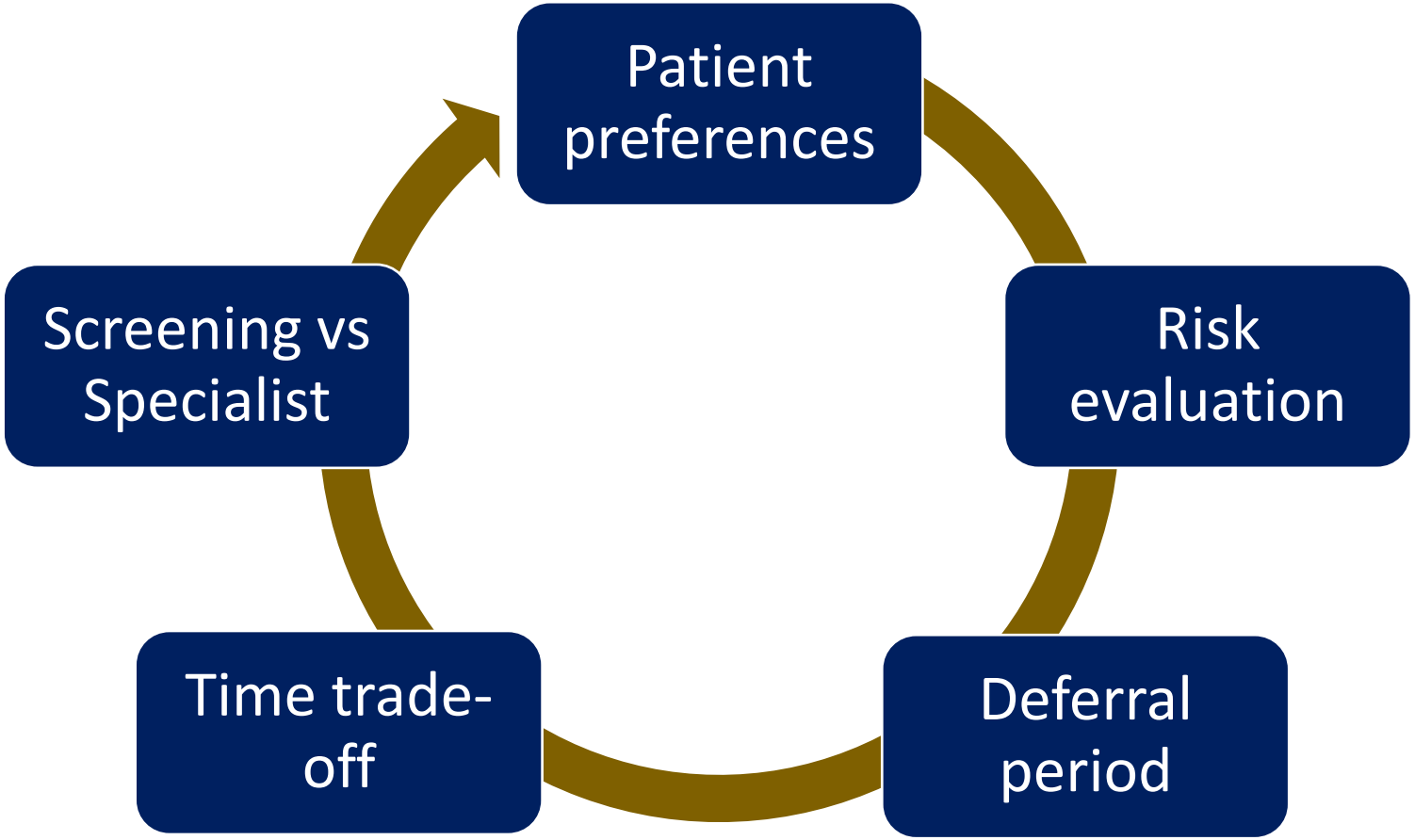
Overall mean rate of 40%

Direct relevance - sensitivity / specificity: 83-91% and 32-94%
Indirect relevance - sensitivity / specificity: 60-95% and 61-94%

Key recommendations and consensus

Diagnosis
Undertake vision screening of all stroke survivors to improve detection of visual problems in stroke survivors.
Undertake vision screening using a standardised, validated vision screening tool or by specialist eye team assessment.
Undertake early vision screening within 3-4 days post onset of stroke.

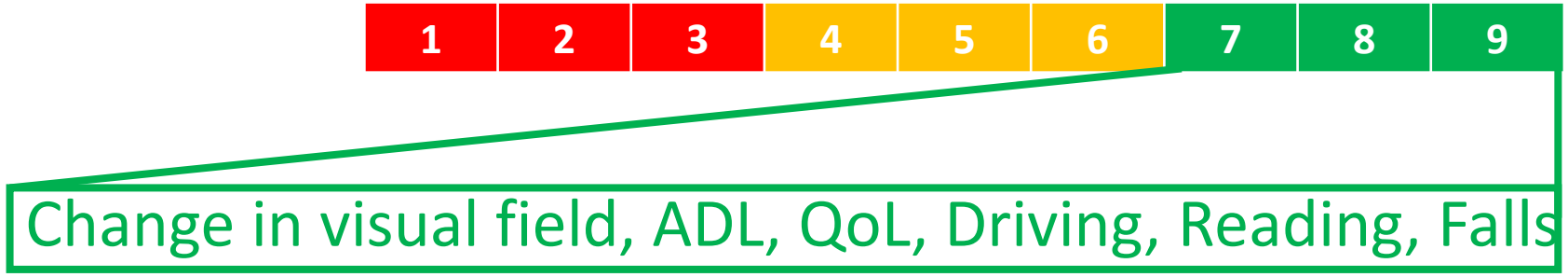
Diagnostic considerations



8. For adults with homonymous visual field loss due to stroke, does **compensatory, substitutive or restitutive** interventions compared to no interventions improve activities and quality of life?

R

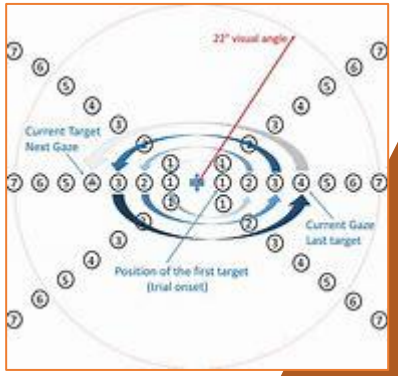
Critical outcomes



9 studies (RCTs)

Mean 44.6 (24-87) participants

Acute to Chronic care interventions



Compensatory → Visual scanning / search training

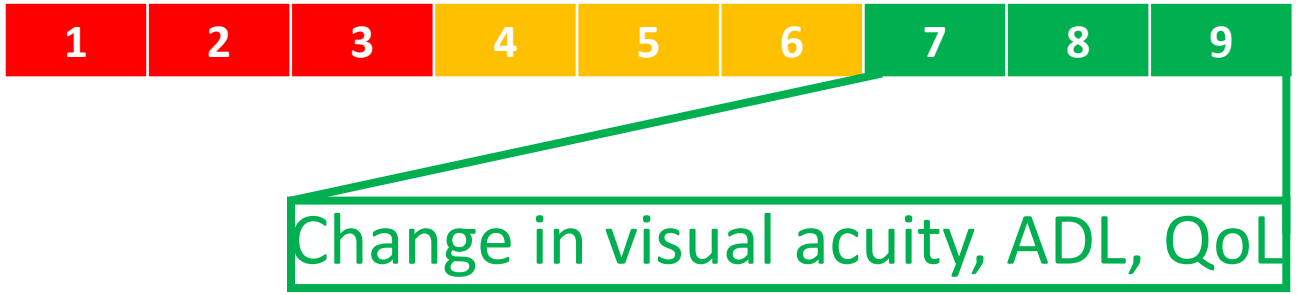
Substitutive → Prism therapy

Restitutive → Computerised training
Brain stimulation

9. For adults with ocular stroke (central retinal artery occlusion) due to stroke, does **compensatory, substitutive or restitutive** interventions compared to no interventions improve activities and quality of life?

R

Critical outcomes



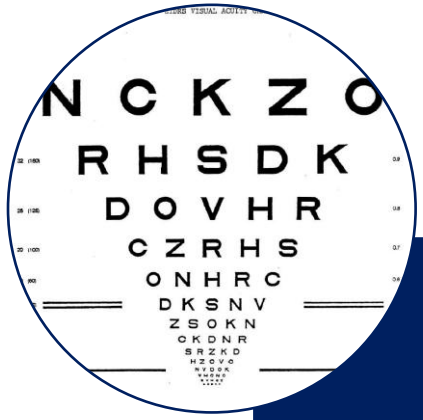
5 studies (none RCTs – case comparison/cohort)

Mean 73.6 (25-134) participants

Acute care interventions

IV thrombolysis

Hyperbaric oxygen



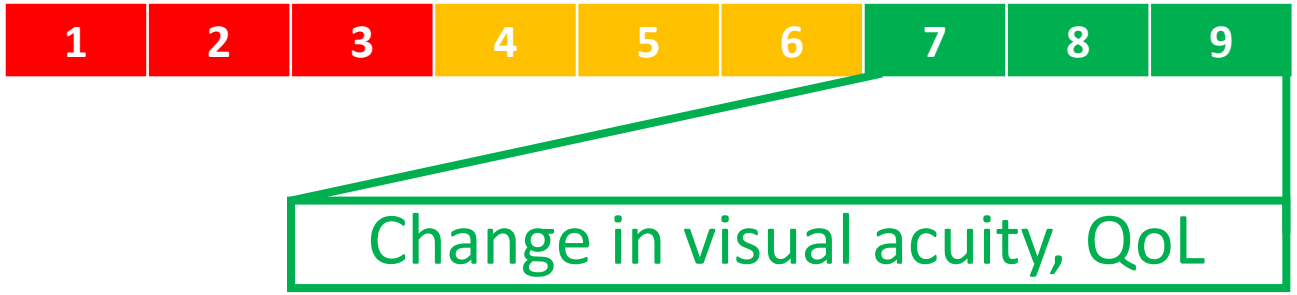
Consistent improvement (0.7 ⬆ 1.0 logMAR)

Main effect within 4.5 hours

10. For adults with central visual impairment due to stroke, does **compensatory, substitutive or restitutive** interventions compared to no interventions improve activities and quality of life?

E

Critical outcomes



3 studies (none RCTs – cross-sectional/cohort)

Median 273 (77-1500) participants

Acute care interventions

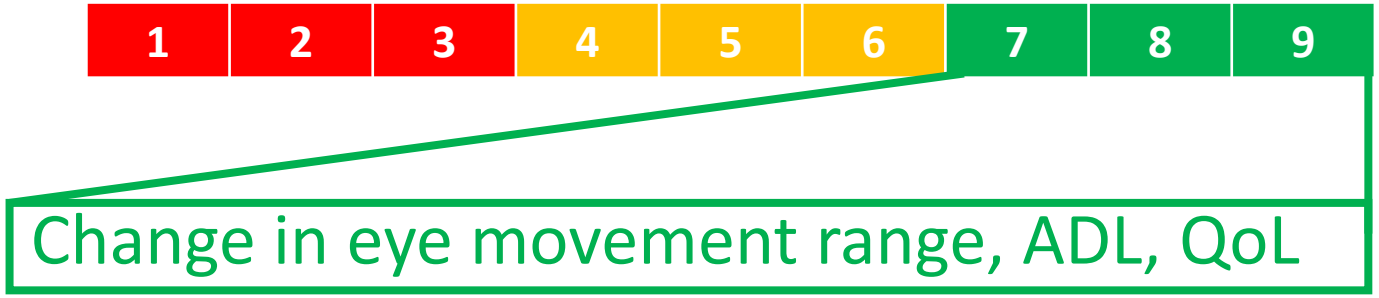
Participants: Stroke survivors with central vision impairment
Settings: Acute
Intervention: Restitutive

Outcome	*N participants*	*Effect sham / standard care*	*Effect intervention*	*Significance between groups*	*Quality of evidence (GRADE)*
Change in visual acuity Snellen/logMAR[109]	Freeman: 24 of 55	N/A 	Change over 6 months: mean 63 days N=12 partial/full recovery, N=5 no recovery, remainder not reviewed	N/A	+ooo Very Low[a]
Snellen/logMAR[110]	Lotery 20 of 77	N/A 	Change from baseline to 2 weeks N=11 partial/full recovery with glasses	N/A	
logMAR[1]	Rowe 354 of 1204	N/A 	Change from baseline to 1 year N=126 full recovery, N= 129 partial recovery, N=90 no recovery, remainder not reviewed Near visual acuity: Pre: Right / Left eye Mean 0.6 (SD 0.356) / Mean 0.61 (SD 0.483) Post: Right / Left eye Mean 0.45 (SD 0.279) / Mean 0.50 (SD 0.506) Distance visual acuity: Pre: Right / Left eye Mean 0.5 (SD 0.562) / Mean 0.53 (SD 0.594) Post: Right / Left eye Mean 0.33 (SD 0.456) / Mean 0.44 (SD 0.793)	N/A	

11. For adults with eye movement disorders due to stroke, does **compensatory, substitutive or restitutive** interventions compared to no interventions improve activities and quality of life?

R

Critical outcomes

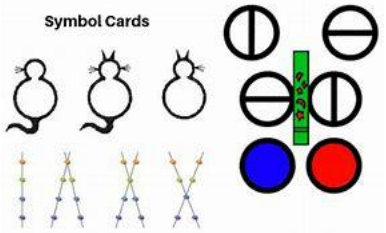


2 studies (1 RCT – 1 case comparison)

Mean 76.5 (64-89) participants

Acute and chronic care interventions

Participants: Stroke survivors with eye movement disorders
Settings: Acute
Intervention: Compensatory
Reference standard: Control, standard or conservative care



Outcome	*N participants*	*Effect sham / standard care*	*Effect intervention*	*Significance between groups*	*Quality of evidence (GRADE)*
Change in eye movements	Johansson 48 intervention 41 standard care	Change from baseline to 8 weeks	Change from baseline to 8 weeks		+ooo Very Low[a]
Convergence[112]		Pre: Median 20 Post: Median 12 NS	Pre: Median 20 Post: Median 15 p=0.02	N/A	
Convergence facility[112]		Pre: Median 0 Post: Median 3 NS	Pre: Median 0 Post: Median 6 p=0.03	N/A	
Distance vergence reserve[112]		Pre: Median 12 Post: Median 14 p=0.04	Pre: Median 15 Post: Median 22 p<0.01	N/A	
Near vergence reserve[112]		Pre: Median 23 Post: Median 27 NS	Pre: Median 23 Post: Median 28 p<0.01	N/A	

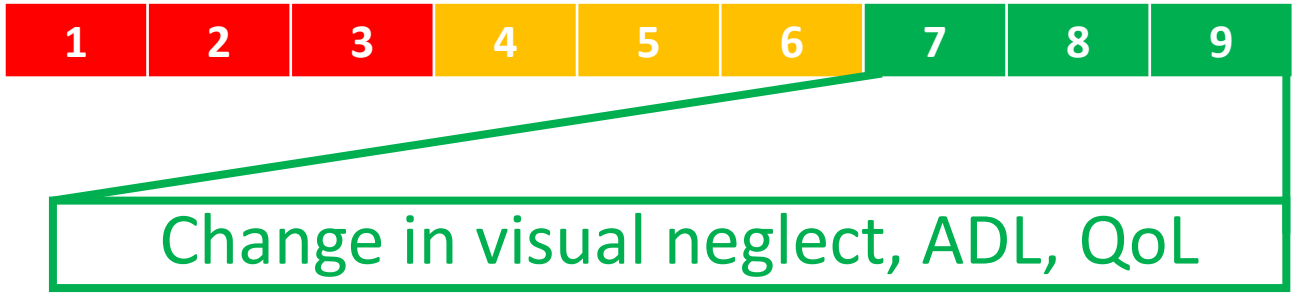
Participants: Stroke survivors with eye movement disorders
Settings: Acute
Intervention: Compensatory
Reference standard: Control, standard or conservative care

Outcome	*N participants*	*Effect sham / standard care*	*Effect intervention*	*Significance between groups*	*Quality of evidence (GRADE)*
Change in activities of daily living Berg Balance scale[111] Barthel Index scale[111]	Batool 32 intervention 32 sham	Change from baseline to 4 weeks Pre: Mean 11.19 ± 2.18 Post: Mean 12.63 ± 2.52 p=0.0001 Pre: Mean 20.31 ± 7.72 Post: Mean 26.25 ± 10.70 p=0.0001	Change from baseline to 4 weeks Pre: Mean 10.75 ± 2.17 Post: Mean 16.34 ± 2.88 p=0.0001 Pre: Mean 18.28 ± 7.47 Post: Mean 32.66 ± 12.69 p=0.0001	 S: p=0.0001 S: p=0.033	++++ High
Change in quality of life Convergence insufficiency symptom score[112]	Johansson 48 intervention 41 standard care	Change from baseline to 8 weeks Pre: Median 20 Post: Median 15 NS	Change from baseline to 8 weeks Pre: Median 20 Post: Median 15 p<0.01	 p<0.01	+ooo Very Low[a]

12. For adults with visual neglect due to stroke, does **compensatory, substitutive or restitutive** interventions compared to no interventions improve activities and quality of life?

R

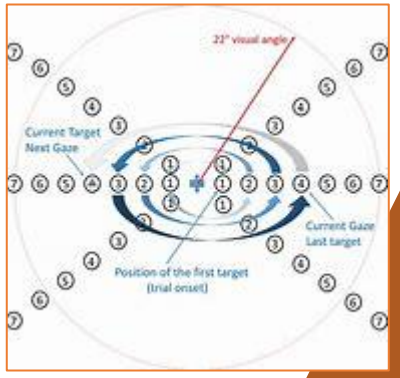
Critical outcomes



44 studies (37 RCTs – 7 cross-sectional/cohort)

Median 30 (20-426) participants

Acute and chronic care interventions



Compensatory

→ Visual scanning / visuomotor training
Combination exercises therapy
Robot-assisted therapy

Substitutive

→ Prism therapy
Eye patching
Mirror therapy

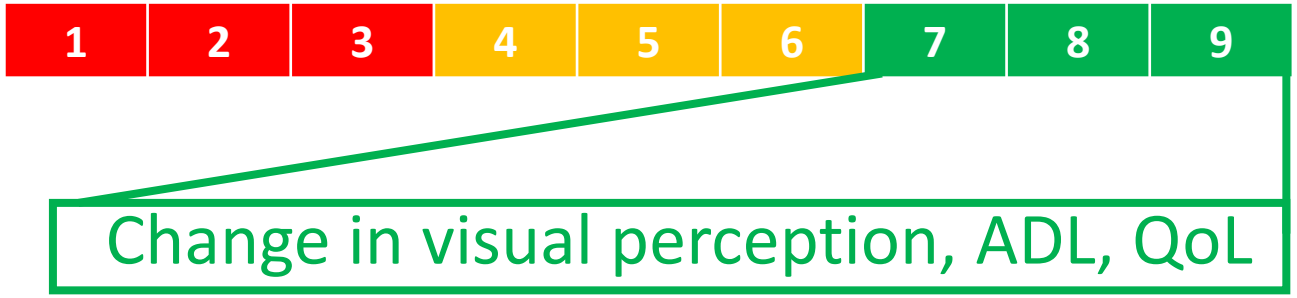
Restitutive

→ Computerised training
Brain stimulation

13. For adults with other visual perceptual disorders due to stroke, does **compensatory, substitutive or restitutive** interventions compared to no interventions improve activities and quality of life?

R

Critical outcomes



4 studies (RCTs)

Mean 32 (24-44) participants

Acute care interventions

Compensatory

→ Task training

Restitutive

→ Transcranial direct current stimulation
Repetitive transcranial magnetic stimulation

Treatment
Treat stroke survivors with compensatory interventions of visual scanning/visual search to aid adaptation to visual field loss after stroke.
Treat ocular stroke (central retinal artery occlusion) with thrombolysis within 4.5 hours of stroke onset (if there are no contraindications) to aid recovery of visual function.
Provide early management options to improve visual acuity.
Refer to specialist eye services for the targeted management of eye movement disorders.
Provide individualised intervention targeted at the specific type of visual neglect or visual perception deficit that has arisen.
Establish close collaboration between stroke teams (particularly occupational therapy), neuropsychology and eye care teams (orthoptics, ophthalmology) for targeted management of visual impairment.
Provide appropriate vision-related information, resource materials and vision aids to stroke survivors and their care givers

Areas of future research

Diagnosis

Implementation of standardised vision screening programme

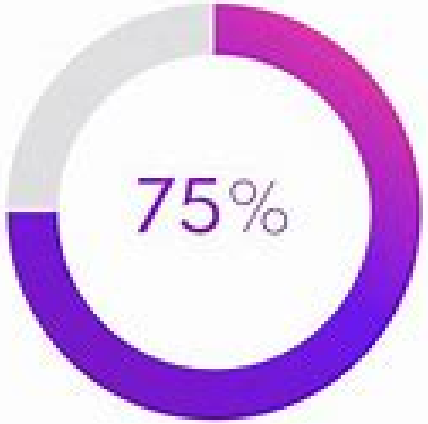
- Comparison of screening to no routine stroke screen
- Comparison of timing of vision screening

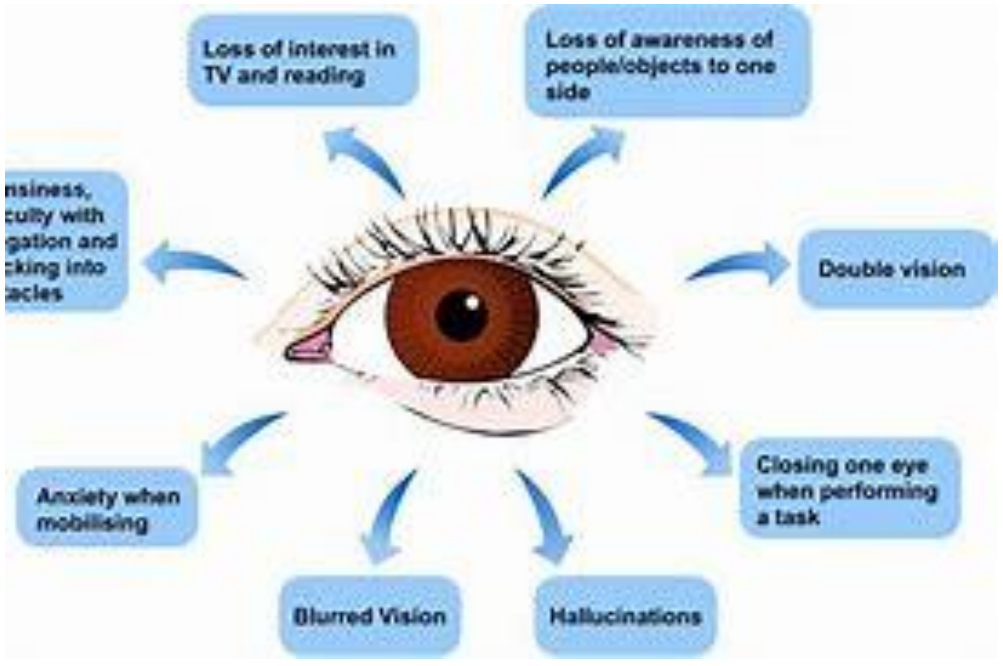
Treatment

Outcome measures

- Change in function, ADL and QoL
- Driving performance, Falls risk
- Visual field loss: visual scanning training & visual restitution training
- CRAO: pathways for urgent referral
- Central vision

Conclusions





Summary

…decision-making: Vision screening and assessment, Timing, Management

For clinicians with stroke survivors…

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https://eso-stroke.org/guidelines/eso-guideline-directory/

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