

Question 24 evidence tables

Question 24: What are the staffing requirements for orthoptic services on acute stroke units?

NB Any discrepancies between reviewers in evidence quality and comment were discussed at the corresponding evidence review meeting

SWOT = strengths, weaknesses, opportunities, threats; SR = systematic review, MA = meta-analysis, RCT = randomised controlled trial, IPDMA = individual patient data meta-analysis, MDT = multidisciplinary team, PICO = patient/population, intervention, comparison and outcomes, OR = odds ratio, CI = confidence interval, QoL = quality of life, ADL = activities of daily living, OR = odds ratio, RR = relative risk, aOR = adjusted odds ratio, cOR = crude odds ratio, CI = confidence interval, RoB = risk of bias, I2 = heterogeneity statistic.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
609	Rowe, F., Walker, M., Rockliffe, J., Pollock, A., Noonan, C., Howard, C., et al. (2016). Delivery of high quality stroke and vision care: experiences of UK services. <i>Disability and rehabilitation</i> , 38(8), 813-817.	UK Qualitative – interviews and focus groups n=14 services n=24 health care professionals involved in integrated stroke - vision care services (n=13 Orthoptists, n=4 OT, n=3 physio, n=2 stroke nurse, n=1 eye clinic manager).	High quality integrated stroke - vision care services.	SWOT framework.	Identified strengths of these services included open access for referrals, ward assessments with aim of within 1 week of admission with eye clinic follow-up, dedicated orthoptic stroke sessions, mixture of primary orthoptic screening and secondary orthoptic screening after trained member of the MDT. Identified weaknesses included lack of funding resulting in service being dropped or lack of cover for annual leave, MDT staff required regular re-training due to rotations. Opportunities were identified as increased number of sessions, further training for the MDT and more joint working. Threats were identified as funding and lack	Only high-quality services considered. Selection of services involved a subjective judgement of high quality. Mixture of interviews and focus groups.

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					of support from managers and consultants.	
609	Rowe, F., Walker, M., Rockliffe, J., Pollock, A., Noonan, C., Howard, C., et al. (2016). Delivery of high quality stroke and vision care: experiences of UK services. <i>Disability and rehabilitation</i> , 38(8), 813-817.	14 UK NHS Trusts with "High Quality" services for vision in stroke: defined as having integrated stroke and vision care. Purposively sampled – subjective criteria. Participants were 11 orthoptists; 1 manager; 2 nurses; 4 OTs; 3 physios. Included services had average of 2 dedicated orthoptist sessions per week (range 1-4)	Observational study. 1:1 interviews and focus groups.	SWOT thematic analysis of interviews and focus groups.	Stated "key elements" included: assessment within 1 week; at least 2 orthoptic sessions per week on stroke units; orthoptist named on core stroke team. Respondents valued the presence of an orthoptist on the stroke unit.	- Unclear how responses used to reach "key elements", particularly recommendation for minimum 2 orthoptic sessions per week. Most responses from orthoptists. Services selected as those having orthoptic services on stroke units – "High Quality" services defined by subjective criteria. No stroke physician or ophthalmologist views included. Potential for bias in sample of respondents.
611	Rowe, F. J., Hepworth, L. R., Hanna, K., & Howard, C. (2018). Timing of vision screening and assessment in an acute population. <i>International Journal of Stroke</i> , 13(3 Supplement 1), 11.	This is a conference abstract of a sub-study from the large epidemiology study involving 3 acute stroke services in NW England' and recruiting 1500 participants over 15 months. The aim was to report the timing at which specialist vision screening is feasible in an acute stroke population.	The orthoptic research team assessed all stroke survivors with assessment of visual acuity, visual fields, ocular alignment, ocular motility, visual inattention and visual perception alongside documentation of past ocular history and current visual symptoms.	Time of visual screening after stroke onset in days.	1033 underwent visual screening at a mean of 6.45 days (SD 24; median 3). 668 were assessed at baseline; 365 could not be assessed so were re-reviewed - 70% were assessed by the second visit. The time-point at which most stroke survivors could achieve a full visual assessment was at a median of 4 days (mean 13.4) post stroke onset.	Not assessed as this is only an abstract, however it is a descriptive analysis of a sub section of results from a large cohort study which was carried out reasonably well.
611	Rowe, F. J., Hepworth, L. R., Hanna, K., & Howard, C. (2018). Timing of vision	Prospective, epidemiology study, across 3 stroke units. All stroke admissions were identified by the	The orthoptic research team assessed all stroke survivors with assessment of visual	90 died before vision assessment; 172 could never be assessed. 1033 underwent visual	365 could not be assessed so were re-reviewed - 70% were assessed by the second visit. The time-point at which most	Early assessment in acute stroke of 4 days.

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	screening and assessment in an acute population. <i>International Journal of Stroke</i> , 13(3 Supplement 1), 11.	stroke research nurses. 1295 patients were recruited.	acuity, visual fields, ocular alignment, ocular motility, visual inattention and visual perception.	screening at a mean of 6.45 days (SD 24; median 3). 668 were assessed at baseline.	stroke survivors could achieve a full visual assessment was at a median of 4 days. Reasons for not being able to undergo vision screening or assessment were mostly related to severity of stroke where stroke survivors were unable to participate in with vision testing.	Early visual assessment is feasible when undertaken by Orthoptists and important as a core stroke assessment.
618	Rowe, F. J., Hepworth, L. R., Howard, C., Hanna, K. L., Cheyne, C. P., & Currie, J. (2019). High incidence and prevalence of visual problems after acute stroke: An epidemiology study with implications for service delivery. <i>PLoS ONE</i> , 14(3), e0213035.	Purpose: To report annual point prevalence and incidence of visual impairment acute stroke. A prospective epidemiology study. Across 3 stroke units, 1291 patients recruited. 99 died before full assessment. 169 couldn't be assessed. Overall 1023 patients were assessed. 959 underwent full visual assessment. 19.4 days after stroke .	The orthoptic research team assessed all remaining patients on the stroke unit. patients had standard clinical assessment of visual acuity, visual fields, ocular alignment, ocular motility, visual inattention and visual perception.	73% with incidence of stroke-related visual impairment.	1291 patients were recruited: 99 died before full assessment 169 could never be assessed. 1023 patients were assessed with diagnosis. Over half were assessed at baseline. 959 underwent full visual assessment at a mean of 19.4 days. 28% had normal eye exams. 72% had visual impairment: 55.8% with impaired central vision, 41.7% with eye movement abnormalities, 28% with visual field loss, 27.2% with visual inattention and 4.3% with visual perceptual disorders. (7.3%) had visual impairment due to pre-existent causes.	High
619	Rowe, F. J., Hepworth, L. R., Howard, C., Hanna, K. L., Cheyne, C. P., & Currie, J. (2019). High incidence and prevalence of visual problems after	Prospective epidemiology study of prevalence and incidence of vision impairments in an acute stroke cohort over the course of 1 year from 3 acute stroke services in NW England.		Types of visual problems were assigned to four categories including: -Impaired central vision (defined as visual acuity > 0.3 logMAR equivalent),	1033 patients underwent visual screening at a median of 3 days (IQR 2), but almost half of stroke admissions were unable to complete the screening assessment.	+ A good picture of the incidence of visual impairments due to stroke that highlights how commonly vision is affected.

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	acute stroke: An epidemiology study with implications for service delivery. <i>PLoS ONE</i> , 14(3), e0213035.	The authors were also seeking to determine feasibility of early timing of visual assessment. Visual screening examination was offered to all stroke admissions, (no research consent was required). The vision services in the three hospitals was staffed at the recommended level. 1033 stroke participants had visual screening. Descriptive statistics were used to report types of visual impairment		-Ocular motility abnormalities (defined as ocular misalignment, incomplete ocular motility) -Visual field loss: (homonymous hemianopia, quadrantanopia, scotoma) -Visual perceptual disorders (defined as impaired perception of visual objects or space, e.g. visual inattention, agnosia, alexia). Average days post stroke of vision screening.	The incidence of new onset visual sequelae was 48% for all stroke admissions and 60% in stroke survivors. Three quarters 752/1033 (73%) had visual problems (point prevalence): 56% with impaired central vision, 40% eye movement abnormalities, 28% visual field loss, 27% visual inattention, 5% visual perceptual disorders. 281/1033 (27%) had normal eye exams.	
612	Rowe, F. J., & Rowe, F. J. (2011). Accuracy of referrals for visual assessment in a stroke population. <i>Eye</i> , 25(2), 161-167.	UK Cohort n=799 stroke survivors with suspected visual impairment	Standardised MDT screening/referral form	Presence or absence of visual impairment determined by orthoptic vision assessment	Low sensitivity and specificity: Sensitivity = 0.42, Specificity = 0.52 High positive predictive value = 91% Agreement using Kappa =0.428. 58% referrals had no signs reported and relied on symptom reporting. 23.5% referred had documented communication difficulties.	++
612	Rowe, F. J., & Rowe, F. J. (2011). Accuracy of referrals for visual assessment in a stroke population. <i>Eye</i> , 25(2), 161-167.	Aim of the study -to evaluate accuracy of referrals from MDT stroke team requesting visual assessments. Prospective multi-centre observational case-cohort study.	1222 patients referred with visual problems to the orthoptists for assessment. 423 excluded. 799 stroke survivors were recruited.	Visual field, ocular alignment and motility, evaluation of saccadic, smooth pursuit and vergence eye movements fusional vergence, stereopsis. Perceptual	92% of all patients referred had a confirmed diagnosis of visual impairment of varying type. The first vision assessment was undertaken at a median 19 days.	Agree it is important that stroke survivors who have visual difficulties are referred for appropriate ocular examination.

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		<p>Multicentre prospective study undertaken in 20 acute trust hospitals. Stroke survivors referred with suspected visual difficulty were recruited. Standardised screening</p> <p>All centres had a linked stroke specialist Orthoptist.</p>	Gold standard assessment completed by Orthoptist when evaluating visual status.	deficits were recorded after questioning the patients.	<p>21% abnormal eye movements, 17% visual field loss, 5.5% visual acuity, 1% visual inattention 1% visual perceptual abnormalities. Combinations of these diagnoses were found in the remaining patients (45%)</p> <p>A high positive predictive value for referral demonstrating- 58% of referrals had no signs but referred on symptoms and suspicion of patients behaviour.</p>	Main issue with this study is that all units involved in the study had a designated specialist Orthoptist. May lead to heightened awareness among the MDT
614	<p>British and Irish Orthoptic Society (2021).</p> <p>The British and Irish Orthoptic Society (BIOS) Position Statement for Vision Services in Stroke Practice.</p>	<p>UK and Ireland</p> <p>Position statement</p>			<p>Based on a reduced length of stay, established high prevalence of visual impairment post-stroke since previous recommendation, minimum orthoptic staffing recommendations are 0.4 FTE per 10 bedded hyper-acute unit, 0.2 FTE per 10 bedded acute stroke unit and 0.1 FTE per 10 bedded neuro-rehabilitation unit, plus 0.1 FTE for outpatient follow per 30 bedded stroke provision. Allowance should also be made for administrative workload.</p>	
614	<p>British and Irish Orthoptic Society (2021).</p> <p>The British and Irish Orthoptic Society</p>	<p>Recommendations from BIOS. Statement that the recommendations use “a</p>	None.	None.	<p>Recommends the following orthoptist staffing: HASU: 0.4 FTE per 10 beds ASU: 0.2 FTE per 10 beds</p>	Literature not systematically reviewed.

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	(BIOS) Position Statement for Vision Services in Stroke Practice.	combination of current research evidence from the medical literature and Cochrane systematic reviews, expert consensus from the Orthoptic Clinical Advisory Group (CAG) in Stroke and neuro-rehabilitation and models of best practice.			Neuro-rehab: 0.1 FTE per 10 beds 1 outpatient follow-up clinic per week per 30 beds. 0.2 FTE per 10 beds minimum for a stroke service.	Recommends assessment within 3 days or before discharge. Doesn't show how recommended staffing levels deliver this, or recommended model of care.
615	Rowe, F. J., Hepworth, L. R., Howard, C., Hanna, K. L., & Currie, J. (2022). Impact of visual impairment following stroke (IVIS study): a prospective clinical profile of central and peripheral visual deficits, eye movement abnormalities and visual perceptual deficits. <i>Disabil Rehabil</i> , 44(13), 3139-3153.	3 Hyperacute and Acute Stroke Units in North West England. Cohort study. >=18 years old. Within 2 weeks of stroke. Clinical diagnosis of stroke from stroke specialist. Admissions over 15 months.	Orthoptist assessment as soon as possible after stroke onset – typically within 1 week of admission. Visual neglect may have been identified by other MDT members.	Presence of impaired visual perception, attention or eye movements. Orthoptist attributed to pre-existing or stroke-related problem	1500 stroke admissions recruited. Unclear what proportion of total admissions this was, but discussion suggests all admissions may have been identified. Of these, 1204 were assessed. 296 not assessed (116 died, 180 unable to undergo assessment; 53 of these discharged before assessment). Of 1204 assessed, 867 had some sort of visual problem. 703 assessed to have new stroke-related visual impairment. Of patients with visual impairment (of all stroke survivors assessed): 75% (44%) had problem with central vision. 58% of these asymptomatic. 44% (26%, 25% new) had visual field loss. 46% of these were asymptomatic. 76% (44%) had oculomotor impairment	+ Refers to another publication for times to assessment, but that had a slightly different recruitment period (the other study started and ended 3 months earlier). Most importantly, unable to assess case ascertainment, therefore unable to determine precision/accuracy of prevalence estimates. Uncertain whether admission profile similar to other units in the UK. Unable to attribute disability to visual problems in this study, or to estimate the number with clinically significant visual problems. A large proportion of patients were referred on to optometry, low vision or ophthalmology services. Patients with visual field loss appear to have been

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					45% (26%) had visual inattention 8% (5%) had other perceptual disorders. Patients fully recovered, partially recovered or didn't recover by follow-up. Follow-up ranged from 8 to 426 days.	treated by the orthoptist without onward referral. Did not state what additional utility follow-up had compared with initial assessment.
615	Rowe, F. J., Hepworth, L. R., Howard, C., Hanna, K. L., & Currie, J. (2022). Impact of visual impairment following stroke (IVIS study): a prospective clinical profile of central and peripheral visual deficits, eye movement abnormalities and visual perceptual deficits. <i>Disabil Rehabil</i> , 44(13), 3139-3153.	Prospective epidemiology study of vision impairments in an acute stroke cohort from 3 acute stroke services in NW England. Inclusion criteria were stroke survivors 18 years of age or older with the ability to agree to vision screening using verbal or nonverbal indications of agreement. 1500 stroke participants were recruited. 1204 stroke survivors had visual assessment. Follow up assessments were provided to those with visual impairment usually at weekly intervals while an in-patient and, for out-patient visits, at 4, 12 and 26 weeks, and with allowance for longer follow-up where relevant according to individual patient needs. These enabled estimates of recovery, proportion of patients recovering within the time frames of the study. Descriptive statistics were used to report types of visual impairment.	n/a this is a study of the point prevalence and incidence of visual impairments in acute stroke.	Assessment of visual function included: -visual acuity for near and distance, monocular and binocular (logMAR, Cardiff grating acuity cards, Vocational near visual acuity, fixing and following observations), -visual field assessment (visual fields to confrontation, static/kinetic perimetry), -ocular alignment assessment (cover/uncover test), -rotation of eye movements (saccadic and smooth pursuit movements), -vergence (near point of convergence, divergence ability), -simultaneous perception (Bagolini glasses), -stereopsis (Frisby stereotest), -fusional vergence (20 prism dioptre base-out, prism fusion range),	Out of 1204 patients assessed: Reduced central vision was documented in 529, visual field loss in 308, ocular motility abnormalities in 533, visual perception deficits in 59, visual inattention in 315. About half, regardless of visual impairment type, were visually 'asymptomatic' the patients or others had not noticed their vision problems. Recovery, whether full or partial, was best for central vision, ocular motility abnormalities and visual perception deficits (about 70% improvement) occurring over a mean follow-up period of 2-3 months.	+ This paper makes a good stab at determining the point prevalence of various visual impairments in a large sample of 1500 acute stroke patients. The authors also attempted to determine incidence (the impairments that were likely due to the recent stroke) and the proportion of patients showing recovery of the impairments. Unlike Rowe's previous 'incidence' studies of visual impairments found by stroke vision specialists in this large study Comprehensive visual examination was offered to all stroke survivors who were recruited from the sites and not just to those referred to the stroke vision services. Limitation was that the study was limited geographically to 3 sites in NW England.

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				-lid and pupil function, -visual perception (non-validated checklist), -stereopsis (Frisby stereotest), -visual inattention (line bisection, cancellation task, clock drawing, memory-guided tasks, room description, clinical observation).		
616	Hepworth, L. R., Howard, C., Hanna, K. L., Currie, J., & Rowe, F. J. (2021). "Eye" Don't See: An Analysis of Visual Symptom Reporting by Stroke Survivors from a Large Epidemiology Study. <i>J Stroke Cerebrovasc Dis</i> , 30(6), 105759.	Large multi-centre prospective epidemiology study. Aim of the study to explore the reported symptoms of post-stroke visual impairment from a large epidemiology study. 3 hospitals HASU ASU in North West of England. All stroke patients in the acute phase. Each of three stroke units had 2 Orthoptic sessions per week. With additional outpatient Orthoptic clinic for follow up. Total 1500 stroke admissions - 296 patients did not undergo visual assessment and 180 unable. 1204 completed visual assessment 337 had a normal assessment 867 had one or more visual impairments.	Assessment of visual function, assessment visual acuity, colour vision, ocular alignment, ocular movements, binocular vision, visual fields, visual inattention, visual perceptual. Initial full assessment undertaken at median of 4 days post stroke.	43% of stroke survivors did not report visual symptoms despite presence of objectively confirmed visual impairment.	703 stroke survivors Commonly reported symptom blurred vision (22.4%) Visual field loss (14.1%), diplopia (11%), reading difficulty (10.5%).	This study does highlight the importance of a comprehensive screening for all stroke survivors. Acceptable study.
616	Hepworth, L. R., Howard, C., Hanna, K. L., Currie, J., & Rowe, F. J. (2021). "Eye" Don't See: An Analysis of Visual Symptom	Large multi-centre prospective epidemiology study. Visual assessment attempted for all stroke admissions to three acute stroke units in the North West of England.	Visual assessment included a case study, visual acuity, ocular alignment, ocular motility, visual fields,	Visual acuity – logMAR, Vocational near visual acuity or Cardiff acuity cards. Reading ability – Radner reading test.	44.4% reported visual symptoms, no visual symptoms by 38.4% and 14.5% were unable to report symptoms.	+ Useful article on what should be covered on a visual assessment and the range of visual difficulties after Stroke,

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	Reporting by Stroke Survivors from a Large Epidemiology Study. <i>J Stroke Cerebrovasc Dis</i> , 30(6), 105759.	1500 stroke admissions and 1204 received a visual assessment. Study set in the UK, Liverpool between July 2014 – September 2015. Each of the three stroke units had two orthoptic sessions per week with an additional outpatient orthoptic clinic for follow up appointments after stroke unit discharge.	visual inattention and visual perception. Initial assessment was undertaken at a median of 4 days post-stroke, follow up of those with visual impairment was weekly whilst an inpatient and at clinically appropriate intervals for outpatients.	Colour vision – city test. Contrast sensitivity assessment – MARs test. Ocular alignment – cover uncover test Ocular movements – saccadic, smooth pursuits and vergence. Binocular vision – 20 prism dioptre base out, prism fusion range, Frisby stereotest. Visual fields – confrontation test, kinetic/static perimetry using an Octopus 900 perimeter. Visual inattention – line bisection, clock drawing, cancellation task and room description. Visual perception – tasks using common objects and pictures. Descriptive statistics were used to report the types of visual symptoms reported. Independent samples analysis with One-Way ANOVA and Kruskal Wallis H test was used for evaluation of age at stroke onset and stroke severity. Independent t test and Chi square test was used for evaluation of symptoms	Most common symptom was blurred/altered vision 22.1%, field loss 12.6%, diplopia 9.9%, and reading difficulties 9.7%. Stroke survivors with a squint and cranial nerve palsies were significantly more likely to report symptoms. About 40% of stroke survivors with new onset visual symptoms did not or could not report visual symptoms. Stroke type for those with visual impairment was infarction 89.2% and haemorrhage 10.8%.	however did not discuss staffing numbers required. Study limited by only studying stroke patients in three stroke units in the North West of England. Not always possible to identify which visual impairment caused each specific visual symptom. Unclear how many stroke survivors were assessed in each clinic and the length of time of the clinics.

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				reporting versus category of visual impairment.		
617	Rowe, F. J. (2017). Vision In Stroke cohort: Profile overview of visual impairment. <i>Brain Behav</i> , 7(11), e00771.	Multicentre prospective observational case cohort study. This was undertaken in 20 acute Trust hospitals The data was collected by the local orthoptic principle investigator. Target population was stroke patients suspected of having a visual difficulty. Referrals were from inpatient wards, rehabilitation units, community services and outpatient clinics. Data collated centrally at the University of Liverpool. Patients were excluded if they were unable to consent, diagnosis was of a transient ischaemic attack or discharged before could complete assessment. 1,345 patients were referred for visual assessment, 915 were recruited and 430 were excluded.	Screening assessment form used and a standardized investigation sheet consisting of pre-existent ocular pathology, symptoms and signs, investigations of visual field, ocular motility and perceptual aspects. Quality of life was undertaken using the Activities of Daily Living Dependent on Vision (ADLDV) questionnaire.	Results were inputted to the statistical package SPSS version 22. Pearson chi squared test was undertaken to analyse cross tabulations of results for visual field loss and outcome of follow-up versus factors such as age, presence of other visual impairment, laterality and area of stroke and recovery.	8% had normal visual assessment, 45.5% had solely one form of visual impairment, 17% had visual field loss, 20% had eye movement abnormalities, 2% had visual perceptual difficulties, 7% had low central vision and 46.5% had multiple visual impairments. Visual symptoms were reported by 84% of patients with visual field loss the most common symptom. Treatment options were offered to all patients, new or updated refractions most commonly provided, followed by prisms, occlusion, typoscopes and low vision aid. Advice was also provided on eye and head scanning, reading strategies, appropriate lighting, visual field awareness, visual inattention awareness and use of compensatory head posture.	+ Useful article on what should be covered on a visual assessment and the range of visual difficulties after Stroke, however did not discuss staffing numbers required.
617	Rowe, F. J. (2017). Vision In Stroke cohort: Profile overview of visual	Multicentre prospective study in 20 acute trust hospitals (UK). Local orthoptic principal investigator. Referral made from	Patients suspected visual difficulty were identified using a screening form.	Visual fields assessed qualitatively by traditional confrontation methods.	915 patients recruited. Data analysed using SPSS version 22 Initial visual assessment median 22 days. 8% had	Wide range of visual disorders following stroke. Stroke survivors require screening and

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	impairment. <i>Brain Behav</i> , 7(11), e00771.	inpatient wards, rehabilitation units, community services, outpatient clinics. Data collected centrally at University of Liverpool. Patients only excluded if unable to consent due to cognitive impairment. 1,345 patients referred with suspected visual impairment	Standardised investigation sheet for inability to provide informed consent, patients discharged prior to receiving visual assessment, diagnosis changed to TIA or other, patient died. eye assessment consisting of identification of known pre-existing ocular pathology, symptoms and signs, investigation of visual field, ocular motility and perceptual aspects. Ocular treatment details were recorded along with outcome.	Visual acuity assessed with Snellen or LogMAR acuity test. Ocular alignment and motility assessed with evaluation of saccadic, smooth pursuit and vergence eye movement, retinal correspondence, fusional vergence and lid and pupil function. Perceptual deficits recorded via questionnaire. Line bisection, cancellation tests. QOL ADL dependent on vision.	normal visual assessment. 92% confirmed visual impairment (24% central visual, 16% acquired strabismus, 68% ocular motility disorders, 52% homonymous hemianopia, 52% visual inattention, 4.6% other visual perceptual disorders. Overall 84% visually symptoms with visual field loss. Treatment options provided: refraction, prisms and occlusion. 430 patients were excluded (inability/unwilling to consent, discharged prior to assessment, diagnosis changed to TIA or other, or died.	assessment by specialist assessment.