Quality of Life Is Poorer for Patients With Stroke Who Require an Interpreter

An Observational Australian Registry Study

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Background and Purpose—In multicultural Australia, some patients with stroke cannot fully understand, or speak, English. Language barriers may reduce quality of care and consequent outcomes after stroke, yet little has been reported empirically.

Methods—An observational study of patients with stroke or transient ischemic attack (2010–2015) captured from 45 hospitals participating in the Australian Stroke Clinical Registry. The use of interpreters in hospitals, which is routinely documented, was used as a proxy for severe language barriers. Health-Related Quality of Life was assessed using the EuroQoL-5 dimension-3 level measured 90 to 180 days after stroke. Logistic regression was undertaken to assess the association between domains of EuroQoL-5 dimension and interpreter status.

Results—Among 34 562 registrants, 1461 (4.2%) required an interpreter. Compared with patients without interpreters, patients requiring an interpreter were more often women (53% versus 46%; $P<0.001$), aged ≥75 years (68% versus 51%; $P<0.001$), and had greater access to stroke unit care (85% versus 78%; $P<0.001$). After accounting for patient characteristics and stroke severity, patients requiring interpreters had comparable discharge outcomes (eg, mortality, discharged to rehabilitation) to patients not needing interpreters. However, these patients reported poorer Health-Related Quality of Life (visual analogue scale coefficient, −9; 95% CI, −12.38, −5.62), including more problems with self-care (odds ratio: 2.22; 95% CI, 1.82, 2.72), pain (odds ratio: 1.84; 95% CI, 1.52, 2.34), anxiety or depression (odds ratio: 1.60; 95% CI, 1.33, 1.93), and usual activities (odds ratio: 1.62; 95% CI, 1.32, 2.00).

Conclusions—Patients requiring interpreters reported poorer Health Related Quality of Life after stroke/transient ischemic attack despite greater access to stroke units. These findings should be interpreted with caution because we are unable to account for prestroke Health Related Quality of Life. Further research is needed. **(*Stroke*. 2018;49:761-764. DOI: 10.1161/STROKEAHA.117.019771.)**

Key Words: ischemic attack, transient ■ quality of health care ■ quality of life ■ stroke ■ visual analog scale

In Australia, >7% of strokes occur in patients whose first language is not English.[1] People with limited spoken English require medical interpreters or rely on family for interactions with the healthcare system.[2] Little is known about quality of care and outcomes for patients with acute stroke who require interpreters.[3] For the first time in Australia using national stroke registry data, we aimed to explore differences in health-related quality of life (HRQoL) between those that did, and did not, require an interpreter and whether this language issue was associated with differences in acute care received in hospital.

Material and Methods

We used data from the Australian Stroke Clinical Registry (AuSCR; January 1, 2010, to December 31, 2015) obtained from 45 hospitals.

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Information collected in the AuSCR includes patient demographics, processes of care, and health outcomes for hospitalized episodes of stroke or transient ischemic attack.[4] The data that support the findings of this study are available from the corresponding author on reasonable request.

Eligible patients were aged ≥18 years. For this study, language barriers were defined by the variable interpreter needed (online-only Data Supplement). Data for the patient-reported outcomes were collected between 90 and 180 days after the index event.[4] Using a modified Dillman protocol, a survey, including the EuroQoL-5 dimension-3 level instrument,[5] was posted to eligible patients (or proxy) and, if not returned after 2 attempts, the nonresponding patients or proxies were contacted by telephone.[4] Among those identified with limited English during the telephone follow-up interview, who had no-one available to speak on their behalf, a translated validated version of the EuroQoL-5 dimension survey (see https://euroqol.org/eq-5d-instruments/) was mailed to them if available.

Between-group comparisons were conducted using χ^2 tests for categorical variables and Kruskal–Wallis tests for continuous variables. Multilevel regression analyses enabled between-group assessment of differences in death rates (Cox regression), problems in quality of life (logistic regression), and visual analogue score and length of stay (median regression). Multivariable models were adjusted for age, sex, type of stroke, in-hospital stroke, previous stroke, ability to walk on admission,[6] time after stroke (subacute <5 months and chronic ≥5 months), and socioeconomic position (online-only Data Supplement).

Ethics approvals were obtained for all hospitals contributing to the AuSCR and, for national death registrations, from the Australian Institute of Health and Welfare. The AuSCR protocol incorporates an opt-out approach, whereby all eligible cases are registered unless the patient or family nominates to have their data excluded via simple, cost-free options (free-call telephone number or postage-paid).

Results

Among 34 562 episodes (median age, 76 years; 46% women; 63% ischemic stroke; 19% transient ischemic attack) included, 27 583 were eligible for follow-up. Median follow-up after stroke was 156 days (5 months; no interpreter, 53%; interpreter, 61%; $P<0.001$). A total of 1461 of 34 562 (4.2%) patients required an interpreter.

Patients requiring an interpreter were older, more often had a greater severity of stroke, took longer to arrive at hospital after the onset of their symptoms (median minutes, 173 versus 155; $P=0.06$), and were more often women, advantaged, aphasic, and born in Italy and other European countries (Figures 1 and 2) than those not requiring an interpreter (Table I in the online-only Data Supplement).

Patients requiring an interpreter more often received care on a stroke unit (85% versus 78%; $P<0.001$) than those not requiring an interpreter while all other processes of care remained similar.

In univariable analysis, there were between-group differences in outcomes, including mortality, length of stay, discharge destination, location of survivor at follow-up, and quality of life (Table II in the online-only Data Supplement). In multivariable analysis, patients who required an interpreter had a 2-day longer length of stay and less often reported that they were living alone or living at home without supports than those who did not (Table). Quality of life at follow-up, as measured by the visual analogue score and EuroQoL-5 dimension (except the dimension of mobility), was also poorer in those who required an interpreter (Table). Interactions between age and interpreter status were observed in all domains of the EuroQoL-5 dimension-3 level (Figure I in the online-only Data Supplement).

Similar to our overall findings, when we excluded proxy responses, those requiring an interpreter reported poorer quality of life at follow-up as measured by the visual analogue score (β-coefficient, −7.67; 95% CI, −12, −3; $P=0.002$) than those not requiring an interpreter. This association remained significant among those born in Italy (β-coefficient, −7; 95% CI, −11, −3; $P<0.001$) and was borderline in Asia (β-coefficient, −6; 95% CI, −13, 0.8; $P=0.08$) while no difference was

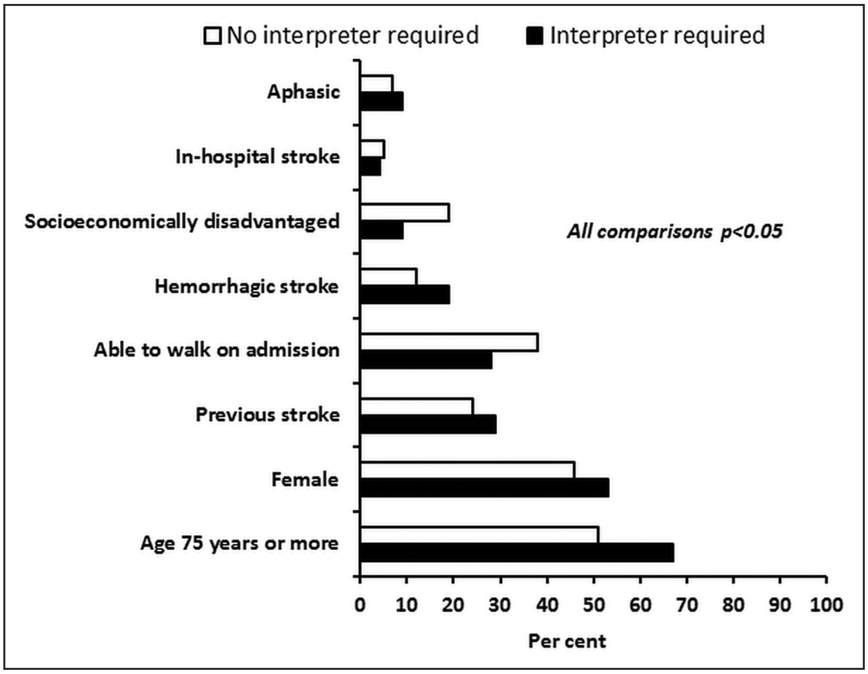

Figure 1. Characteristics of patients by interpreter status.

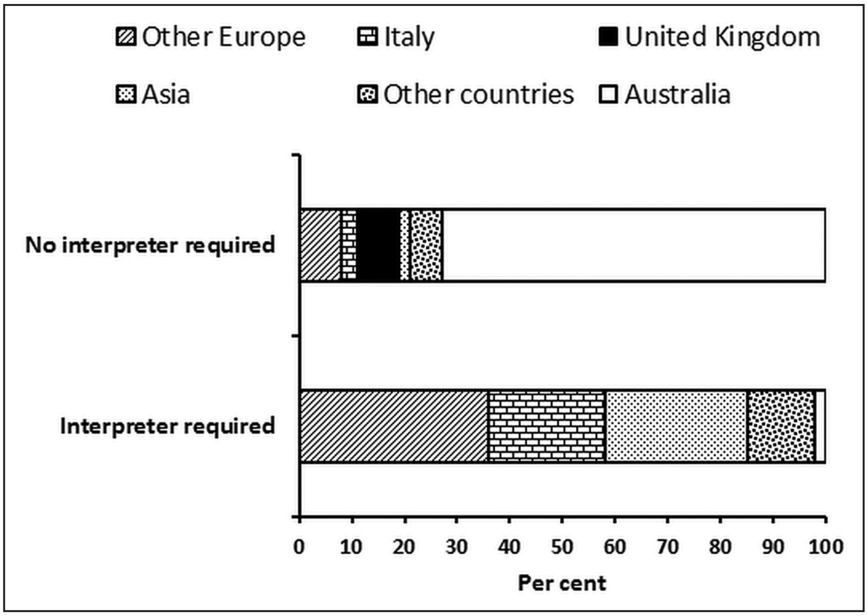

Figure 2. Country of birth of patients by interpreter status.

detected in other European countries (β-coefficient, −4; 95% CI, −14, 6; *P*=0.41).

Discussion

Patients who required an interpreter received similar or better quality of care, possibly because they more often accessed stroke units, and had a longer hospital stay but reported poorer quality of life at 3 to 6 months than patients not requiring an interpreter.

Receiving management on a stroke unit was associated with improved long-term survival and HRQoL,[7] findings consistent with those from a Canadian study.[3] Similar to us, Shah et al[3] also reported that patients who had language barriers more often received management on a stroke unit and had a longer length of stay than patients who did not have language barriers.

The poorer health-related quality of life we observed in stroke survivors who required an interpreter than those who did not, even when we excluded proxy responses, may be related to age and sex because these variables moderated the effect on interpreter use on HRQoL (Figure I in the online-only Data Supplement). Interventions to improve quality of life in patients with language barriers may have most effect in older and female patients.

The strengths and limitations of the AuSCR have been described in previous publications.[4,7] Completeness of data variables (98% required interpreter and 90% language spoken) and interrater reliability (recent audits detected no discrepancies) were excellent. Limitations include the fact that we did not collect information on whether the patient actually used an interpreter during their admission or other variables, such as preexisting disability, quality of life, or family structure. It is plausible that quality of life before stroke differed between participants with and without language barriers, and our inability to adjust for this may have influenced the magnitude of difference observed at the 90- to 180-day follow-up. Because ethnicity is not collected in the registry, we were

Table. Outcomes by Interpreter Status

	Multivariable*		
Interpreter Required	Effect Size	95% CI	*P* Value
Died	Hazard rate		
Within 30 d	0.99	0.88, 1.14	0.99
Within 90 d	1.04	0.92, 1.17	0.49
Within 180 d	1.02	0.92, 1.14	0.70
Discharge destination	Odds ratio		
Home	0.95	0.82, 1.09	0.44
Rehabilitation	1.06	0.93, 1.21	0.37
Aged care	0.91	0.71, 1.17	0.48
Location of stroke survivor at follow-up			
Living alone	0.50	0.39, 0.66	<0.001
Living at home			
With support	2.00	1.61, 2.50	<0.001
Without support	0.49	0.39, 0.62	<0.001
Length of stay (per day)	Coefficient		
All patients	0.89	0.38, 1.41	0.001
EQ-5D dimensions	Odds ratio		
Mobility	1.15	0.96, 1.38	0.12
Self-care	2.22	1.82, 2.72	<0.001
Pain	1.84	1.52, 2.34	<0.001
Anxiety/depression	1.60	1.33, 1.93	<0.001
Usual activities	1.62	1.32, 2.00	<0.001
EQ-5D -3L overall	Coefficient		
VAS	−9	−12.38, −5.62	<0.001

EQ-5D-3L indicates EuroQoL-5 dimension-3 level; and VAS, visual analog score.

*Adjusted for time to follow-up after stroke, sex, age, socioeconomic position, ability to walk on admission, type of stroke, in-hospital stroke, and previous stroke.

unable to determine the proportion of patients who could not speak English by ethnic status which may be a better determinant of language barriers than country of birth. This is why we chose to use the variable use of interpreter as a proxy for language barriers but acknowledge that it may underestimate the extent of language barriers in this population.

Research into language barriers can be hampered by the choice of definition of language barriers, including the patient's preferred language,[3] use of an interpreter, and record of language assessment on admission by administrative staff.[8] Use of a patients' preferred language may overestimate language barriers (because the patient may still be fluent in a second or third language). However, in sensitivity analyses, results were similar for quality of care and outcomes when using preferred language as our independent variable, confirming the reliability of our findings.

Conclusions

The data acquired in the AuSCR assist in understanding variation in the quality of care and outcomes among different stroke populations in Australia. Patients requiring interpreters reported poorer HRQoL 90 to 180 days after stroke despite evidence of better adherence to quality of care indicators within the acute phase of care. These findings should be interpreted with caution because we are unable to account for prestroke HRQoL. Further research is needed.

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Disclosures

None.

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SUPPLEMENTAL MATERIAL

Quality of life is poorer for patients with stroke who require an interpreter: an observational Australian Registry study

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2. Patient population and exposure definition
3. Outcomes and covariate definitions
4. Statistical analysis
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Table II: Outcomes by interpreter use status

Figure I: Interactions between age and interpreter status on health-related quality of life (reported problems in domains of mobility, self-care, pain, anxiety/depression, usual activities within the of EQ-5D-3L instrument)

Supplemental references

Supplemental co-investigators and other contributors to the Australian Stroke Clinical Registry

Supplemental methods

1. *Study design and data source*

This was an observational cohort study incorporating data from the Australian Stroke Clinical Registry (AuSCR). Information collected in the AuSCR includes patient demographics (e.g. age, gender, whether an interpreter was required) processes of care (e.g. management on a stroke unit and discharge medications such as antihypertensive agents) and health outcomes (e.g. mortality and health related quality of life) on hospitalized first episode of stroke.[1, 2] Longer-term patient outcomes were obtained by annual data linkage to national death registrations and surveys of eligible patients between 90 to 180 days after admission.[1]

2. *Patient population and exposure definition*

Eligible patients were aged $\geq$18 years and admitted to one of the 45 participating hospitals between 1 January 2010 to 31 December 2015. For this study, language barriers were defined by the variable ‘interpreter needed’. Need for interpreter service was defined by whether an approved interpreter service is required for the person (AuSCR data dictionary[3]). This definition includes whether approved interpreter services were required for sign language or verbal translation of languages other than English. Patients with missing data for the variable ‘interpreter required’ were coded as ‘no’ in the denominator.

3. *Outcomes and covariate definitions*

Mortality was measured within 7, 30, 90 and 180 days of stroke/TIA. Additional outcomes evaluated were length of stay and discharge destination from hospital (discharge to home, aged care facility and inpatient rehabilitation). The socioeconomic position of participants was estimated using the postcode-based Index of Relative Socioeconomic Advantage/Disadvantage (IRSAD) provided by the Australian Bureau of Statistics.[4] The IRSAD is reported as predetermined quintiles whereby a higher quintile indicated greater socio-economic advantage. For the patient-reported outcome analyses we used data collected between 90 and 180 days after the index event.[1] Eligible patients were those with first event (either stroke or TIA) recorded in the AuSCR and from hospitals that provided patient data within 180 days of the patients’ event. Using a modified Dillman protocol, a survey was posted to eligible patients (or proxy) and, if not returned after two attempts, the patient or proxy was contacted by telephone.[1] It has previously been shown that proxy responses and those of patients at six months following stroke are similar.[5]

Data for HRQoL were obtained using the EuroQoL-5 dimension-3 level (EQ-5D-3L) instrument.[6] A self-reported measure of the visual analogue scale (VAS) from 0 to 100 was used to elicit overall health, with 0 corresponding to the worst health state imaginable and 100 corresponding to the best health state imaginable. For patients who died, we coded the VAS as zero. The EQ-5D-3L survey is available in different languages. For those identified with limited English during the telephone follow-up interview, and when no-one was available to speak on their behalf, a translated EQ-5D survey (where available) was mailed to them. Further details are provided in previous publications[2, 7, 8]

4. Statistical analysis

Patient characteristics were compared between patients who did, and did not, require an interpreter using chi^2 tests for categorical variables and Kruskal-Wallis tests for continuous variables. Cox proportional hazards regression analysis was conducted to assess differences between groups in rates of death within 30, 90 and 180 days. Quantile regression analysis was also conducted to investigate differences in VAS scores and length of stay. To determine the effect of requirement of interpreter services on all outcomes, all regression models were adjusted for age, sex, type of stroke, in-hospital stroke, previous stroke, ability to walk on admission (as a validated measure of stroke severity[9]) and socioeconomic position. Logistic regression was undertaken to determine the individual effect of these variable on the five dimensions of the EQ-5D, i.e. mobility, self-care, usual activities, pain or discomfort, and anxiety or depression. The dimensions were dichotomised to ‘no problems’ and ‘any’ problems. Factors significantly associated with HRQoL were tested as interaction terms with interpreter status to identify factors modifying the association between interpreter status and HRQoL. Sensitivity analyses were also undertaken to compare outcomes according to country of birth and whether or not the patients preferred language was English. All models were multi-level to adjust for patient clustering within hospitals. Data were analysed using StataIC 12.1 (StataCorp 2013).

5. Ethics

Ethics and governance approvals were obtained for all participating hospitals contributing to the AuSCR. Ethical approval was obtained from the Australian Institute of Health and Welfare to conduct data linkage to the National Death Index.

Supplemental results:

The ten languages most frequently spoken by patients who required an interpreter were Italian, Greek, Macedonian, Mandarin, Arabic, Cantonese, Vietnamese, Turkish, Portuguese and Spanish.

Table I: Characteristics of patients by interpreter status

	Interpreter required		
	Yes n (%)	**No** n (%)	**p-value**
Admissions	N=1,461	N=33,101	
Female	776 (53)	14,970 (46)	<0.001
Median age (Q1, Q3)	80 (72, 86)	75 (64, 84)	<0.001
Country of birth			<0.001
Australia	27 (2)	22,333 (73)	
United Kingdom	0 (0)	2,478 (8)	
Italy	310 (22)	870 (3)	
Other European	504 (36)	2,396 (8)	
Asia	378 (27)	831 (3)	
Other countries	172 (12)	1,826 (6)	
Previous stroke/TIA	405 (29)	7,379 (24)	<0.001
In-hospital stroke	52 (4)	1,651 (5)	0.011
Socio-economic position			<0.001
Quintile 1	125 (9)	6,226 (19)	
Quintile 2	294 (20)	7,621 (23)	
Quintile 3	149 (10)	3,260 (10)	
Quintile 4	308 (21)	6,699 (21)	
Quintile 5	579 (40)	8,744 (27)	
Type of stroke			<0.001
Hemorrhagic	281 (19)	4,069 (12)	
Ischemic	1,026 (70)	20,853 (63)	
Transient ischemic attack	134 (9)	6,291 (19)	
Undetermined stroke	20 (1)	1,838 (6)	
Stroke severity			
Able to walk on admission	408 (28)	12,441 (38)	<0.001
Associated medical condition			
Aphasic	128 (9)	2,375 (7)	0.022
Cognitive dysfunction	2 (<1)	26 (<1)	0.44
Vascular dementia	5 (<1)	93 (<1)	0.67

Q1: 25th percentile; Q3: 75th percentile; IRSAD: Index of Relative Advantage and Disadvantage; Quintile 1 represents the most socio-economically disadvantaged patients and Quintile 5 the most advantaged patients; TIA: Transient ischemic attack.

Table II: Outcomes by interpreter use status

Interpreter required	**Univariable** **Yes** ***n (%)****	 **No** ***n (%)***	 ***p-value***
Died			
Within 7 days	125 (9)	2,149 (7)	0.002
Within 30 days	254 (17)	4,007 (12)	<0.001
Within 90 days	320 (22)	5,035 (15)	<0.001
Within 180 days	359 (25)	5,832 (18)	<0.001
Discharge destination			
Home	502 (40)	15,360 (52)	<0.001
Rehabilitation	485 (39)	8,076 (27)	<0.001
Aged care	98 (8)	1,526 (5)	<0.001
Location of stroke survivor at time of follow-up interview			
Living alone	69 (13)	3,430 (22)	<0.001
Living at home			
With support	298 (66)	5,616 (43)	<0.001
Without support	154 (34)	7,565 (57)	<0.001
Length of stay, median days (Q1, Q3)			
All patients	6 (3,11)	4 (2,8)	<0.001
EQ-5D Dimensions			
Mobility	289 (55)	7,901 (52)	0.10
Self-care	283 (54)	4,584 (30)	<0.001
Pain	342 (66)	7,214 (47)	<0.001
Anxiety/ Depression	302 (58)	6,739 (44)	<0.001
Usual activities	377 (73)	8,579 (56)	<0.001
EQ-5D -3L, median (Q1, Q3)			
VAS	60 (45,75)	75 (54,85)	<0.001

*Number (%) unless otherwise indicated; Q1: 25th percentile; Q3: 75th percentile; EQ-5D-3L: EuroQoL-5 dimension-3 level; VAS: visual analogue score

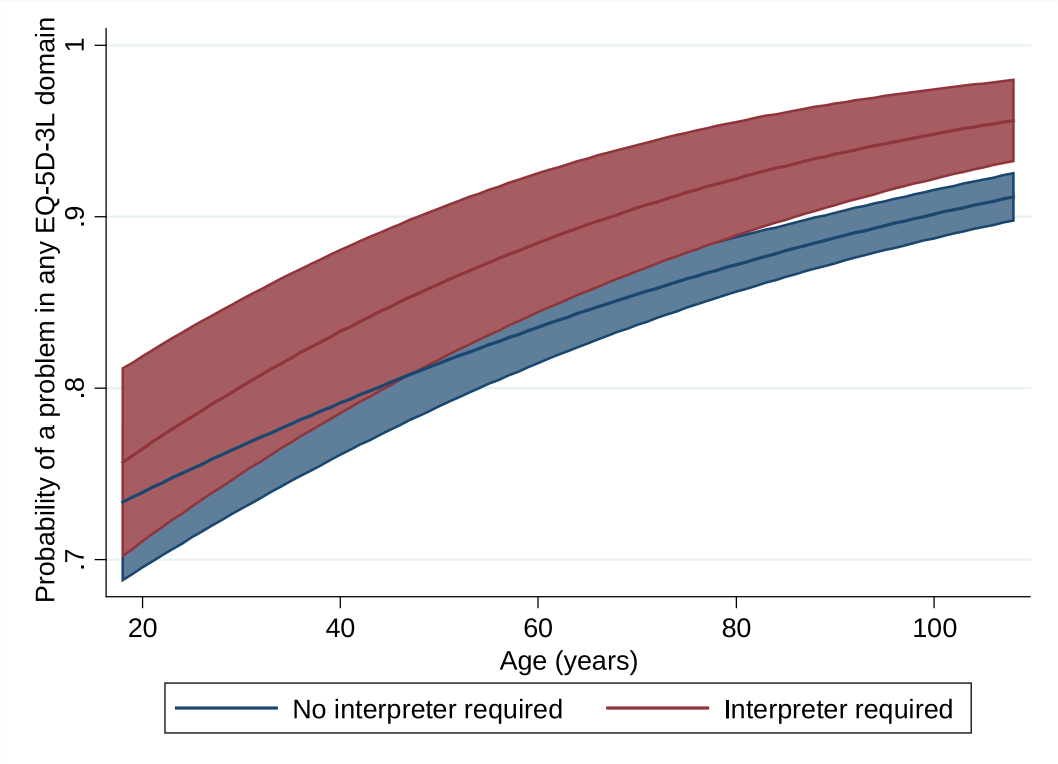

Figure I: Interactions between age and interpreter status on health-related quality of life (reported problems in domains of mobility, self-care, pain, anxiety/depression, usual activities within the of EQ-5D-3L instrument)

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Supplemental: co-investigators and other contributors to the Australian Stroke Clinical Registry Consortium

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