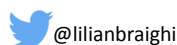


Rehabilitation pathways for older stroke survivors: a descriptive analysis from the AVERT trial

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Janice Collier, Julie Bernhardt,
on behalf of the AVERT Trial collaboration group



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Background

- *Age and Disability*: probably the most important predictors of stroke rehabilitation outcomes
- 70% stroke patients >65 years-old
- Guidelines recommend rehab for patients with disability
- Services variable and heterogeneous worldwide



Denti et al. 2008, Mackevitt et al. 2005, Winstein et al. 2017, Lynch et al. 2017, Crichton et al. 2012, Markus et al. 2004, Raine et al. 2009, Almborg et al. 2010

Inequities in stroke care and in access to rehabilitation

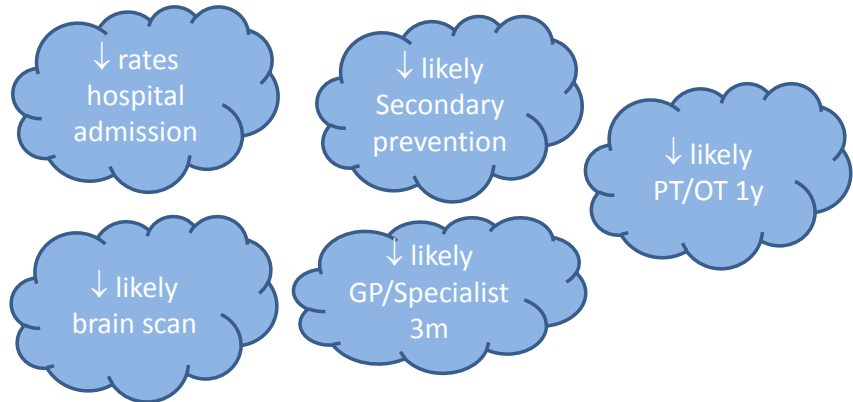


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Lynch et al. 2017, Crichton et al. 2012, Markus et al. 2004, Raine et al. 2009, Almborg et al. 2010

AVERT trial

- International, multicenter, RCT
- 2104 stroke survivors recruited within 24h
- 12-months follow-up



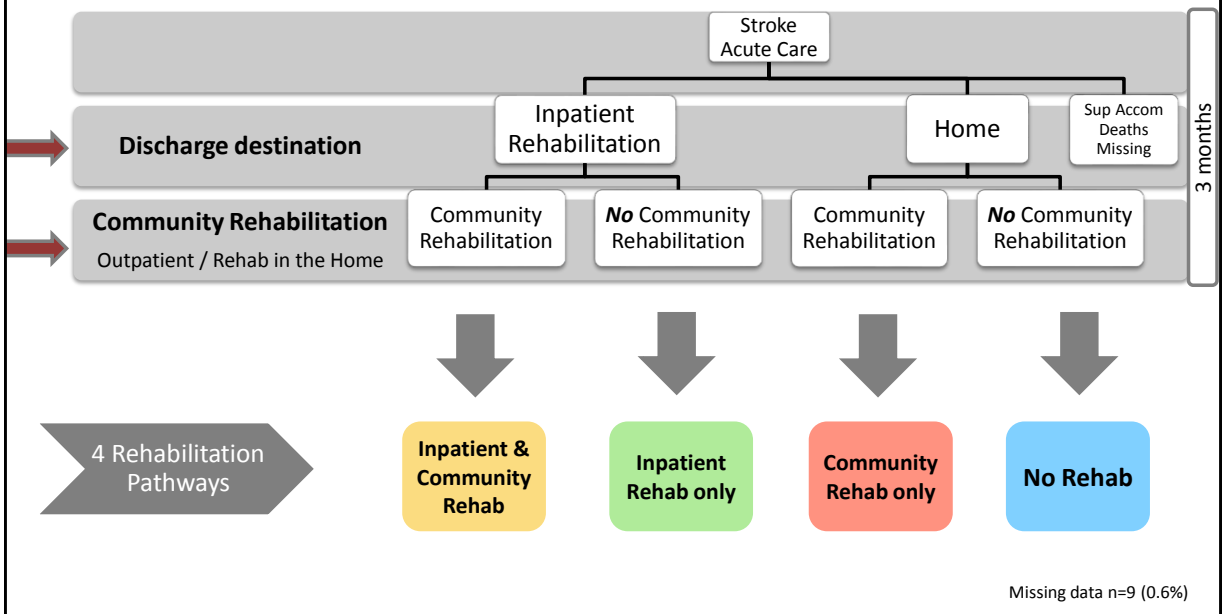
Aims

1. Describe post-acute Rehabilitation Pathways for **older stroke survivors** (≥ 66 years-old) within **3 months** across 3 international regions:

Australia/New Zealand; United Kingdom; Malaysia/Singapore

2. Describe clinical outcomes for older stroke survivors across the Pathways at **12-months**

Methods: Rehabilitation Service Use Pathways

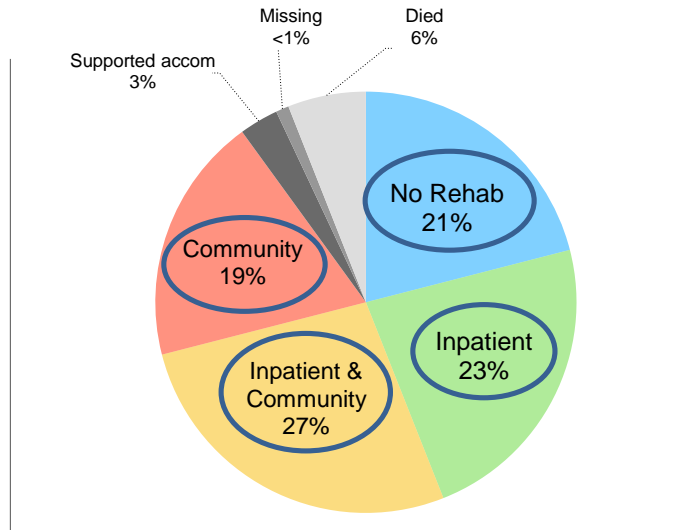


Baseline characteristics of stroke patients ≥66 years (n=1436)

Age (years)	78 (72-83)		Premorbid disability	mRS 0	998 (70%)
	66-80	891 (62%)		mRS 1	255 (18%)
	>80	545 (38%)		mRS 2	183 (13%)
Recruitment region	Australia and New Zealand	880 (61%)	Independent walking	Without aid	1187 (83%)
	United Kingdom	449 (31%)		With aid	248 (17%)
	Malaysia and Singapore	107 (8%)	Stroke history	First stroke	1153 (80%)
				NIHSS Score	7 (4-12)
		Mild (<8)		765 (53%)	
Gender	Female	614 (43%)	Moderate (8-16)	441 (31%)	
Risk factors	Hypertension	1037 (72%)	Severe (>16)	230 (16%)	
	High Cholesterol	602 (42%)	Stroke Type	Infarct	1272 (89%)
	Diabetes	307 (21%)		IC Haemorrhage	164 (11%)
	Ischaemic Heart Disease	384 (27%)	rtPA treatment	364 (25%)	
	Atrial Fibrillation	407 (28%)	AVERT group	Very early mobilisation	706 (49%)
	Smoker	183 (13%)	treatment assigned	Usual care	730 (51%)
			Acute LOS (days)	7 (4-14)	
Independent walking	Without aid	1187 (83%)			
	With aid	248 (17%)			
Living Arrangements	Home Alone	410 (29%)			

Data are n (%) or median (IQR). NIHSS=National Institutes of Health Stroke Scale. rtPA=recombinant tissue plasminogen activator

Rehabilitation Pathway distribution for Older stroke survivors within 3 months in the AVERT trial

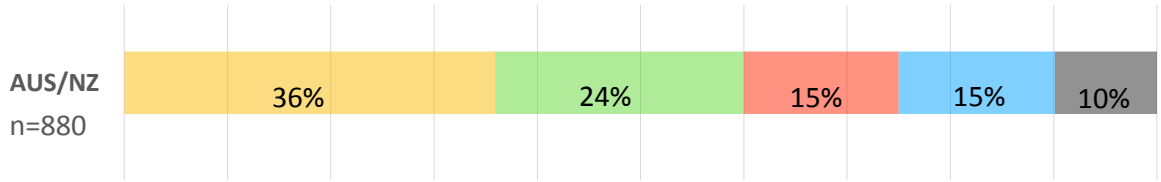


N=1436 (total ≥66 years-old)

IPR & CR n=383. IPR only n=332. CR only n=269. S Accom n=47. Died in hospital n=91. Missing data n=9

Pathway distribution for stroke patients ≥66y by Region

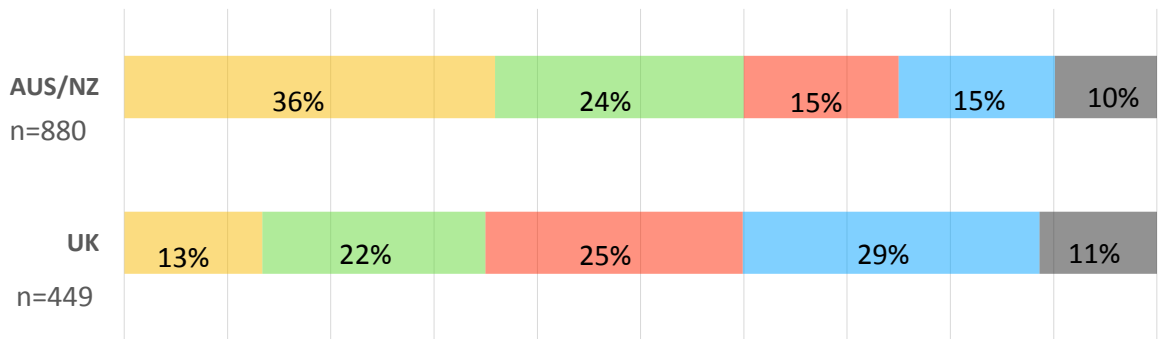
■ Inpatient & Community Rehab
 ■ Inpatient Rehab only
 ■ Community Rehab only
 ■ No Rehab
 ■ Others



Others includes Supported Accommodation, Deaths and Missing data

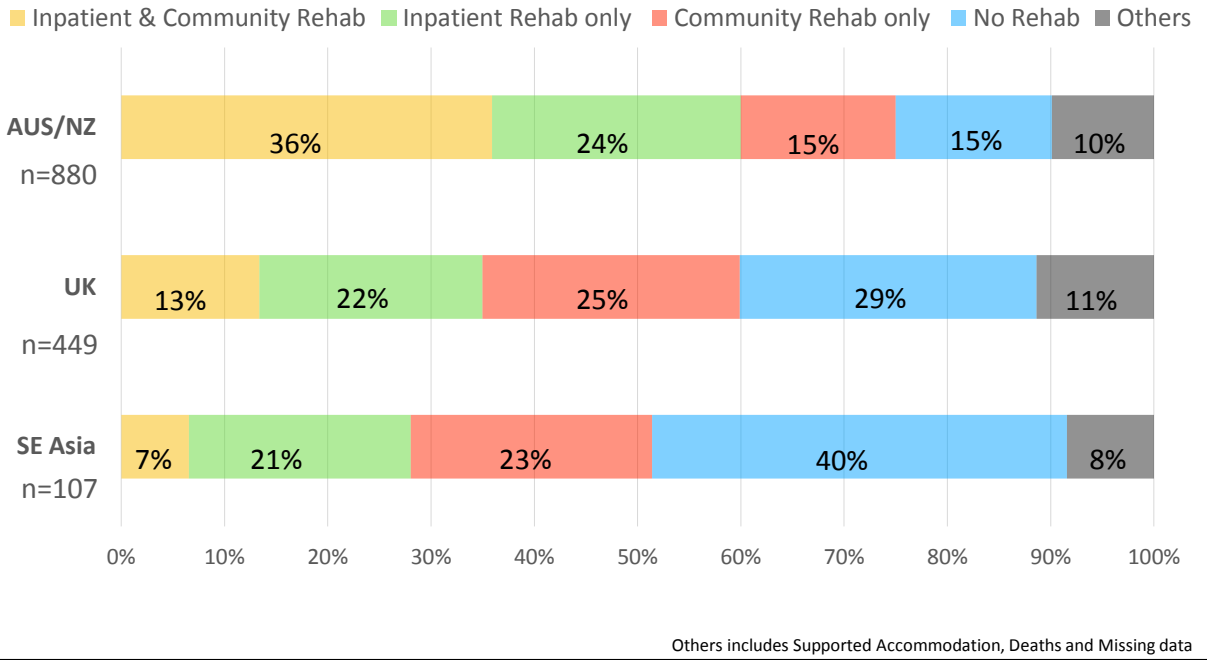
Pathway distribution for stroke patients ≥66y by Region

■ Inpatient & Community Rehab
 ■ Inpatient Rehab only
 ■ Community Rehab only
 ■ No Rehab
 ■ Others



Others includes Supported Accommodation, Deaths and Missing data

Pathway distribution for stroke patients ≥66y by Region



12-month disability, depression, quality of life for older patients

Demographics and stroke characteristics	Inpatient & Community Rehab (n=383)	Inpatient Rehab only (n=332)	Community Rehab only (n=269)	No Rehab (n=305)
Age	77 (72-81.9)	79.5 (73.8-84.3)	76.8 (71.6-81.8)	75.6 (70.8-80.9)
Stroke severity (NIHSS)	8 (5-12)	11 (6-17)	6 (3-8)	4 (2-6)
Acute Length of Stay	7 (5-12)	11 (7-23)	7 (4-14)	4 (2-7)

Data are n (%) or median (IQR). Patients discharged to Sup Accommodation (n=47) not included in the Pathways. NIHSS=National Institutes of Health Stroke Scale. mRS = modified Rankin Scale.

12-month disability, depression, quality of life for older patients

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Acute Length of Stay	7 (5-12)	11 (7-23)	7 (4-14)	4 (2-7)
12-month outcomes	46.3% Rehab Borderline/Morbid Depression			
DISABILITY mRS 3-5	196 (51.2%)			19% No Rehab mRS 3-5
DEPRESSION Borderline + Morbid	198 (51.7%)	140 (42.2%)	118 (43.7%)	39% No Rehab Depression
HRQoL Poor / Worse than death (alive patients)	169 (46.7%)	172 (64.4%)	74 (28.7%)	21.6% No Rehab Low QoL

Data are n (%) or median (IQR). Patients discharged to Sup Accommodation (n=47) not included in the Pathways. NIHSS=National Institutes of Health Stroke Scale. mRS = modified Rankin Scale. Depression (depression subscale of the Irritability, Depression and Anxiety scale). Health Related Quality of Life (HRQoL) (AQoL-4D). Missing data Depression n=128 / AQoL n=33

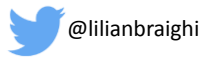
Conclusions

- Provision of post-acute stroke rehabilitation for older patients (≥66years-old) within 3 months varied across regions
- Overall, one-in-five older stroke patients had no post-acute Rehabilitation
- High rates depression and low levels of QoL were observed at 12-months across all pathways

Acknowledgments

- AVERT Trial collaboration group
- Patients and families involved in the AVERT trial
- Rosy Walters received a clinical stipend from the NHMRC CRE in Stroke Rehabilitation and Brain Recovery (App 1077898)

- | | |
|--------------------|---------------------|
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| • Karen Borschmann | • Venesha Rethnam |
| • Kate Hayward | • Sharon Kramer |
| • Vincent Thijs | |



Normative AQoL data (estimate from Hawthorne & Korn, 2013)

Proportion of population within AQoL deciles

Age group (years)	AQoL decile		
	<death - Poor	Fair	Good - Excellent
18-64	7.4%	24.0%	68.8%
65+	10.1%	30.5%	58.7%

Normative Depression data (estimate from Paolucchi et al, 2006)

36% patients with PSD (about 80% developed with 3 months)
compared to **13%** in age-matched controls

Median age = 67

Beck Depression Inventory (BDI) score of 10 or more

For aphasic patients, if they indicated the "sad face" on the VAMS.

NIHSS

All regions together

NIHSS	Rehab		No Rehab	
	Median	IQR	Median	IQR
Younger	7	(5-11)	4	(2-6)
Older	8	(5-12)	4	(2-6)

By Region

Aus/NZ

NIHSS	Rehab		No Rehab	
	Median	IQR	Median	IQR
Younger	8	(5-12)	3	(2-5)
Older	8	(5-13)	4	(2-6)

UK

NIHSS	Rehab		No Rehab	
	Median	IQR	Median	IQR
Younger	8	(5-11.5)	4	(2-6)
Older	8	(5-13)	4	(2-7)

SE Asia

NIHSS	Rehab		No Rehab	
	Median	IQR	Median	IQR
Younger	6	(4-9)	5	(3-7)
Older	6	(4-8)	5	(3-7)

All regions together

NIHSS	IPR & Community		IPR only		Community only		No Rehab	
	Median	IQR	Median	IQR	Median	IQR	Median	IQR
Younger	9	(6-13)	9	(6-14)	6	(4-9)	4	(2-6)
Older	8	(5-12)	11	(6-17)	6	(3-8)	4	(2-6)

12-month disability, depression, quality of life

12-month outcome	<66 years (n=632)		≥66 years (n=1290)	
	Rehab (n=450)	No Rehab (n=182)	Rehab (n=985)	No Rehab (n=305)
mRS 3-5	30% (137)	9% (17)	49% (487)	19% (58)
Depression Borderline/morbid	47% (210)	37% (67)	46% (456)	39% (119)
HRQoL Poor/worse than death	32% (146)	19% (34)	52% (512)	29% (87)
Baseline NIHSS Median (IQR)	7 (5-11)	4 (2-6)	8 (5-12)	4 (2-6)

Depression (depression subscale of the Irritability, Depression and Anxiety scale)
Health Related Quality of Life (HRQoL) (AQoL-4D)

12-month Outcomes for each region

mRS 3-5	Rehab		No Rehab	
	Younger (450)	Older (985)	Younger (182)	Older (305)
Aus	26% (67)	48% (318)	4% (4)	16% (20)
UK	32% (24)	52% (140)	14% (5)	23% (30)
SE ASIA	39% (46)	53% (29)	14% (8)	19% (8)
Total	30% (137)	49% (487)	17 (9%)	19% (58)
Depression (borderline/morbid)				
	Rehab		No Rehab	
	Younger (450)	Older (985)	Younger (182)	Older (305)
Aus	46% (120)	45% (300)	40% (36)	37% (50)
UK	52% (61)	49% (132)	54% (19)	43% (55)
SE ASIA	39% (29)	44% (24)	21% (12)	32% (14)
Total	47% (210)	46% (456)	37% (67)	39% (119)
HRQoL (poor/worse than death)				
	Rehab		No Rehab	
	Younger (450)	Older (985)	Younger (182)	Older (305)
Aus	28% (72)	50% (331)	35% (12)	23% (30)
UK	36% (42)	57% (154)	32% (11)	34% (44)
SE ASIA	43% (32)	49% (27)	32% (11)	30% (13)
Total	32% (146)	51% (524)	19% (34)	29% (87)

12-month disability, depression, quality of life for older patients

Demographics and stroke characteristics	Inpatient & Community Rehab (n=383)	Inpatient Rehab only (n=332)	Community Rehab only (n=269)	No Rehab (n=305)
Age	77 (72-81.9)	79.5 (73.8-84.3)	76.8 (71.6-81.8)	75.6 (70.8-80.9)
Living arrangements before stroke				
Home alone	97 (25.3%)	118 (35.5%)	75 (27.9%)	82 (26.9%)
Home with someone	281 (73.4%)	208 (62.6%)	191 (71%)	220 (72.1%)
Sup Accommodation	5 (1.3%)	6 (1.8%)	3 (1.1%)	3 (1%)
Pre Mobility				
Independent walking no aid	333 (86.9%)	254 (76.5%)	234 (87%)	256 (83.9%)
Walking with gait aid	50 (13%)	78 (23.5%)	34 (12.64%)	49 (16.1%)
Stroke severity (NIHSS)	8 (5-12)	11 (6-17)	6 (3-8)	4 (2-6)
Acute Length of Stay	7 (5-12)	11 (7-23)	7 (4-14)	4 (2-7)
12-month outcomes				
Disability (modified Rankin Scale)				
mRS 0-2	162 (42.3%)	70 (21.1%)	157 (58.7%)	216 (70.8%)
mRS 3-5	196 (51.2%)	194 (58.5%)	97 (36.7%)	58 (19%)
mRS 6 (deaths)	21 (5.5%)	65 (19.6%)	11 (4.1%)	27 (8.8%)
Walking 50m unassisted at 12m	328 (85.6%)	171 (51.5%)	251 (93.3%)	289 (94.7%)
Place of living at 12m				
Home alone	63 (16.5%)	45 (13.5%)	73 (27.1%)	69 (22.6%)
Home with someone	253 (66.6%)	118 (35.5%)	172 (63.9%)	197 (64.6%)
Sup Accommodation	41 (10.7%)	100 (30.1%)	10 (3.7%)	9 (2.9%)
Depression (Borderline + Morbid)	198 (51.7%)	140 (42.2%)	118 (43.7%)	119 (39%)
HRQoL (alive patients) Poor / Worse than death	169 (46.7%)	172 (64.4%)	74 (28.7%)	60 (21.6%)

Data are n (%) or median (IQR). Patients discharged to Sup Accommodation (n=47) not included in the Pathways.
 NIHSS=National Institutes of Health Stroke Scale. Depression (depression subscale of the Irritability, Depression and Anxiety scale)
 Health Related Quality of Life (HRQoL) (QoL 4D)