Online Supplementary files

Table of Contents

Search strategy

Database	Search terms
Medline	1. exp Cerebrovascular Disorders/ or exp Brain Infarction/ or exp Stroke/ or exp Cerebral Infarction/ or exp Brain Stem Infarctions/ or exp Stroke, Lacunar/ or exp Intracranial Arteriovenous Malformations/ 2. (stroke$ or poststroke$ or cva$).tw. or (cerebrovascular$ or cerebral vascular).tw. or (cerebral or cerebellar or brain$ or vertebrobasilar).tw. or (cerebral or intracerebral or intracranial or brain$).tw. or (infarct$ or isch?emi$ or thrombo$ or emboli$).tw. or ((intracranial or cerebrovascular) adj4 (disorder* or apoplex* or accident* or occlusion* or disease* or insufficienc*)).tw. or (brain* or cerebral*) adj4 (h?emorrage or infarction* or "vascular disorder*")).tw. 3. 1 or 2 4. exp Pneumonia/ or exp Respiratory Tract Infections/ or exp Bronchopneumonia/ or exp Pneumonia, Aspiration/ or exp Pneumonia, Bacterial/or exp Respiratory Tract Infections/ or exp Pneumonia, Ventilator-Associated/ 5. (infection* adj3 (hospital* or nosocomial)).tw. or ((pneumonia or bronchopneumonia or "respiratory tract infection*") adj4 (ventilator* or bacterial or aspiration* or nosocomial*)).tw. 6. 4 or 5 7. exp cohort studies/ 8. 3 and 6 and 7
EMBASE	1. exp Cerebrovascular Disorders/ or exp Basal Ganglia Cerebrovascular Disease/ or exp Brain Ischemia/ or exp Stroke/ or exp Brain Infarction/ or exp Hypoxia-Ischemia, Brain/ or exp Intracranial Arterial Diseases/ 2. (Intracranial Embolism and Thrombosis).tw. or ((brain or intracranial or basal ganglia or lenticulostriate) adj5 (vascular adj5 (disease$ or disorder or event))).tw. 3. 1 or 2 4. exp Pneumonia/ or exp Pneumonia, Aspiration/ or exp Pneumonia, Bacterial/ or exp Pneumonia, Ventilator-Associated/ 5. exp cohort studies/ 6. 3 and 4 and 5

CINAHL	1. Stroke 2. Stroke Units 3. Stroke patients 4. Stroke, Lacunar 5. 1 or 2 or 3 or 4 6. Pneumonia 7. Pneumonia, Ventilator-Associated 8. Pneumonia, Necrotising 9. Pneumonia, Bacterial 10. Pneumonia, Aspiration 11. 6 or 7 or 8 or 9 or 10 12. 5 and 10
PsycINFO	1. Stroke/ 2. Cerebrovascular disorders/ 3. exp Cerebrovascular Accidents/ 4. 1 or 2 or 3 5. Pneumonia/ 6. exp Swallowing/ 7. 5 or 6 8. 4 and 7

National Institute of Health Stroke Scale score (NIHSS score)

The score ranges from 0-42. Score 1-4 indicates Minor stroke, Score 5-15 indicate Moderate stroke, Score 16-20 indicates Moderate to severe stroke, Score 21-42 indicates Severe stroke

1a. Level of consciousness (LOC)	0=Alert; keenly responsive 1=Not alert; but arousable by minor stimulation 2= Not alert; requires repeated stimulation to attend, or is obtunded and requiresstrong or paiful stimulation to make movements 3= Responds with only reflex motor or autonomic effects or totally unresponsive, flaccid and areflexic
1b. LOC questions:	0= Answers both questions correctly 1= Answers one question correctly 2= Answers neither question correctly
1c. LOC commands:	0= Performs both tasks correctly 1= Performs one task correctly 2= Performs neither task correctly
2. Best gaze:	0= Normal 1= Partial gaze palsy 2= Forced eye deviation
3. Visual	0= No visual loss 1= Partial hemianopia 2= Complete hemianopia 3= Bilateral hemianopia
4. Facial palsy	0= Normal symmetrical movements 1= Minor paralysis 2= Partial paralysis 3= Complete paralysis
5. Motor arm:	0= No drift 1= Drift 2= Some effort against gravity 3= No effort against gravity 4= No movement UN= Amputation or joint fusion 5a. Left arm 5b. Right arm
6. Motor leg:	0= No drift 1= Drift 2= Some effort against gravity 3= No effort against gravity 4= No movement UN= Amputation or joint fusion 5a. Left leg 5b. Right leg
7. Limb ataxia:	0= Absent

	1= Present in one limb 2= Present in two limbs UN= Amputation or joint fusion
8. Sensory:	0= Normal 1= Mild-to-moderate sensory loss 2= Severe-to-total sensory loss
9. Best language:	0= No aphasia 1= Mild-to-moderate aphasia 2= Severe aphasia 3= Mute, global aphasia
10. Dysarthria:	0= Normal 1= Mild-to-moderate dysarthria 2= Severe dysarthria UN= Intubated or other physical barrier
11. Extinction and Inattention (formerly Neglect)	0= No abnormality 1= Visual, tactile, auditory, spatial or personal inattention 2= Profound hemi-inattention or extinction to more than one modality

Brott T, Adams HP Jr, Olinger CP, Marler JR, Barsan WG, Biller J, et al. Measurements of acute cerebral infarction: a clinical examination scale. Stroke. 1989;20;864-870.

Diagnostic criteria for pneumonia

1. Mann criteria

Pneumonia is diagnosed based on 3 or more of the following criteria

1. Fever (>38°C)
2. Productive cough with purulent sputum
3. Abnormal respiratory examination (tachypnoea [>22/minute], tachycardia, inspiratory crackles, bronchial breathing)
4. Abnormal chest x-ray
5. Arterial hypoxemia (Po_2<70mmHg)
6. Isolation of relevant pathogen (positive Gram's stain and culture)

Mann G, Hankey GJ and Cameron D. Swallowing disorders following acute stroke: prevalence and diagnostic accuracy. *Cerebrovascular Diseases*. 2000; 10: 380-6.

2. CDC criteria

New and persistent infiltrate or consolidation, or cavitation on at least one chest X-ray or at least two serial chest X-rays in a case of underlying lung disease, with one of the following clinical signs:

1. Fever
2. Leucopaenia or leucocytosis
3. Altered mental status in patients older than 70 years in the absence of other aetiologies

There should also be at least two of the following signs:

1. New-onset purulent sputum or change in the character of the sputum
2. New-onset or worsening cough
3. Rales or worsening of gas exchange

CDC. CDC/NHSN Surveillance Definitions for Specific Types of Infections

Tests for dysphagia

1. Swallowing provocation test

This test requires 0.4ml (first step) and, if necessary, 2ml (second step) of distilled water into the suprapharynx through a small nasal catheter. This test is normal if latency of swallowing after either of the water injections is less than three seconds.

Teramoto S, Matsue T, Fukuchi Y. Simple two-step swallowing provocation test for elderly patients with aspiration pneumonia. *Lancet* 1999; 353; 1243.

2. Pharyngeal sensation test

This test involves checking sensation of the oropharynx and is usually followed by a modified barium swallow (videofluoroscopy)

Kidd D, Lawson J, Nesbitt R et al. Aspiration in acute stroke: a clinical study with videofluoroscopy. *Q J Med.* 1993; 86: 825-829.

3. Gugging swallowing screen

This is an assessment for dysphagia which consists of 2 parts: the preliminary assessment (part 1, indirect swallowing test) and the direct swallowing test (part 2) which must be performed sequentially. If maximum points are not attained in any subtest of the assessments, the examination is stopped and videofluoroscopy or fibreoptic endoscopy is recommended.

Trapl M, Enderle P, Nowotny M, et al. Dysphagia bedside screening for acute-stroke patients: the Gugging Swallowing Screen. *Stroke (00392499)*. 2007; 38: 2948-52.

4. Water swallow test

With the patient in sitting position, they are first asked to take a sip of water and any dribbling, delayed swallowing, repeated swallowing or immediate coughing are noted. Any significant coughing or choking at this stage is considered a failed test and the remainder of the test is not performed. If the patient manages the first part of the test, they are asked to swallow 50 ml of water without pausing and the patient is monitored for any coughing or choking in the next two minutes. The test is considered abnormal if this occurs or the time taken is greater than 20 seconds.

DePippo KL, Holas MA and Reding MJ. Validation of the 3-oz water swallow test for aspiration following stroke. *Arch Neurol*. 1992; 49: 1259-61.

5. Staged water swallow test

Dysphagia is assessed by administering progressively larger amounts of water: 3 x 5 ml teaspoons, 10 ml, 20 ml, and then 50 ml with the procedure being discontinued if there is coughing, choking, voice damage or increased breathlessness.

Perry L and Love CP. Screening for dysphagia and aspiration in acute stroke: a systematic review. *Dysphagia*. 2001; 16: 7-18.

6. Three-step swallowing screen protocol

This is a modified water swallow test. The first step is to exclude patients from the swallow test and assesses patients with impaired consciousness, prior dysphagia, dependence on tube feeding, impaired oxygen saturation (less than 90%) with oxygen mask dependence or intubation, obvious saliva drooling or frequent choking on saliva. If the patient does not pass this step, this is repeated 7 days later. If patients pass this step, they are asked to swallow 3 ml of water three times in sitting position and assessed for choking and a wet voice. If they pass this step, they are asked to swallow 100 ml water with 1 minute repeated twice and re-assessed for choking, a wet voice or slow swallowing. If any step is failed, oral intake is postponed, a speech pathologist assessment is made, and the test is repeated after 7 days.

Yeh SJ, Huang KY, Wang TG, et al. Dysphagia screening decreases pneumonia in acute stroke patients admitted to the stroke intensive care unit. *Journal of the Neurological Sciences*. 2011; 306: 38-41

8. Timed water swallow test

The alert seated patient is given 5-10 ml of water to ensure the test is safe to perform. If safe, 100 ml water is administered watching for choking. The number of swallows is observed by looking at the movement of the thyroid cartilage. The stopwatch is started when the first drop of water touches the lip and stops when the subject breathes following the last swallow. It is abnormal if swallowing capacity or volume per swallow are outside the normal range (95% prediction interval for age and sex) or if there is coughing during the test or a wet voice after the test.

Hinds NP, Wiles CM. Assessment of swallowing and referral to speech and language therapists in acute stroke. *Q J Med.* 1998; 91; 829-835

9. ROSS test

The seated patient is instructed to drink 200 ml of water through a straw. Assessment is performed during a single swallow and forced, repetitive swallow recording the weight of the water remaining in the glass, suction pressure, signals from a Doppler probe, and a piezo-electric movement sensor applied to the neck and thermodetector in the nostril. The peak suction pressure, time of suction, bolus volume, time from suction to swallowing, swallowing

capacity, and time for a completed ingestion cycle are recorded and interactions among test components assessed.

Nilsson H, Ekberg O and Hindfelt B. Oral function test for monitoring suction and swallowing in the neurologic patient. *Dysphagia*. 1995; 10: 93-100

10. Parramatta Hospital assessment of dysphagia

This scale gives a numerical score for 14 aspects of swallow and bulbar function. The subcomponents of this scale are level of alertness, respiratory function, comprehension, expression, lip, tongue and palatal motor function, gag reflex, phonation, cough, preparatory, oral and pharyngeal stages of swallowing and tolerance for differing food consistencies. The maximum total score is 100.

Warms T and Richards J. "Wet Voice" as a predictor of penetration and aspiration in oropharyngeal dysphagia. *Dysphagia*. 2000; 15: 84-8

11. Penetration aspiration scale

This is an 8 point scale that describes penetration of aspirated material into the larynx but not below the vocal folds and aspiration of material below the vocal folds.

Rosenbeck JC, Robbins JA, Roecker EB. A penetration-aspiration scale. *Dysphagia.* 1996; 11; 93-98

Supplementary Table 1. Specific diagnostic criteria for dysphagia and pneumonia in the studies included in the meta-analysis

Author, Year	Diagnosis of dysphagia*	Diagnosis of pneumonia*
Prezelomski, 1986	Not specified	Chest x-ray suggestive of pneumonia
Hinds, 1998	Timed test of swallowing #	Not specified
Nilsson, 1998	ROSS test # nasogastric tubes not inserted	Not specified
Pinto, 1998	Not specified	Clinical or radiologic evidence
Sala, 1998	Standardised test for dysphagia #	Clinical and radiologic
Grau, 1999	Not specified	Chest x-ray: infiltrate, consolidation, or pleural effusion or rales or dullness to percussion
Kammersgaard, 2001	Not specified	Infiltrates on chest x-ray, leucocytosis, positive microbiologic analysis of airway secretions
Weimar, 2002	Not specified	Auscultatory rales and fever or radiologic evidence or new purulent sputum
Broadley, 2003	Water swallow test, modified barium swallow #	Chest x-ray
Hamidon, 2003	Not specified	Not specified
Hilker, 2003	Water swallow or pharyngeal sensation test	CDC criteria
Pittock, 2003	Not specified	Inspiratory rales and fever or radiologic evidence or purulent sputum

Spratt, 2003	Not specified	Clinical and radiologic evidence
Dziewas, 2004	Swallowing provocation test or water swallow test followed by nasogastric tube insertion	Mann criteria
Heuschmann, 2004	Not specified	Clinical and/or diagnostic findings
Steger, 2004	Not specified	Fever, leucocytosis, infiltrates on chest x-ray
Garbusinski, 2004	Water swallow test (modified)	Not specified
Kwon, 2006	Water swallow test or pharyngeal sensation test	Inspiratory rales and fever, radiologic evidence or new purulent sputum
Matz, 2006	Not specified	Not specified
Vargas, 2006	Water swallow test and if abnormal nasogastric tube inserted	Infiltrates on chest x-ray, fever, respiratory symptoms (cough, dyspnoea or pleuritic pain) and leucocytosis (>11000/mm^3) or leucopenia (<4000/ mm^3)
Kwan, 2007	Not specified	Symptoms and/or signs (purulent cough, unilateral respiratory rales, bronchial breathing) with at least one of: leucocytosis or fever or radiologic evidence on chest x-ray
Ros, 2007	Modified barium swallow	Clinical and radiologic
Sellars, 2007	Staged water swallow test with pulse oximetry, modified barium swallow	Mann criteria

Sundar, 2007	Bedside swallow assessment	Not specified
Hong, 2008	Not specified	Rales and fever with radiologic evidence and/or purulent sputum
Indredavik, 2008	Not specified	Rales with at least one of the following: temperature >38°C, new purulent sputum or positive chest x-ray
Saposnik, 2008	Not specified	Clinical and chest x-ray
Sposato, 2008	Not specified	Not specified
Vermeij, 2009	Not specified	CDC criteria
Minnerup, 2010	If NIHSS ≤3, no facial palsy or dysarthria, clinical dysphagia screening performed. FEES performed in patients with NIHSS ≥3, dysarthria or facial weakness. Six-point dysphagia score based on risk of aspiration of foods of different consistency	Pulmonary infiltrates on chest x-ray, fever (>38°C), dyspnoea, abnormal respiratory examination and leucocytosis (>12000/mm^3)
Navarro, 2010	Not specified	Rales and fever or radiologic evidence, or new purulent sputum
Fromm, 2011	Not specified	Not specified
Koennecke, 2011	Not specified	Clinical or diagnostic findings
Schrock, 2011	MetroHealth Dysphagia screen (at least one factor is considered a positive screen for possible dysphagia leading to a modified barium swallow assessment): drowsiness, weak voice or aphasia, drooling of saliva, slurred speech, weak or absent cough;	Infiltrates on chest x-ray

	Abnormal modified barium swallow, standardised dysphagia testing #	
Yeh, 2011	Three-step swallowing screen #	CDC criteria
Huang, 2012	Not specified	Not specified
Harms, 2013	Not specified	At least one of the first and one of the latter: (1) abnormal respiratory examination or chest x-ray infiltrates, (2) cough with purulent sputum, positive microbiologic culture of the lower respiratory tract or blood culture, leucocytosis, increase in C-reactive protein
Ji, 2013	Not specified	Auscultatory rales and fever or radiologic evidence or new purulent sputum
Li, 2014	Water swallow test or weak cough or impaired consciousness	CDC criteria (CT chest could also be used apart from chest x-ray)
Bruening, 2015	Not specified	CDC criteria
Hinduja, 2015	Not specified	CDC criteria
Shah, 2015	Not specified	Auscultatory rales combined with at least 1 of the following: temperature > 38°C, new purulent sputum, or positive chest x-ray
Arnold, 2016	Part 1 of GUSS and if score <5, further evaluation by modified barium swallow or FEES or nasogastric tube placement. If part 1 GUSS score=5,	CDC criteria

	part 2 GUSS done. If score <10, severe dysphagia diagnosed, and a nasogastric tube inserted #	
Conterno, 2016	Not specified	Not specified
Liu, 2016	Not specified	CDC criteria
Bray, 2016	Water swallow test	Diagnosed in the first 7 days after acute stroke
Lindner-Plefghar, 2017	Water swallow test, presence of predictors of aspiration (at least 2 predictors necessary): dysphonia, dysarthria, abnormal choking reflex, abnormal voluntary cough, voice change on swallowing, abnormal water swallow test, FEES (In-house FEES standard protocol used with the penetration aspiration scale) #	Not specified

*History taking, and clinical examination was done in all patients, and the authors' clinical diagnosis accepted. Please see pages 6-9 for details of the tests and criteria used.

If dysphagia was suspected or diagnosed a doctor/ nurse/ speech therapist evaluated for swallowing safety and dietary modification, and nasogastric tube insertion was considered in most studies.

Abbreviations: FEES- Fiberoptic endoscopic examination of swallowing; GUSS- Gugging swallow screen

Supplementary Table 2. Summary of studies included in the meta-analysis

Author, Year	n	Inclusion criteria	Country/ region	Country/ region income	Days of observation/ Mean length of stay (days)	Follow-up (days)	Age Mean Years	Men %	Post-stroke pneumonia %	Site of hospital-based care	Type of stroke
Prezelomski, 1986	104	Acute stroke	USA	HI	5	-	71.8	52.9	12.5	Ward and stroke unit	IS, ICH
Hinds, 1998	115	Acute stroke	UK	HI	13	-	74.9	44.3	23.5	Ward and stroke unit	
Nilsson, 1998	100	Acute stroke	Sweden	HI	-	-	75.4	36	5	Stroke unit	IS, ICH
Pinto, 1998	297	First-ever acute stroke	Portugal	HI	10	-	59.2	53	9.9	Ward and stroke unit	IS
Sala, 1998	187	Acute stroke	Spain	HI	10	-	73.3	50.8	6.9	Ward and stroke unit	IS, ICH
Grau, 1998	119	Acute ischaemic stroke	Netherlands	HI	2	-	61	79	8.4	Ward and stroke unit	IS
Kammersgaard, 2001	1156	Acute stroke	Denmark	HI	3	-	74.2	45.9	7.1	Stroke unit	IS, ICH
Weimar, 2002	3866	Acute stroke	Germany	HI	7	-	66.6	57.9	7.4	Stroke unit	IS
Broadley, 2003	149	Acute stroke	Australia	HI	-	-	70	59	4.7	Stroke unit	IS, ICH
Hamidon, 2003	163	Acute ischaemic stroke	Malaysia	MI	3.6	-	62.2	48.2	12.3	ICU and ward	IS
Hilker, 2003	124	Acute stroke	Germany	HI	3	-	63.8	66.1	20.9	ICU	IS, ICH

Author, Year	n	Inclusion criteria	Country/ region	Country/ region income	Days of observation/ Mean length of stay (days)	Follow-up (days)	Age Mean Years	Men %	Post-stroke pneumonia %	Site of hospital-based care	Type of stroke
Pittock, 2003	117	Acute ischaemic stroke	Ireland	HI	14	-	69.9	58.1	9.4	Ward and stroke unit	IS
Spratt, 2003	257	Acute ischaemic stroke	Australia	HI	21	-	73	49.4	10.1	Stroke unit	IS
Dziewas, 2004	100	Acute stroke	Germany	HI	-	-	68.8	61	44	Ward and stroke unit	IS, ICH
Heuschmann, 2004	13440	Acute stroke	Germany	HI	11	-	70	53.3	6	Ward and stroke unit	IS, ICH
Steger, 2004	992	Acute stroke	Austria	HI	-	-	76.2	42.8	13.6	Ward and stroke unit	IS, ICH
Garbusinski, 2005	148	Acute stroke	Gambia	LI	-	-	-	45.3	18.2	Ward and stroke unit	IS, ICH
Kwon, 2006	286	Acute ischaemic stroke	South Korea	HI	30	-	62.8	67.1	16.4	Ward and stroke unit	IS
Matz, 2006	238	Acute stroke	Finland	HI	10	-	71.8	45.7	13.9	Ward and stroke unit	IS, ICH
Vargas, 2006	229	Acute stroke	Spain	HI	12	-	72.6	51	14.4	Ward and stroke unit	IS, ICH
Kwan, 2007	439	Acute stroke	UK	HI	5	-	74	48.9	10.3	Stroke unit	IS, ICH
Ros, 2007	258	Acute ischaemic stroke	Spain	HI	11	-	74.9	48.8	9.3	Ward and stroke unit	IS
Sellars, 2007	412	Acute stroke	Scotland	HI	-	90	68	49.7	18.9	Ward and stroke unit	IS, ICH

Author, Year	n	Inclusion criteria	Country/ region	Country/ region income	Days of observation/ Mean length of stay (days)	Follow-up (days)	Age Mean Years	Men %	Post-stroke pneumonia %	Site of hospital-based care	Type of stroke
Sundar, 2007	184	Acute ischaemic stroke	India	MI	-	14	-	-	15.7	Ward and stroke unit	IS
Hong, 2008	1254	Acute ischaemic stroke	South Korea	HI	-	90	66.5	56	12	Ward and stroke unit	IS
Indredavik, 2008	489	Acute ischaemic stroke	Norway	HI	7	-	77.2	47.6	11.2	Stroke unit	IS
Saposnik, 2008	3631	Acute ischaemic stroke	Canada	HI	-	30	71	52.1	1.4	Ward and stroke unit	IS
Sposato, 2008	1991	Acute ischaemic stroke	Argentina	MI	8	-	69.4	55.2	14.3	Ward and stroke unit	IS
Vermeij, 2009	521	Acute ischaemic stroke	Netherlands	HI	7	90	70	53.9	7.5	Stroke unit	IS
Minnerup, 2010	591	Acute stroke	Germany	HI	14	-	67.7	54.9	12.1	Stroke unit	IS, ICH
Navarro, 2010	1153	Acute ischaemic stroke	Phillipines	MI	14	-	62	57.7	8.2	Ward and stroke unit	IS
Fromm, 2011	1217	Acute ischaemic stroke	Norway	HI	7	-	76.5	57	9.9	Stroke unit	IS
Koennecke, 2011	16518	Acute stroke	Germany	HI	8	-	71	50.8	7.7	Stroke unit	IS, ICH

Author, Year	n	Inclusion criteria	Country/ region	Country/ region income	Days of observation/ Mean length of stay (days)	Follow-up (days)	Age Mean Years	Men %	Post-stroke pneumonia %	Site of hospital-based care	Type of stroke
Shrock, 2011	283	Acute stroke	USA	HI	-	30	65	51	9	ED	IS, ICH
Yeh, 2011	176	Acute stroke	Taiwan	HI	7	-	66	50	57	ICU	IS, ICH
Huang, 2012	925	Acute ischaemic stroke	Taiwan	HI	14	-	69.5	52.5	10.7	Stroke unit	IS
Harms, 2013	335	Acute ischaemic stroke	Germany	HI	-	-	-	52.5	31.3	ICU and ward	IS
Ji, 2013	19923	Acute ischaemic stroke	China	MI	-	-	64	62	14.1	Ward and stroke unit	IS
Li, 2014	1142	Acute ischaemic stroke	China	MI	12	-	60	63	18.8	Ward and stroke unit	IS
Bruening, 2015	538	Acute ischaemic stroke	Germany	HI	-	90	72	50	22.6	Ward and stroke unit	IS
Hinduja, 2015	202	Acute ICH	USA	HI	19	-	63	63.4	18	Ward and stroke unit	ICH
Shah, 2015	505	Acute stroke	USA	HI	-	45	65	52	4.6	Ward and stroke unit	IS, ICH
Arnold, 2016	570	Acute ischaemic stroke	Switzerland	HI	-	90	65	64.2	5.6	Stroke unit	IS
Conterno, 2016	113	Acute stroke	Brazil	MI	-	-	70.8	55.7	13.5	Ward and stroke unit	IS, ICH

Author, Year	n	Inclusion criteria	Country/ region	Country/ region income	Days of observation/ Mean length of stay (days)	Follow-up (days)	Age Mean Years	Men %	Post-stroke pneumonia %	Site of hospital-based care	Type of stroke
Liu, 2016	165	Acute ischaemic stroke	China	MI	-	90	64.2	-	21.6	Ward and stroke unit	IS
Bray, 2017	63650	Acute stroke	UK	HI	-	-	-	49.6	8.7	Ward and stroke unit	IS, ICH
Lindner-Pfleghar, 2017	144	Acute stroke	Germany	HI	-	-	-	-	2.8	Stroke unit	IS, ICH

Abbreviations: IS- Ischaemic stroke; ICH- Intracerebral haemorrhage; ED-Emergency Department; HI- High income; MI- Middle income; LI-Lower income