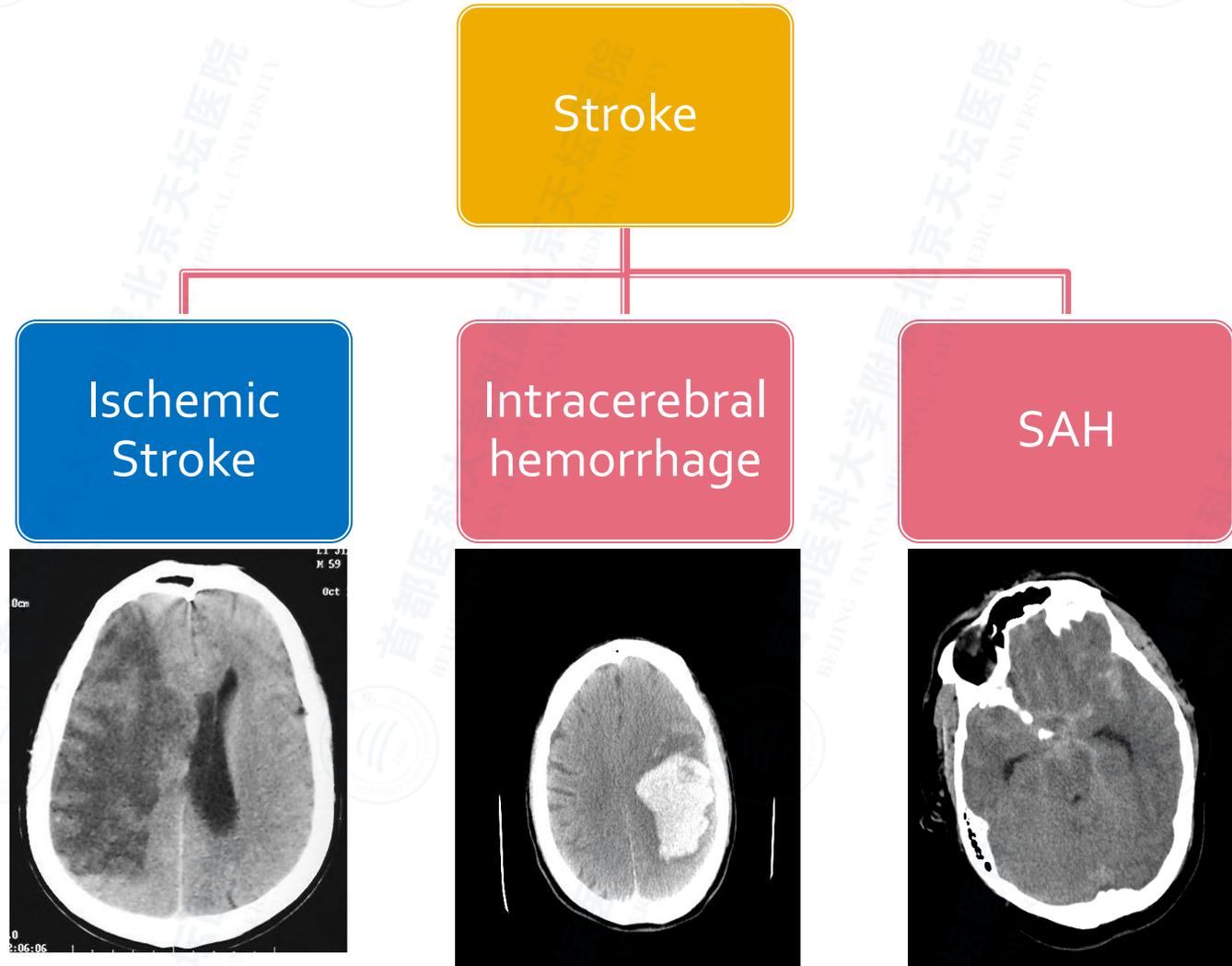


# Clinical presentation and early recognition of stroke

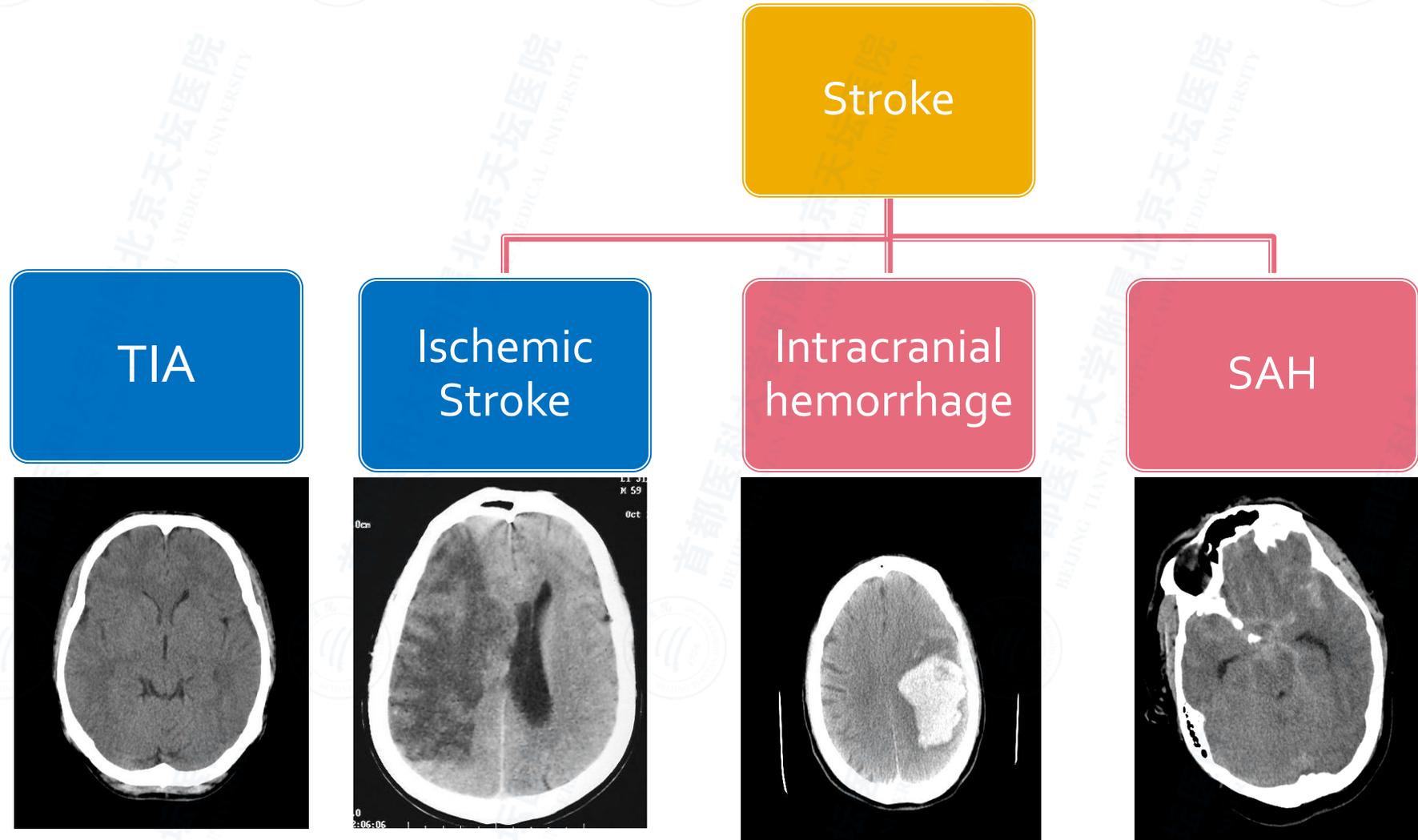


Haiqiang Qin, Beijing Tiantan Hospital

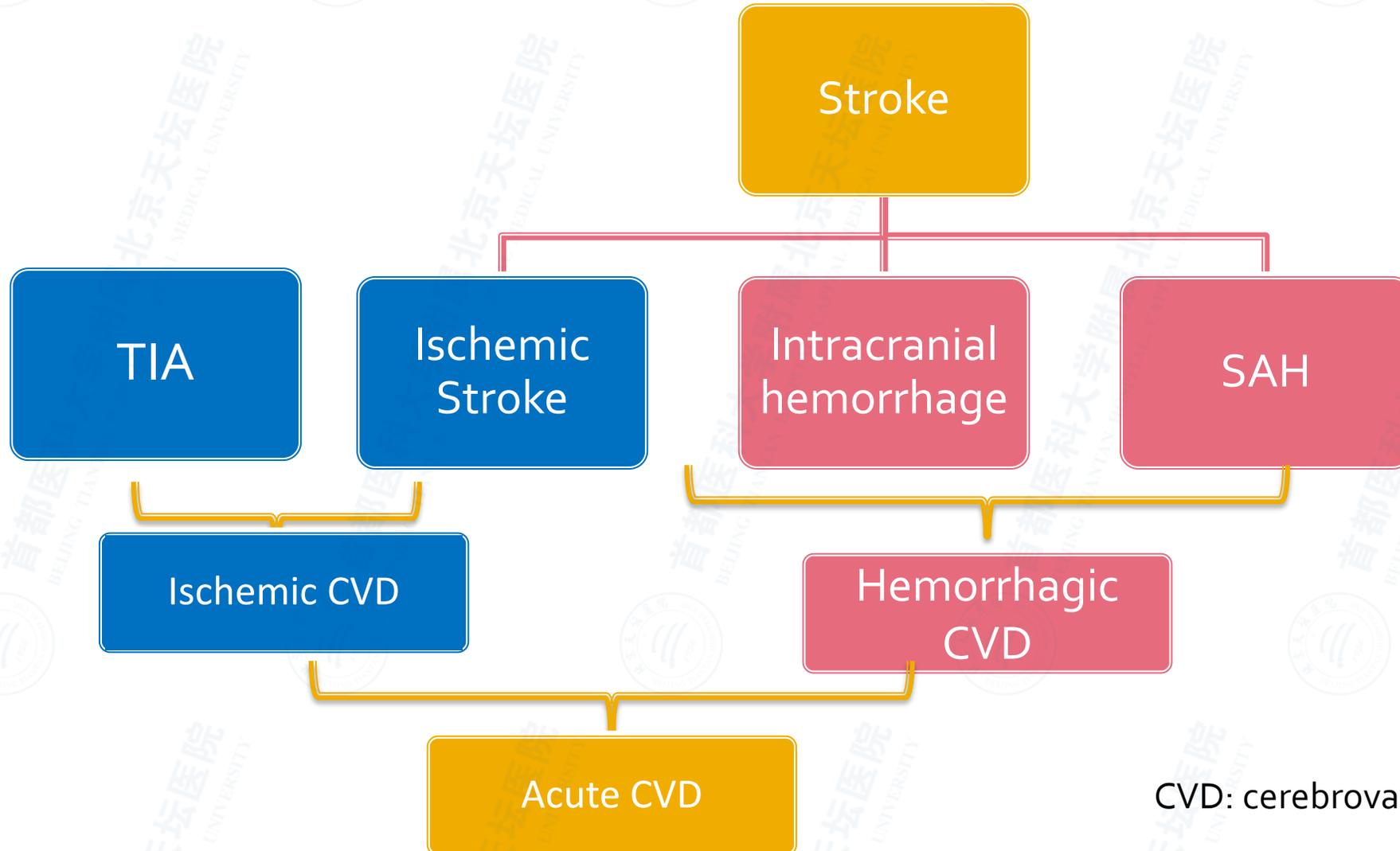
# Stroke types



# Stroke types

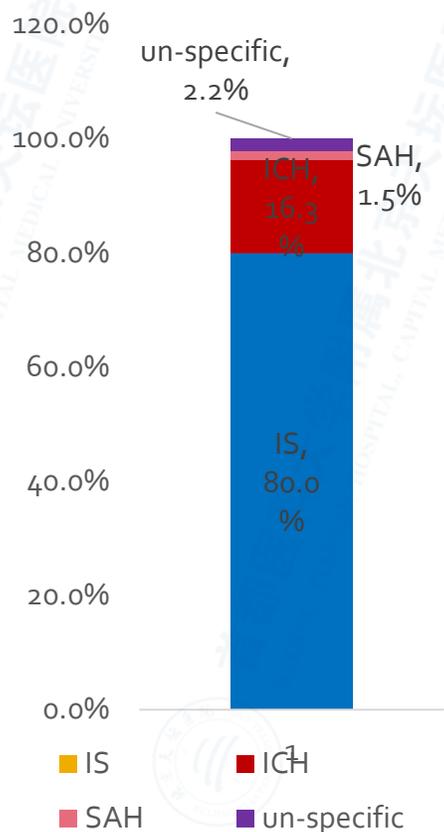


# Stroke types

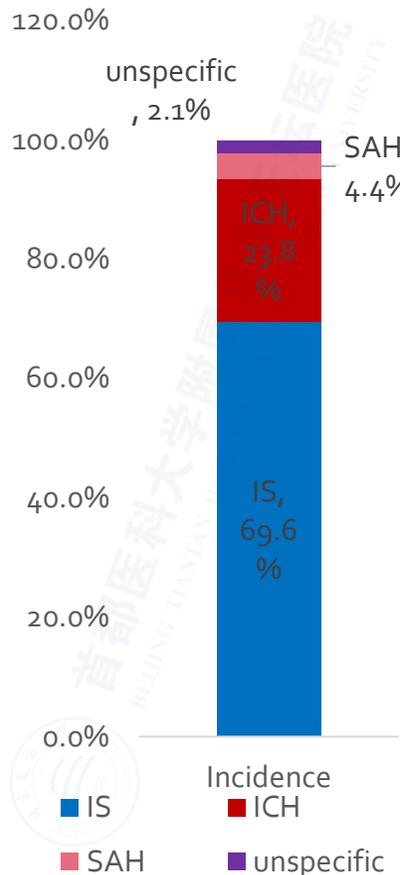


CVD: cerebrovascular disease;

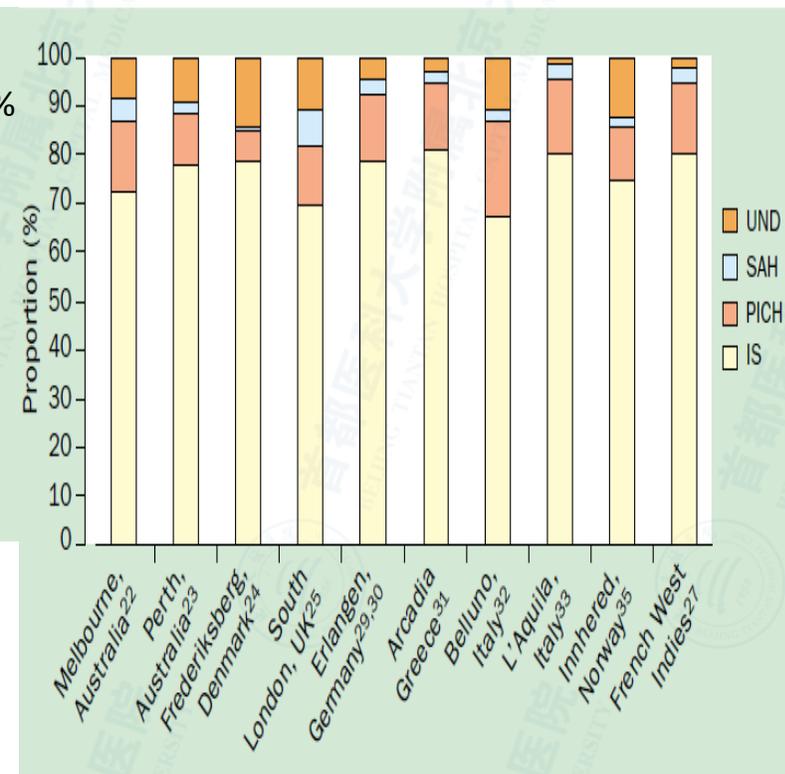
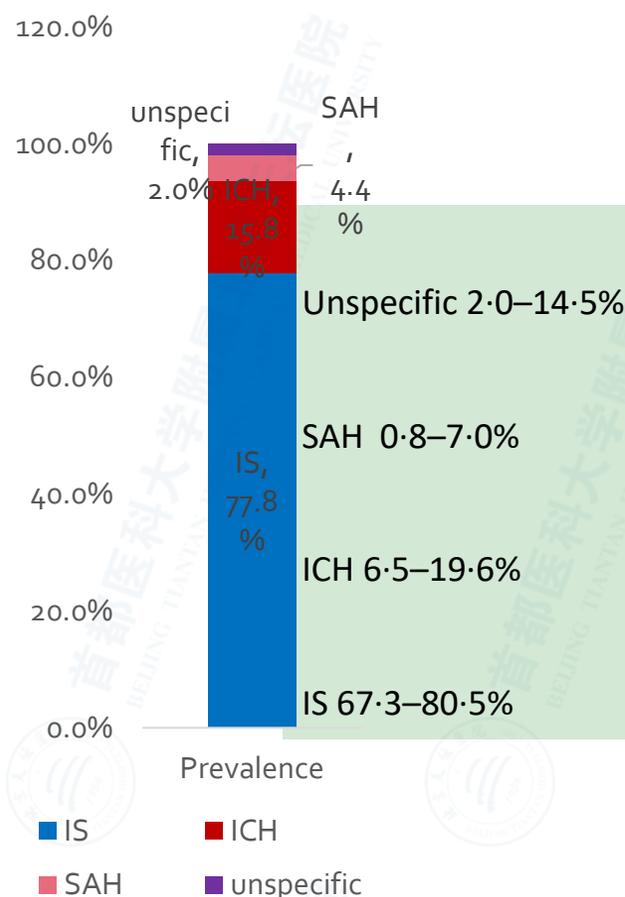
# Proportion of stroke types



CKB

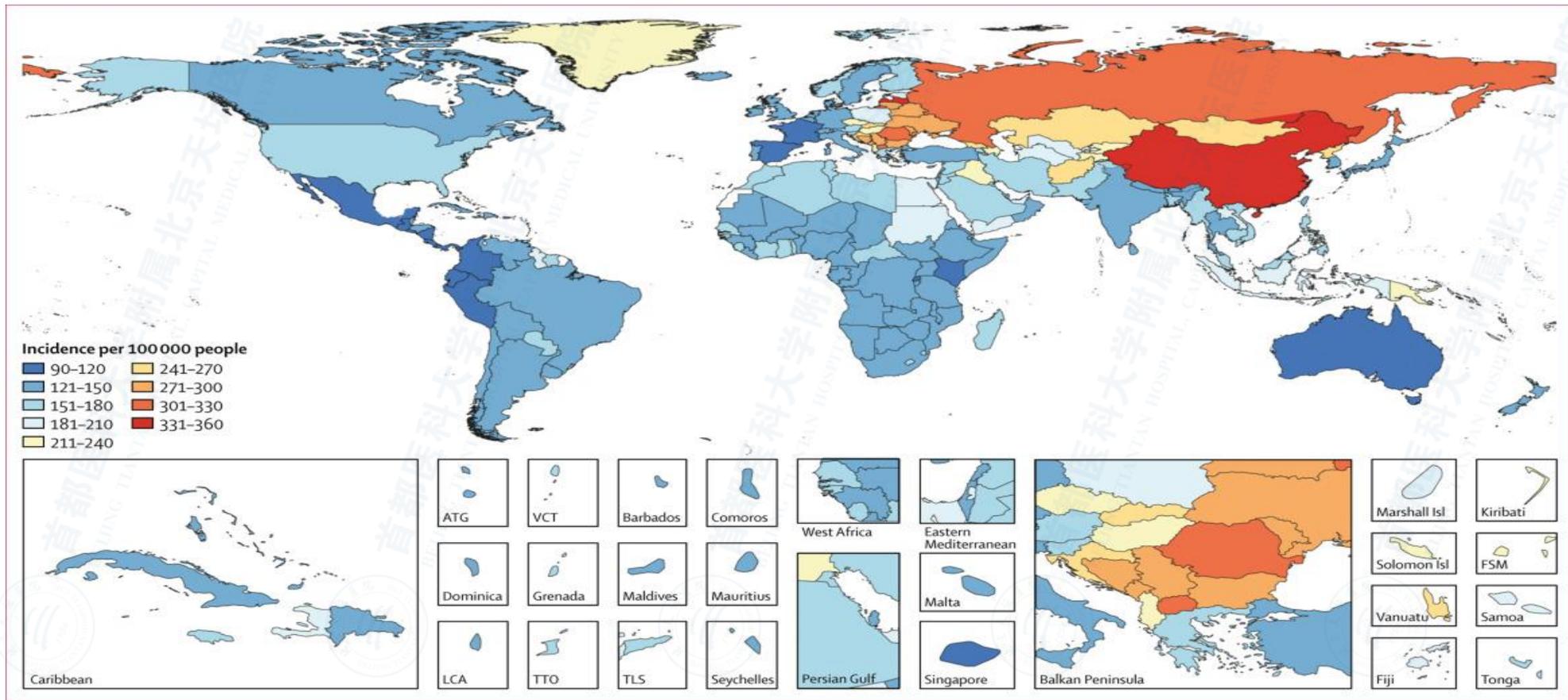


National Community Epidemiological Survey (2013)



Lancet Neurol. 2003 Jan;2(1):43-53

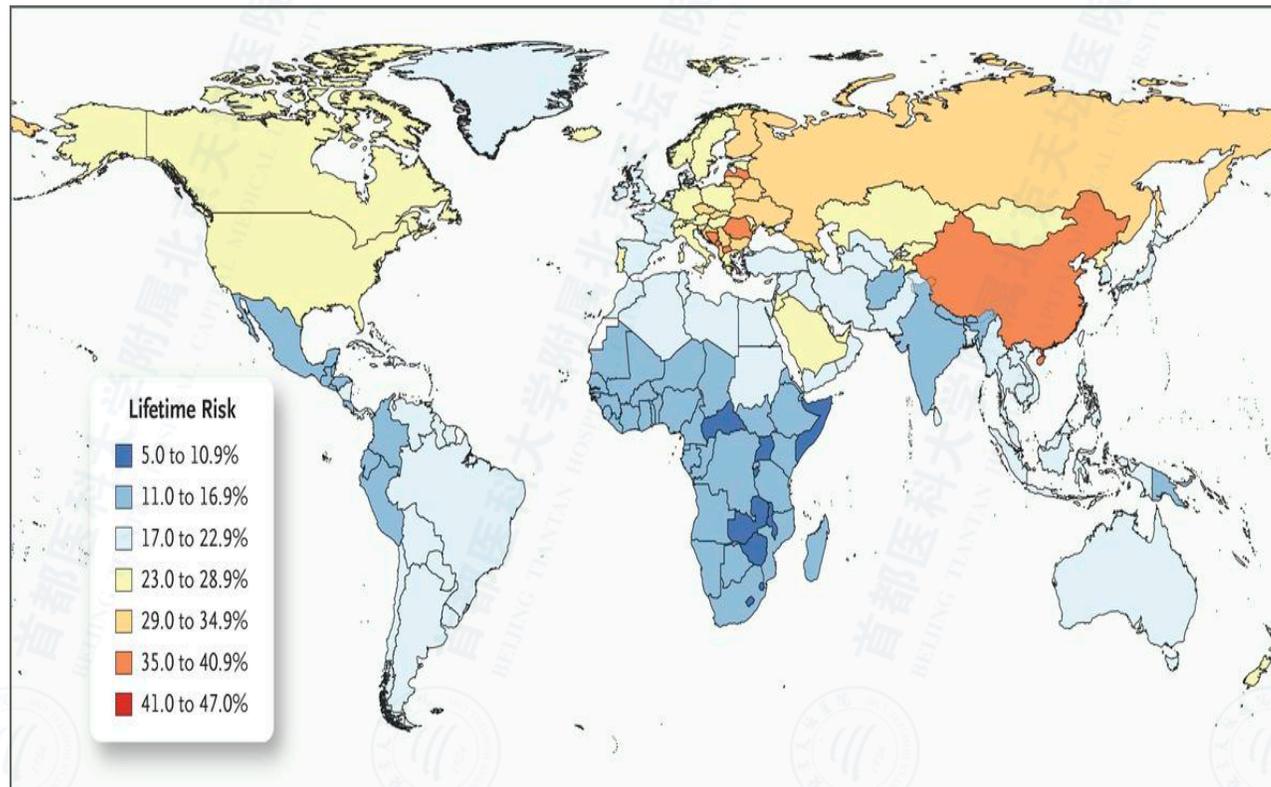
# Epidemiology



Global incidence of stroke in 2016

Lancet Neurol 2019; 18: 439-58

# Epidemiology



China: 39.3%
Latvia: 37.0%
Romania: 36.2%
Montenegro: 36.0%
Bosnia and Herzegovina: 35.7%
Macedonia: 35.2%
Serbia: 33.8%
Bulgaria: 33.4%
Albania: 33.4%
Croatia: 33.0%

Global Lifetime Risk of Stroke in 2016

N Engl J Med. 2018 Dec 20; 379(25): 2429–2437.

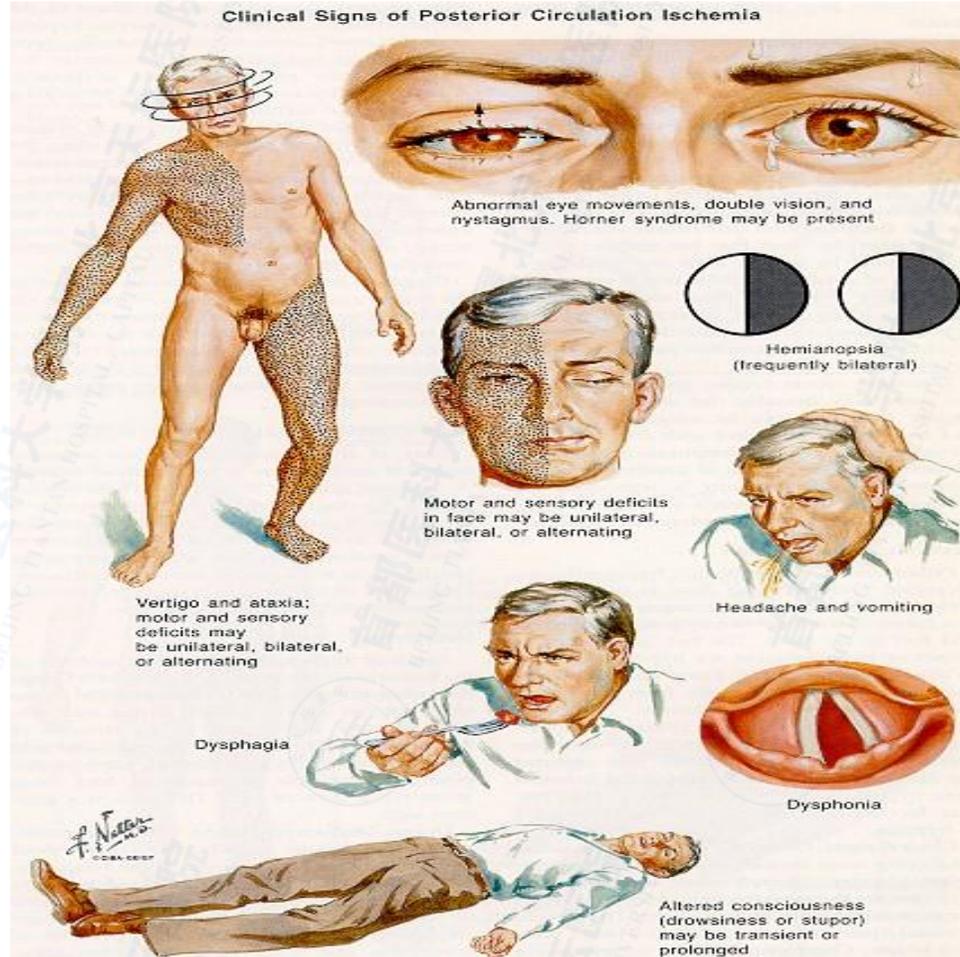
# Epidemiology

Leading causes 1990	Leading causes 2017	Percentage change in number of all-age DALYs	Percentage change in all-age DALYs per 100 000 population	Percentage change in age-standardised DALYs per 100 000 population
1 Lower respiratory infections	1 Stroke	46.8 (38.1 to 53.9)	24.4 (17 to 30.4)	-33.1 (-37.4 to -29.8)
2 Neonatal disorders	2 Ischaemic heart disease	125.3 (109.4 to 138.5)	90.9 (77.5 to 102.1)	4.6 (-3.3 to 10.7)
3 Stroke	3 COPD	-24.2 (-28.9 to -12.9)	-35.8 (-39.7 to -26.2)	-66.4 (-68.4 to -61.2)
4 COPD	4 Lung cancer	140.3 (117.2 to 157.7)	103.6 (84.1 to 118.3)	13.1 (2.3 to 21.2)
5 Congenital birth defects	5 Road injuries	-3.8 (-13.9 to 5.2)	-18.5 (-27.1 to -10.9)	-25.0 (-32.5 to -18.8)
6 Road injuries	6 Neonatal disorders	-64.8 (-70 to -58.8)	-70.2 (-74.6 to -65.1)	-60.8 (-66 to -55.3)
7 Ischaemic heart disease	7 Liver cancer	43.5 (31.3 to 60.3)	21.6 (11.3 to 35.9)	-28.3 (-34.4 to -19.9)
8 Drowning	8 Diabetes mellitus	102.5 (93 to 112.3)	71.6 (63.5 to 79.9)	4.8 (-0.6 to 10)
9 Self-harm	9 Neck pain	81.1 (71.6 to 91.1)	53.4 (45.4 to 62)	2.6 (-1.3 to 6.6)
10 Diarrhoeal diseases	10 Depressive disorders	36.5 (29.3 to 43.9)	15.7 (9.6 to 21.9)	-12.5 (-14.7 to -10.3)
11 Liver cancer	11 Age-related hearing loss	81.3 (77.7 to 84.7)	53.6 (50.6 to 56.5)	-2.6 (-4.1 to -1.3)
12 Stomach cancer	12 Stomach cancer	5.4 (-2.4 to 12.5)	-10.7 (-17.3 to -4.6)	-50.3 (-54 to -47)
13 Tuberculosis	13 Low back pain	23.2 (14.7 to 31.4)	4.4 (-2.8 to 11.3)	-23.2 (-26.9 to -19)
14 Lung cancer	14 Alzheimer's disease	157.0 (138.4 to 170.3)	117.8 (102.1 to 129.1)	-7.5 (-13.8 to -3.1)
15 Depressive disorders	15 Other musculoskeletal	60.8 (50.6 to 72.1)	36.3 (27.7 to 45.8)	-1.2 (-5.4 to 2.1)
16 Drug use disorders	16 Headache disorders	36.2 (31.8 to 41.5)	15.4 (11.7 to 19.9)	-0.2 (-2.5 to 2.2)
17 Low back pain	17 Falls	51.9 (8.4 to 74.1)	28.7 (-8.1 to 47.6)	3.8 (-25.6 to 18.6)
18 Cirrhosis	18 Drug use disorders	-5.0 (-12.8 to 2.8)	-19.5 (-26.1 to -12.9)	-21.2 (-28.1 to -14.9)
19 Diabetes mellitus	19 Blindness	74.9 (70.9 to 79.2)	48.2 (44.8 to 51.8)	-7.3 (-9 to -5.9)
20 Headache disorders	20 Congenital birth defects	63.4 (-68.5 to -58.1)	-69.0 (-73.3 to -64.5)	-55.4 (-61 to -48.8)
21 Neck pain	21 Chronic kidney disease	15.5 (8 to 21.3)	-2.1 (-8.5 to 2.8)	-36.1 (-40.6 to -32.9)
22 Age-related hearing loss	22 Hypertensive heart disease	18.3 (6.7 to 39.1)	0.3 (-9.6 to 17.9)	-48.6 (-53.8 to -39.4)
23 Chronic kidney disease	23 Cirrhosis	-12.5 (-23.8 to 24.6)	-25.9 (-35.4 to 5.6)	-53.9 (-59.9 to -34.9)
24 Other musculoskeletal	24 Oesophageal cancer	9.5 (0.7 to 17.8)	-7.2 (-14.6 to -0.1)	-50.1 (-54.1 to -46.4)
25 Hypertensive heart disease	25 Lower respiratory infection	-88.6 (-89.8 to -86)	-90.3 (-91.3 to -88.2)	-88.6 (-89.9 to -86.4)
26 Oesophageal cancer	26 Self-harm			
27 Falls	28 Drowning			
28 Blindness	34 Tuberculosis			
29 Alzheimer's disease	37 Diarrhoeal diseases			

■ Communicable, maternal, neonatal and nutritional  
■ Non-communicable  
■ Injuries

The Lancet, 2019, Vol. 394, No. 10204, p1145-1158

# Stroke Symptoms



- Unilateral weakness/numbness
- Unilateral Facial Paralysis
- Slurred speech
- Vision problems
- Dizziness with vomiting
- Loss of balance
- Severe headache
- Impaired consciousness or convulsions.

# Clinical presentation

Complaints	Prevalence (%)
Weakness of limbs	142 (89.87%)
Slurring of speech	88 (55.69%)
Deviation of angle of mouth	81 (51.26%)
Headache	64 (40.50%)
Others (Vomiting, dizziness, fever, seizures etc.)	43 (27.21%)

<https://www.researchgate.net/publication/230779765>

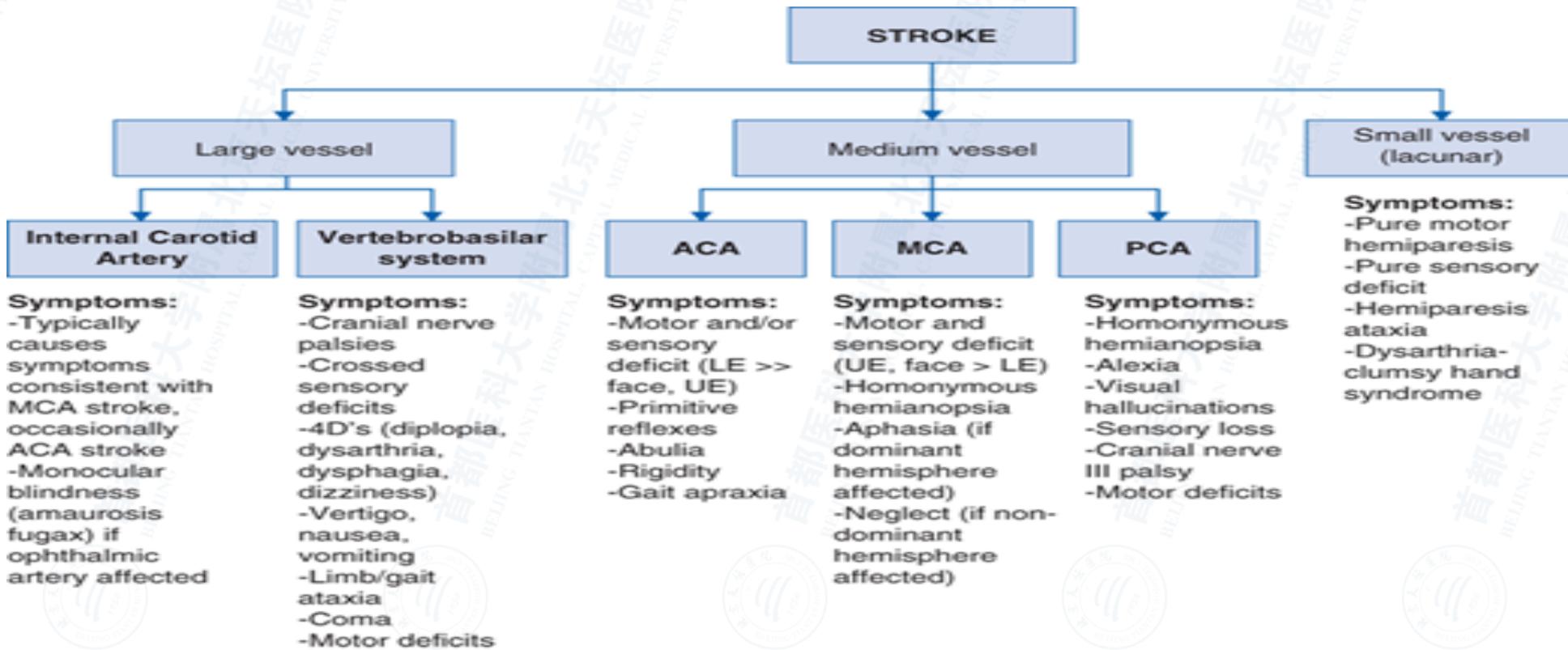
# Stroke Syndromes

## history and neurologic examination

- Unilateral weakness/numbness;
- Unilateral Facial Paralysis;
- Slurred speech
- Vision problems;
- Dizziness with vomiting;
- Severe headache
- Impaired consciousness or convulsions.

## arterial distribution

- large-vessel stroke within the anterior circulation,
- large-vessel stroke within the posterior circulation,
- small-vessel disease of vascular bed.



ACA, anterior cerebral artery; LE, lower extremity; MCA, middle cerebral artery; PCA, posterior cerebral artery; UE, upper extremity.

<https://basicmedicalkey.com/17-stroke-and-cerebrovascular-disease/>

# 8 Ds of stroke care

1. **Detection**
2. **Dispatch**
3. **Delivery**
4. **Door**
5. **Data**
6. **Decision**
7. **Drug/Device**
8. **Disposition**



# FAST Assessment



**B** **E** **F** **A** **S** **T**

**BALANCE**  
Loss of Balance,  
Headache or Dizziness

**EYES**  
Blurred Vision

**FACE**  
One Side of the Face  
Drooping

**ARMS**  
Arm or Leg  
Weakness

**SPEECH**  
Speech Difficulty

**TIME**  
Time to Call for  
Ambulance Immediately

# Notification to the receiving hospital

371 988 patients with acute ischemic stroke from april 2003 to March 2011,

	EMS Prenotification	No EMS Prenotification	Absolute Difference (95% CI)	PValue
Door-to-imaging time, n, median (25 <sup>th</sup> to 75 <sup>th</sup> percentile), min (in patients arriving ≤3 h)	54 983	17 838		
	24 (15–38)	26 (16–43)	–2 min	<0.0001
Door-to-imaging time ≤25 min, (in patients arriving ≤3 h), %	54.8%	48.5%	+6.3% (5.4–7.1)	<0.0001
Door-to-imaging time, n, median (25 <sup>th</sup> to 75 <sup>th</sup> percentile), min	132 374	54 462		
	32 (18–63)	41 (22–80)	–9 min	<0.0001
Door-to-imaging time ≤25 min, %	69.3%	60.5%	+8.8% (8.3–9.2)	<0.0001
Door-to-needle time, n, median (25 <sup>th</sup> -75 <sup>th</sup> percentile), min	77 (59–99)	79 (60–101)	–2 min	<0.0001
Door-to-needle time ≤60 min, %	27.7%	26.9%	+0.8% (0.4–2.0)	0.1787
Onset-to-needle time, median (25 <sup>th</sup> to 75 <sup>th</sup> percentile), min	140 (114–168)	145 (116–170)	–5 min	<0.0001
Onset-to-needle time ≤120 min, %	32.4%	29.8%	+2.6% (1.4–3.9)	<0.0001
tPA Rx rate (arrive by 2 h, treat by 3 h), n/n, %	19 476/23 531	6017/7594		
	82.8%	79.2%	+3.5% (2.5–4.6)	<0.0001

Circ Cardiovasc Qual Outcomes. 2012 Jul 1;5(4):514-22

# EMS identification system

Instrument name	Setting and location of instrument designed for use in	Facial weakness	Arm weakness	Grip strength	Speech disturbance	Leg weakness	Vision	Additional criteria for instrument use
Cincinnati Prehospital Stroke Scale (CPSS)	Prehospital, Cincinnati, USA	✓	✓	×	✓	×	×	×
Face Arm Speech Test (FAST)	Prehospital, Newcastle, UK Prehospital, Newcastle, UK	✓	✓	×	✓	×	×	GCS<7 or suspected head injury exclusion in original paper
Los Angeles Prehospital Stroke Scale (LAPSS)	Prehospital, Los Angeles, USA	✓	✓	✓	×	×	×	Age >45 years; History of seizures or epilepsy absent; Symptom duration <24 h not 'wheelchair bound' or 'bed ridden'; Blood glucose 60–400 mg/dL
Medic Prehospital Assessment for Code Stroke (MedPACS)	Prehospital, North Carolina, USA	✓	✓	×	✓	✓	✓	Prior history of seizure absent; Onset within 24h; Blood glucose between 60 and 400 mg/dL
Melbourne Ambulance Stroke Scale (MASS)	Prehospital, Melbourne, Australia Prehospital, Melbourne, Australia	✓	✓	✓	✓	×	×	Age >45 years; History of seizures or epilepsy absent; Symptom duration <24 h not 'wheelchair bound' or 'bed ridden'; Blood glucose 60–400 mg/dL
Ontario Prehospital Stroke Screening tool (OPSS)	Prehospital, Toronto, Canada	✓	✓	×	✓	✓		Can be transported to arrive within 2 h of onset, or the time patient was 'last seen in an usual state of health'; Excluded if: Canadian Triage and Acuity Scale level 1 and or uncorrected airway, breathing or circulatory problem; if symptoms have resolved; if blood sugar <4 mmol/L; if seizure at onset of symptoms, or witnessed by paramedic; if GCS <10; if terminally ill or palliative care patient
Recognition Of Stroke In the Emergency Room (ROSIER)	ED, Newcastle, UK	✓	✓	×	✓	✓	✓	Only valid if blood glucose ≥3.5 mmol/L; Seizure or syncope –1 point each; Other elements +1 point; Stroke likely if score ≥1

# EMS identification system

Instrument	Number of identified studies evaluating this instrument	Total number of patients to whom instrument applied	Sensitivity (range)	Specificity (range)	PPV (range)	NPV (range)
LAPSS	6	3264	(59–91)	(48–97)	(73–98)	(45–98)
MASS	2	950	(83–90)	(74–85)	(64–90)	(74–90)
MedPACS	1	416	74	33	47	61
OPSS	1	554	89	80	90	88
ROSIER	7	2445	(83–97)	(18–93)	(62–94)	(33–88)
CPSS	8	4482	(44–95)	(24–79)	(40–88)	(57–96)
FAST	8	1841	(79–97)	(13–88)	(62–89)	(48–93)

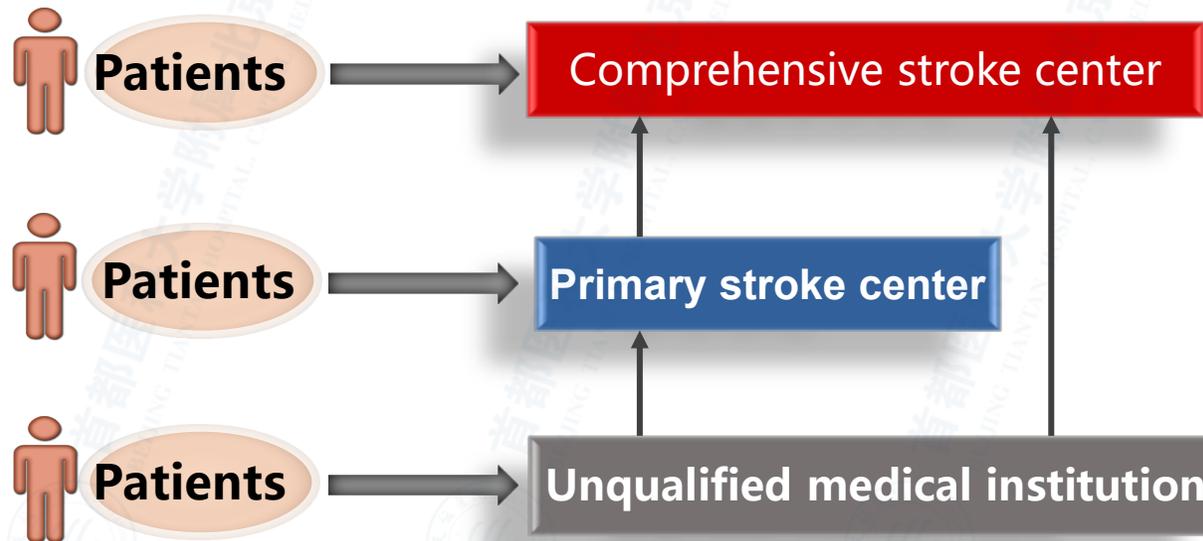
# Notification to the receiving hospital

**EMS personnel should provide prehospital notification to the receiving hospital that a suspected stroke patient is en route so that the appropriate hospital resources may be mobilized before patient arrival.**

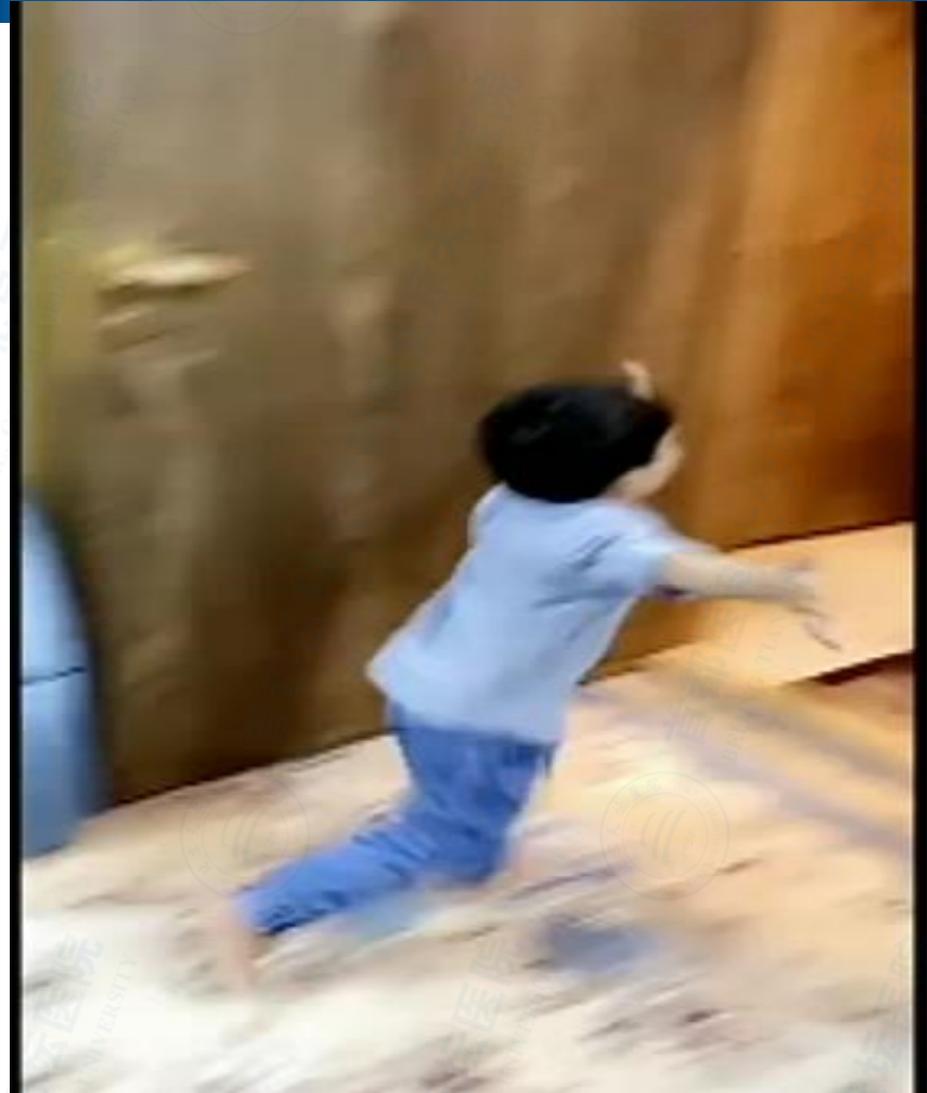


# Stroke center

Diagram of patient visit and transfer of stroke center network



# Pressure during Covid-19 period



# Team Work

