Stroke

Y Qi MD(China), AP


Wrangler


25
医生办公室


AIRIS II


SIEMENS


大医院

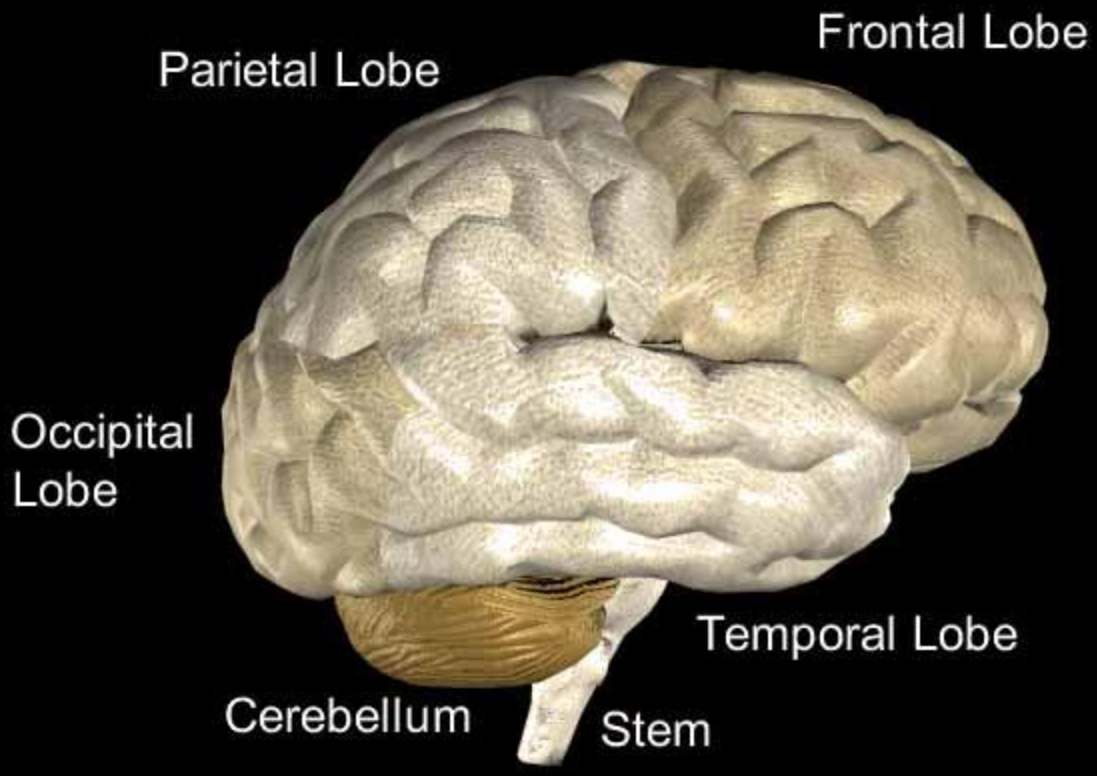

处置室
神内重症监护
NICU
EXIT


93
98
130
92
81
20

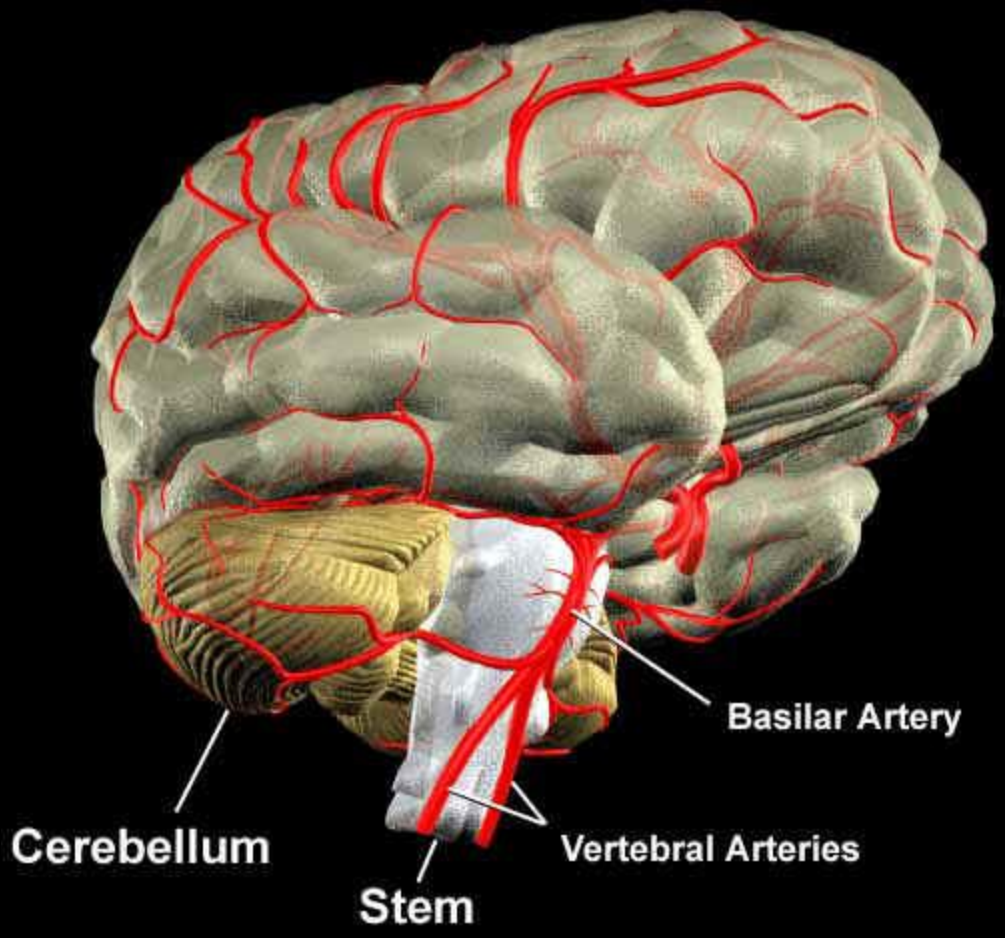

梅菜扣肉
photo by ms

Anatomy of the brain

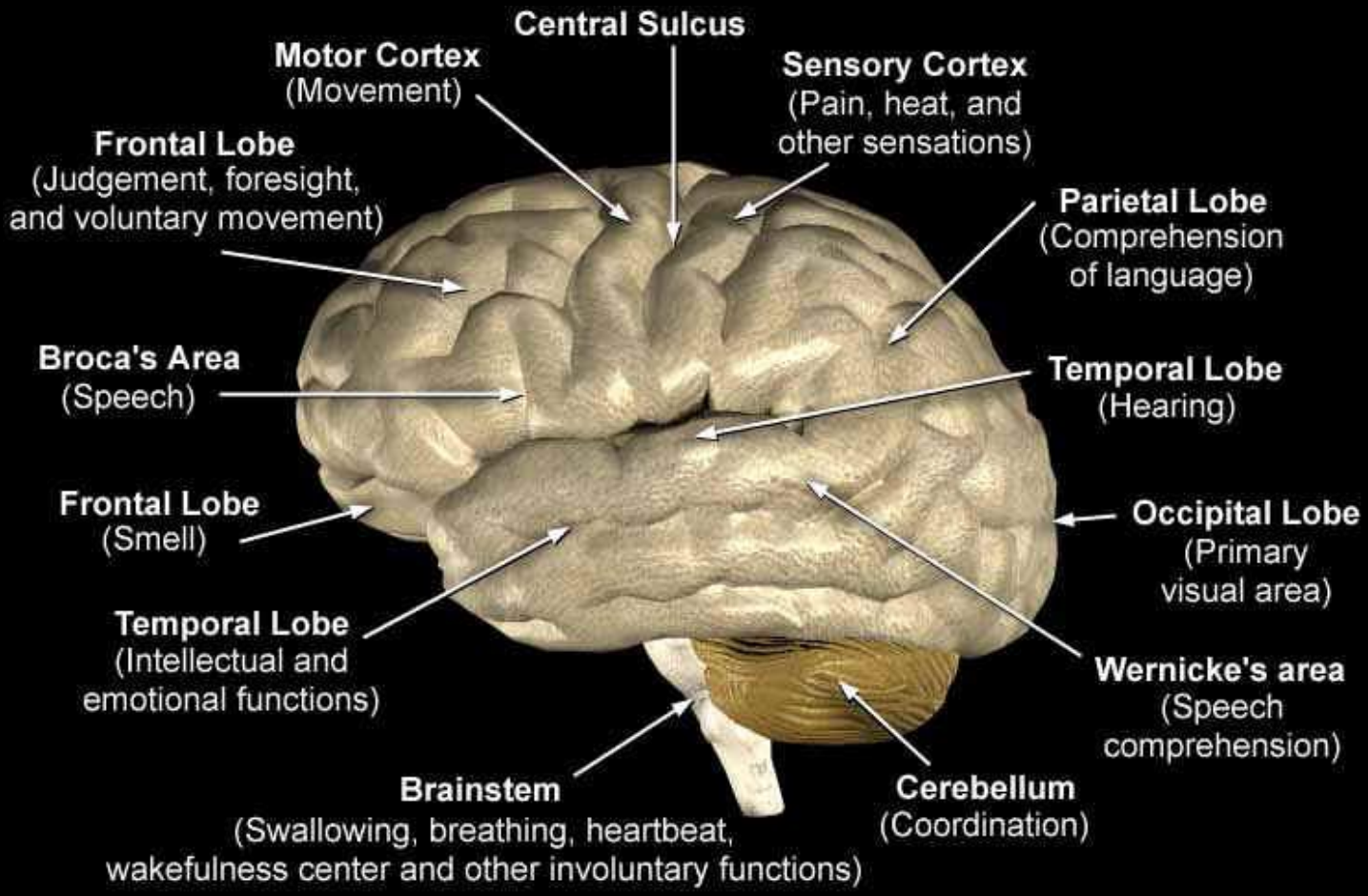
Brain


Parietal Lobe
Frontal Lobe
Occipital Lobe
Temporal Lobe
Cerebellum
Stem

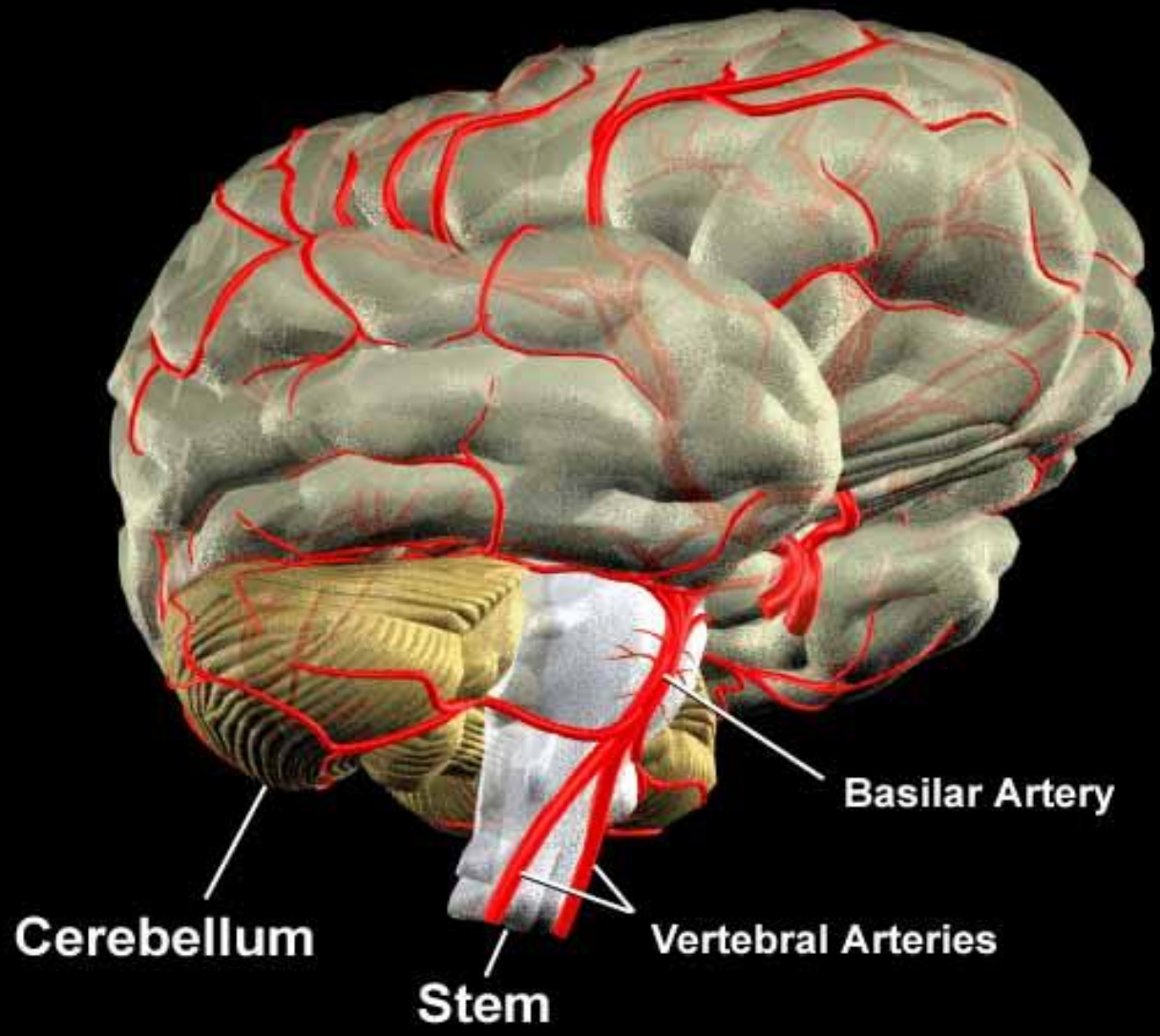
Brain



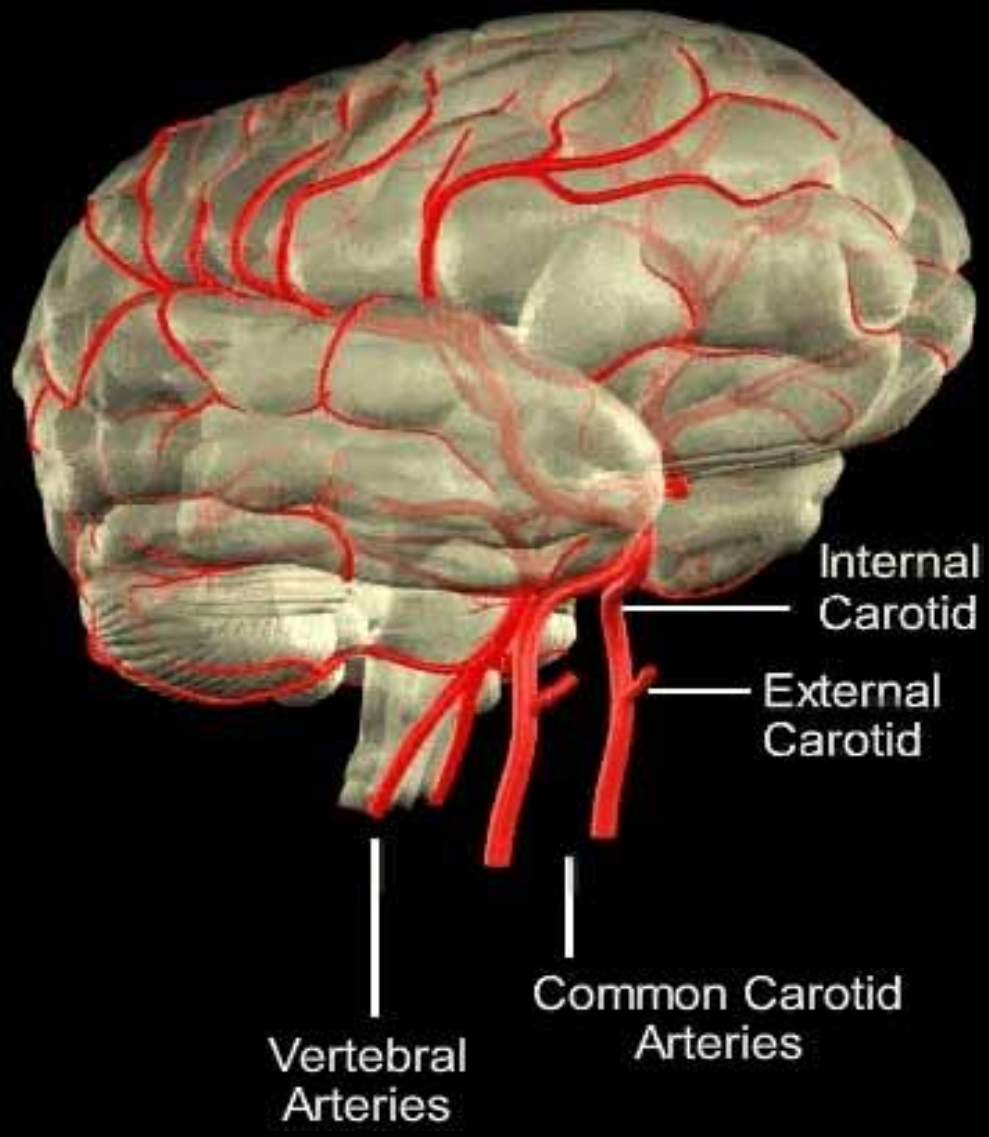
Brain


Central Sulcus
Motor Cortex
(Movement)
Sensory Cortex
(Pain, heat, and
other sensations)
Frontal Lobe
(Judgement, foresight,
and voluntary movement)
Parietal Lobe
(Comprehension
of language)
Broca's Area
(Speech)
Temporal Lobe
(Hearing)
Frontal Lobe
(Smell)
Occipital Lobe
(Primary
visual area)
Temporal Lobe
(Intellectual and
emotional functions)
Wernicke's area
(Speech
comprehension)
Brainstem
(Swallowing, breathing, heartbeat,
wakefulness center and other involuntary functions)
Cerebellum
(Coordination)

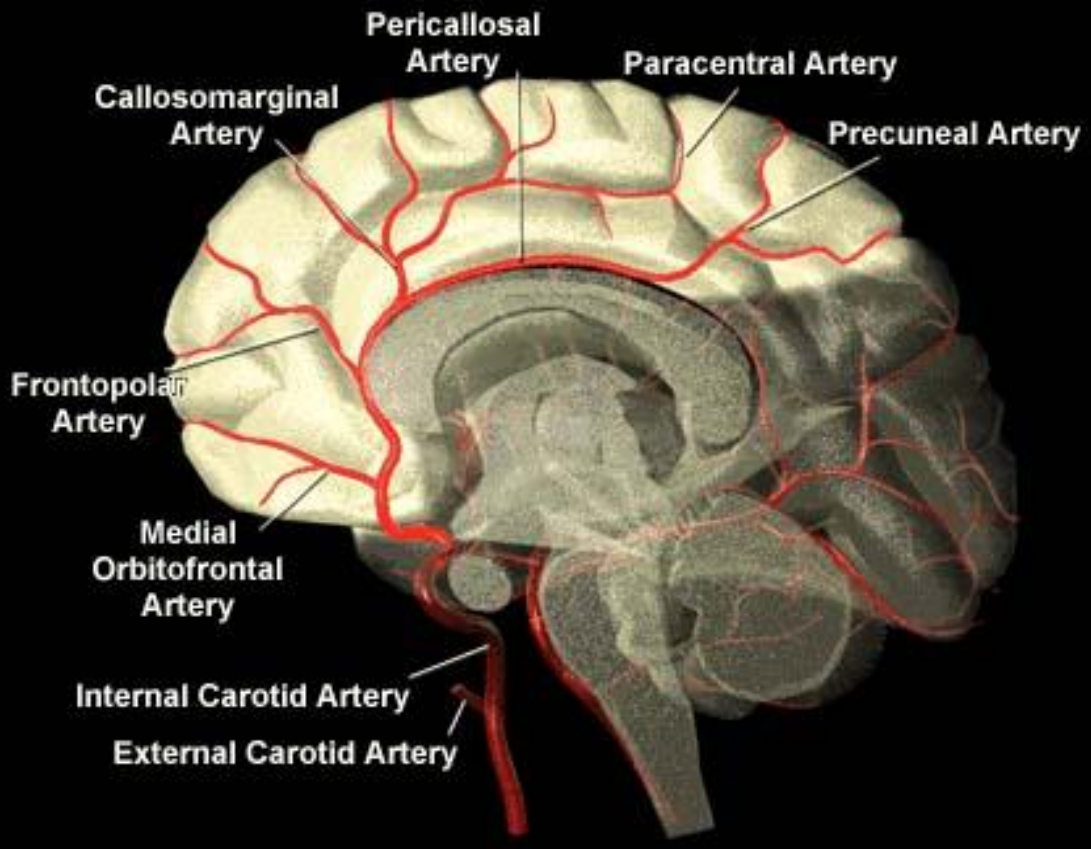
Cerebellum and Brainstem



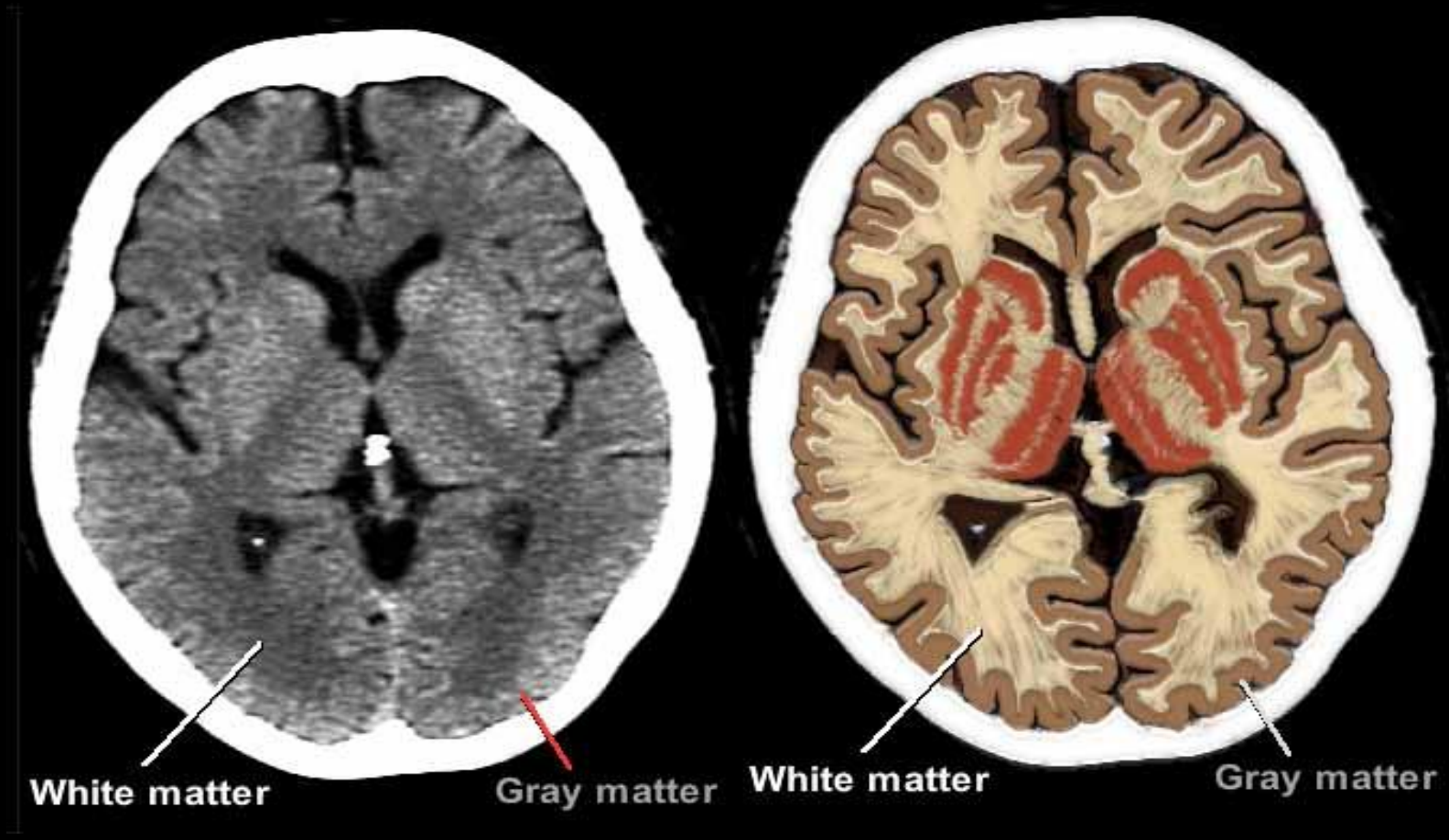
Major Blood Vessels



Anterior Cerebral Artery

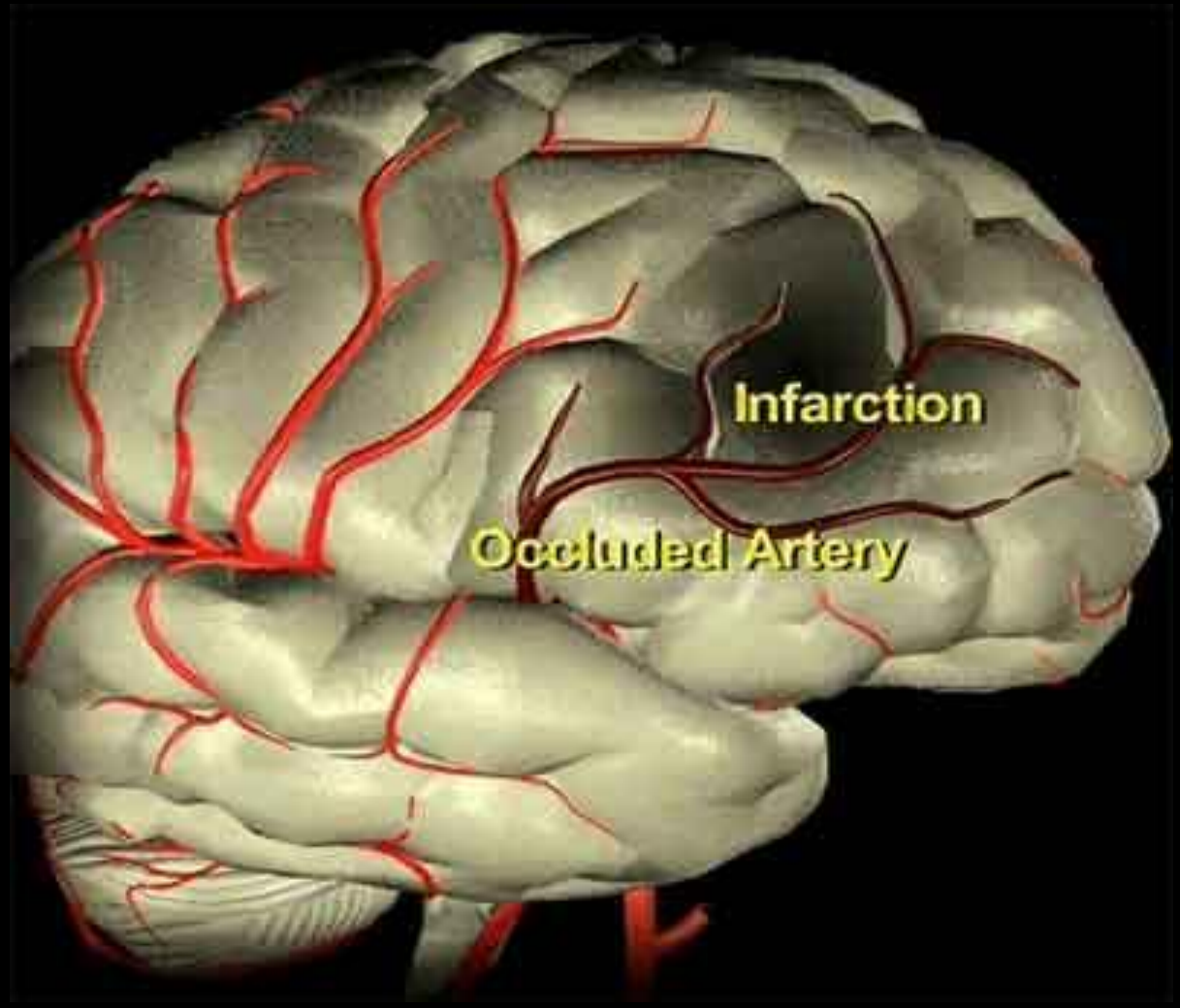


Layers of the Cerebrum - Gray and White Matter

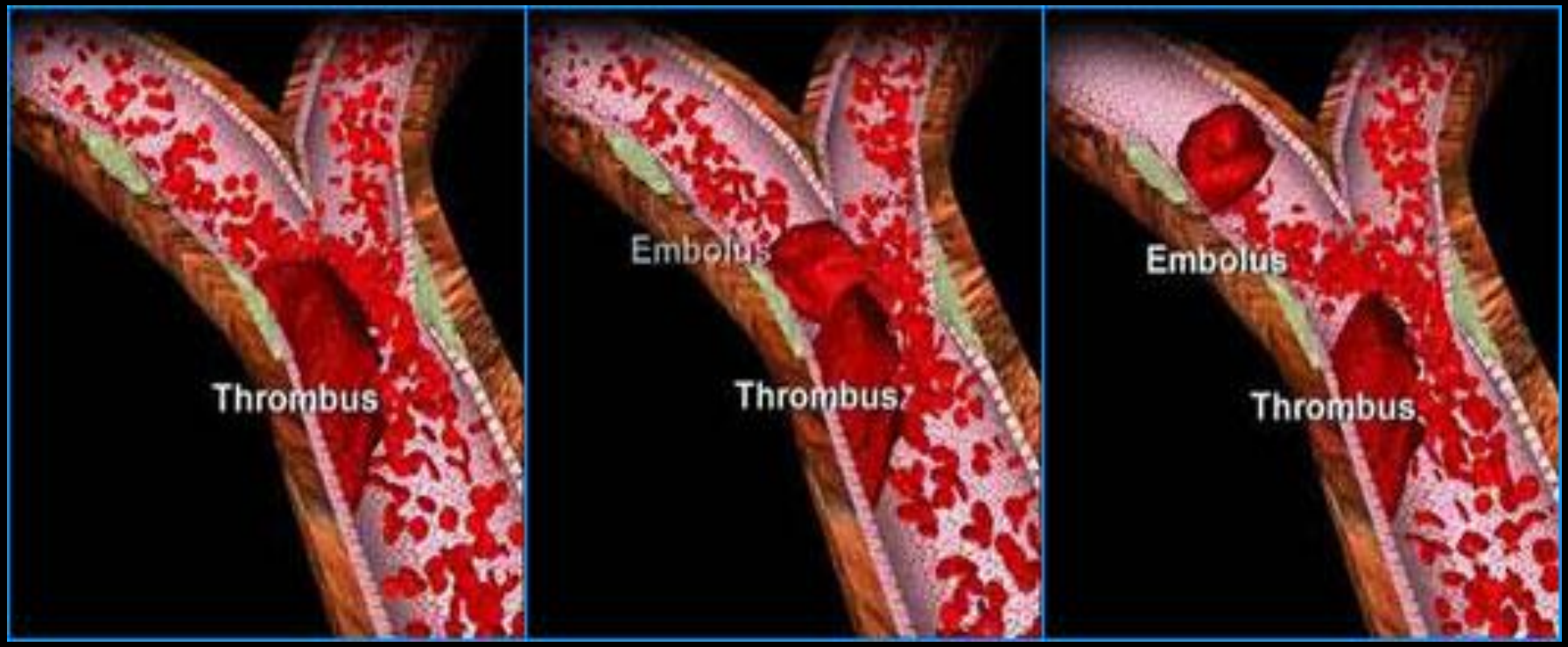


Pathology of stroke

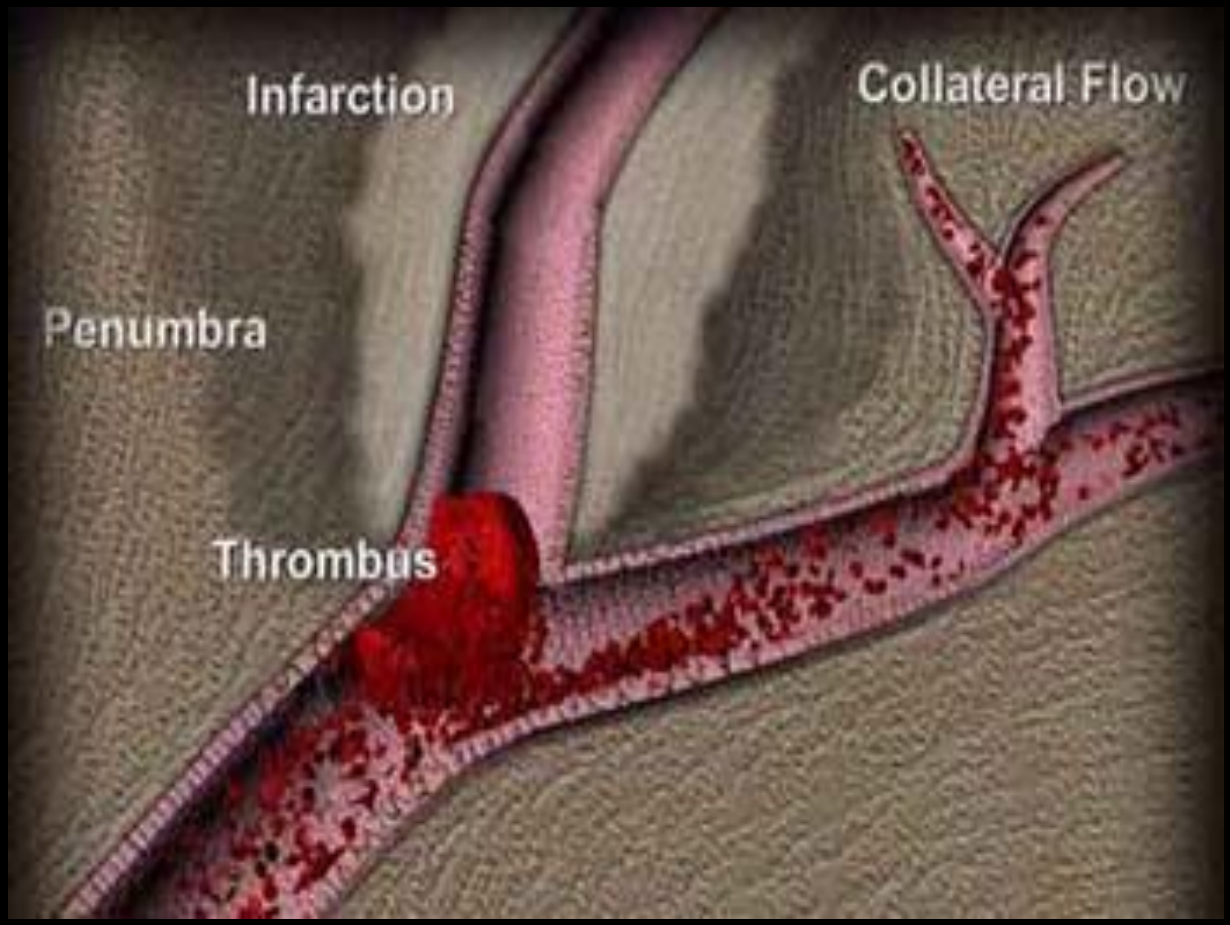
Atherosclerosis and Thrombus Formation



Cerebral Embolism Formation

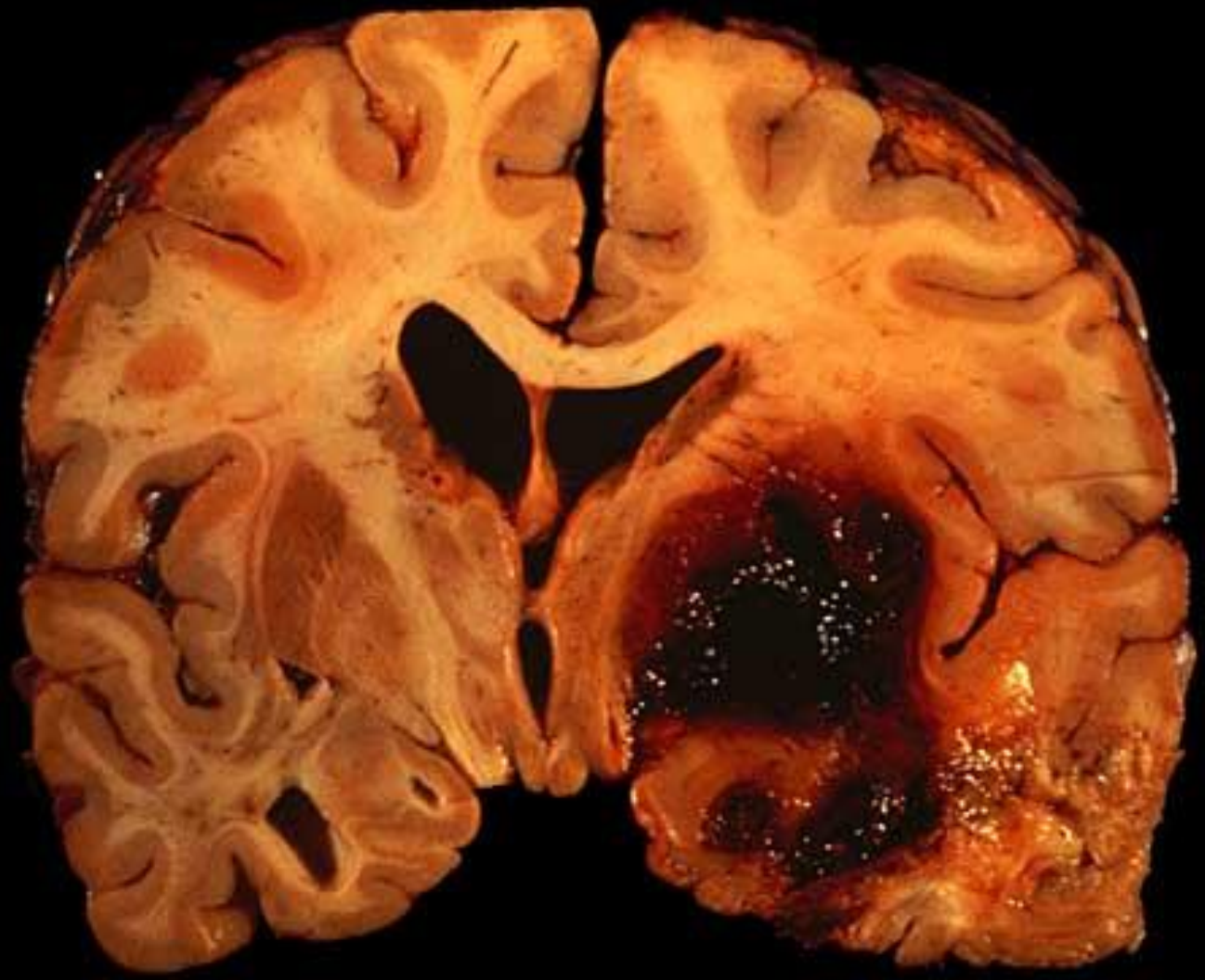


Cellular Injury During Ischemia



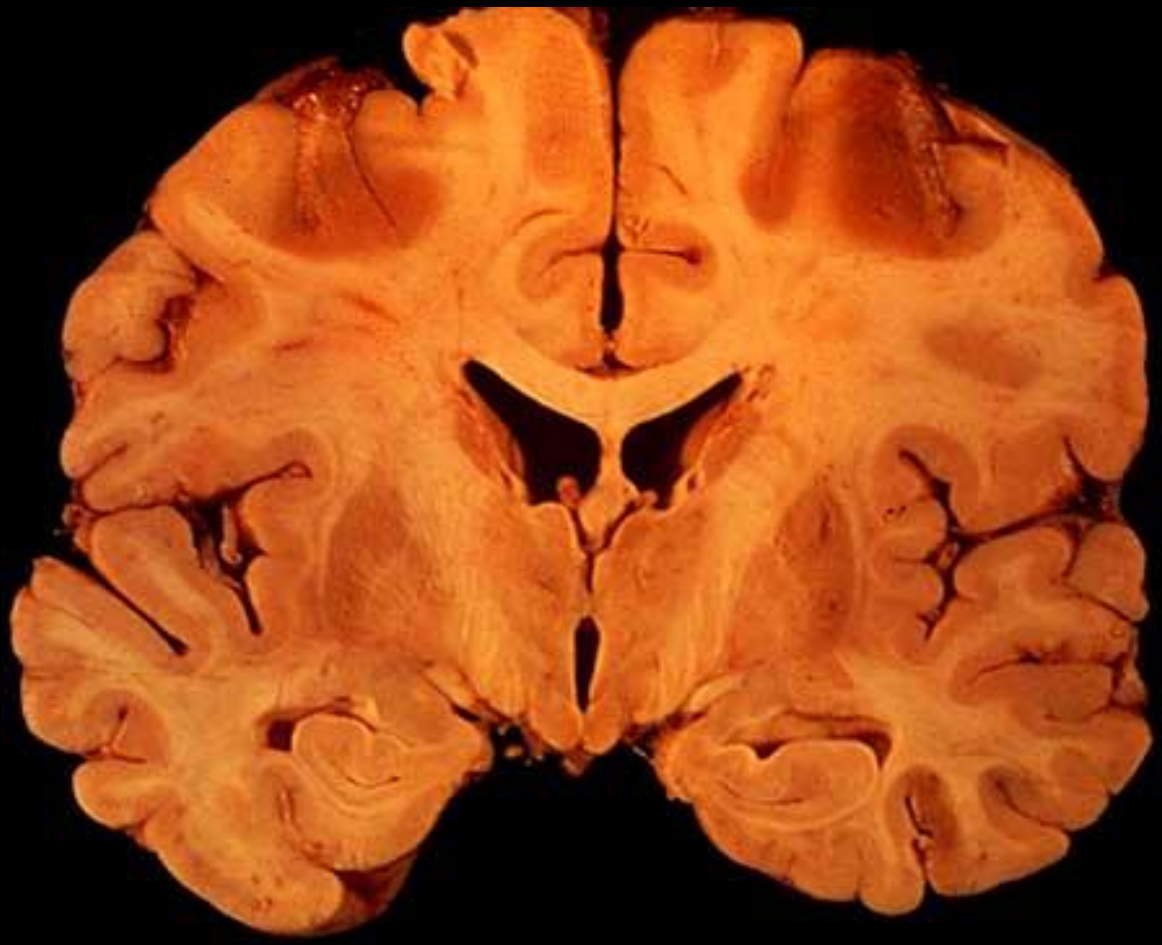
Brain swelling

Intracerebral Hemorrhage



Atherosclerosis

Watershed infarction

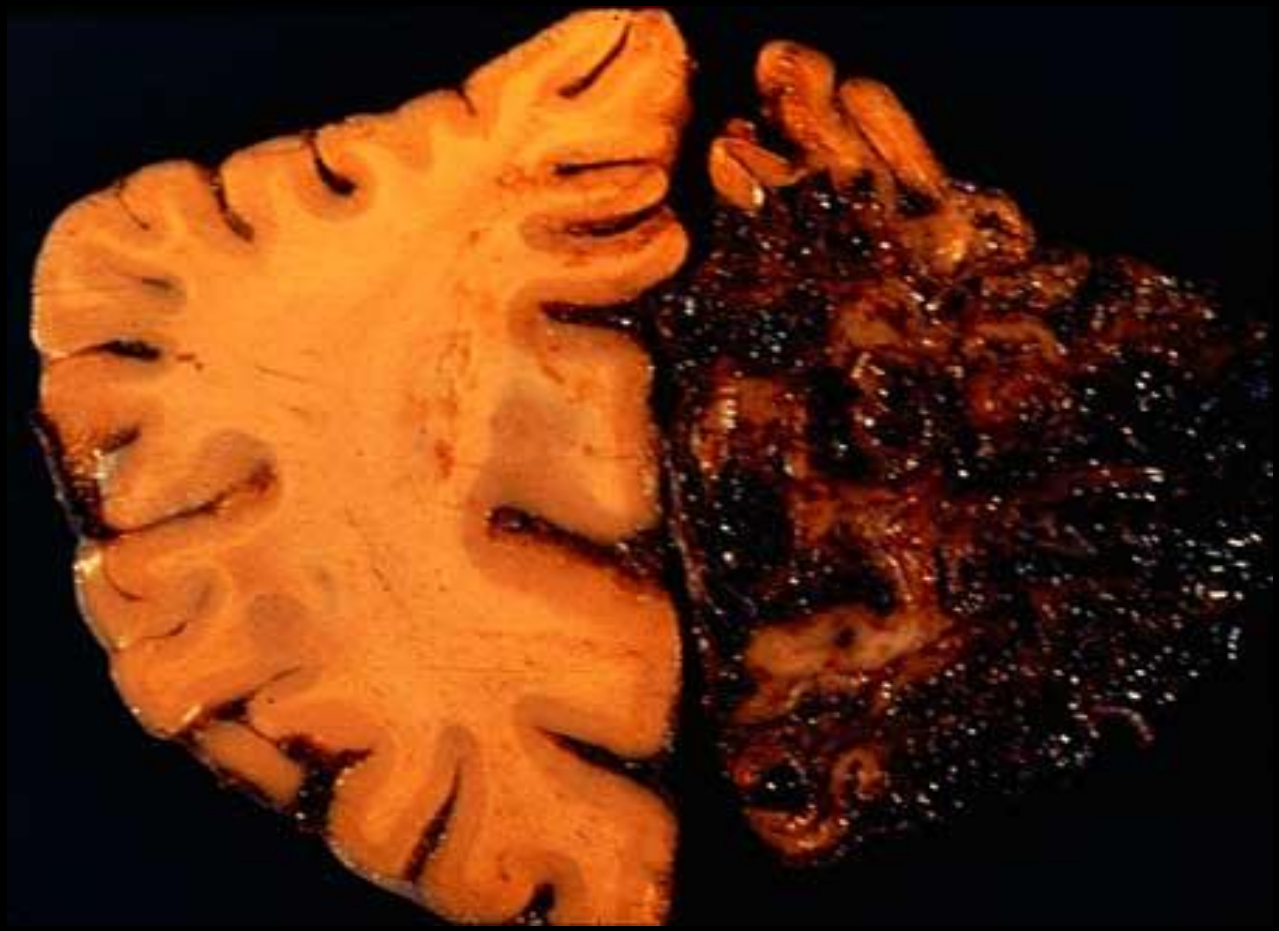


Laminar necrosis of the cotex

Hypertensive hemorrhage in the pons

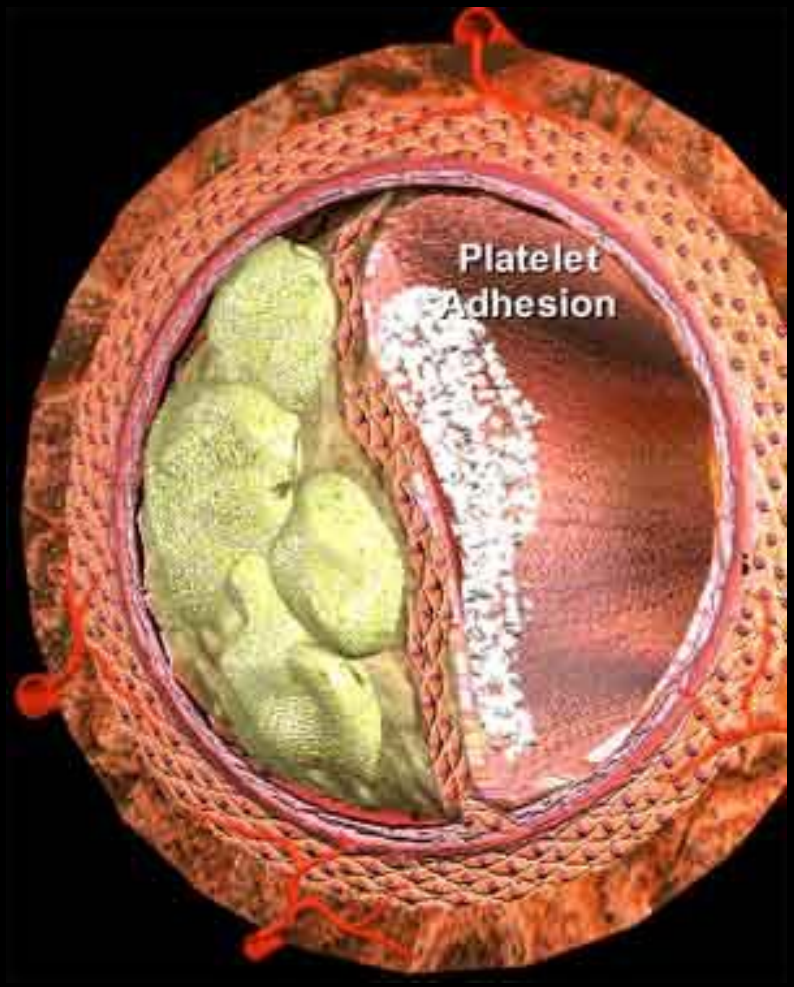
Aneurysm of basilar artery

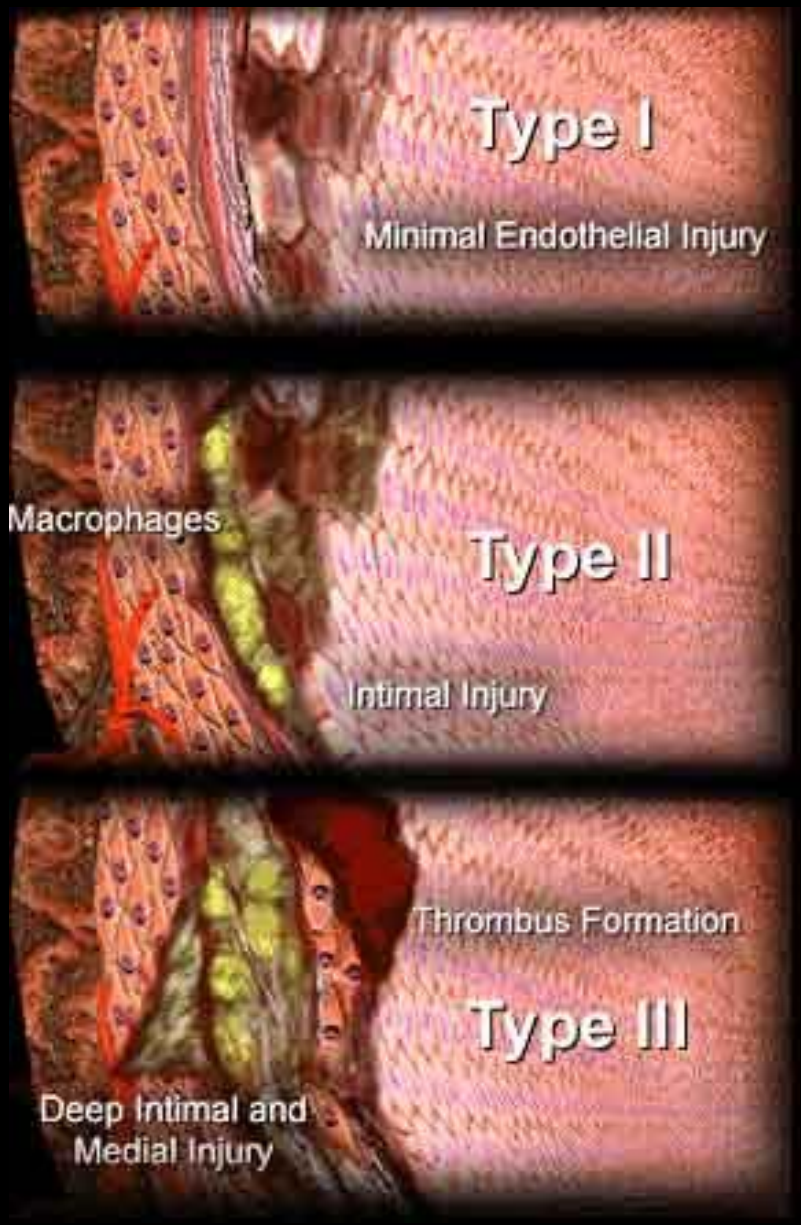
Aneurysm of basilar artery



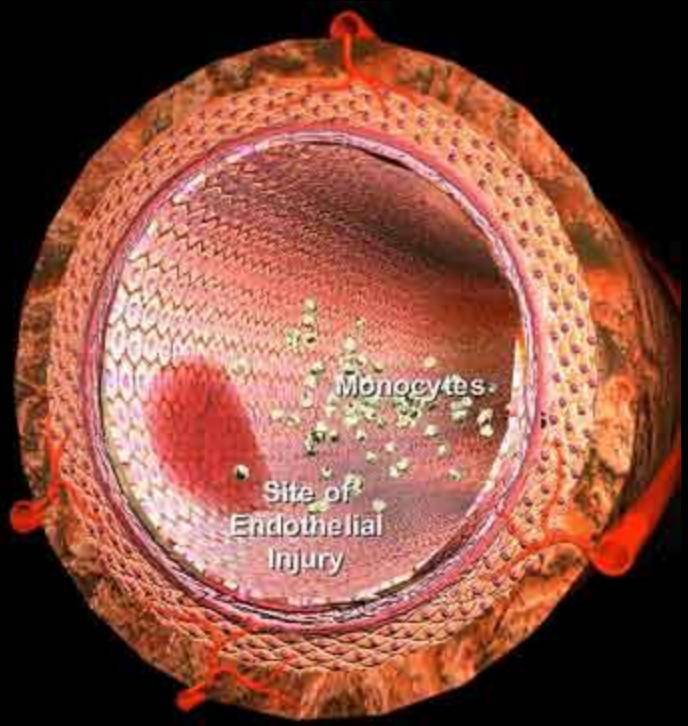
Intraventricular hemorrhage

Atherosclerosis and Thrombus Formation




Type I
Minimal Endothelial Injury
Macrophages
Type II
Intimal Injury
Thrombus Formation
Type III
Deep Intimal and
Medial Injury

Atherosclerosis and Thrombus Formation Role of Monocytes and T-Lymphocytes in the Transformation to Foam Cells



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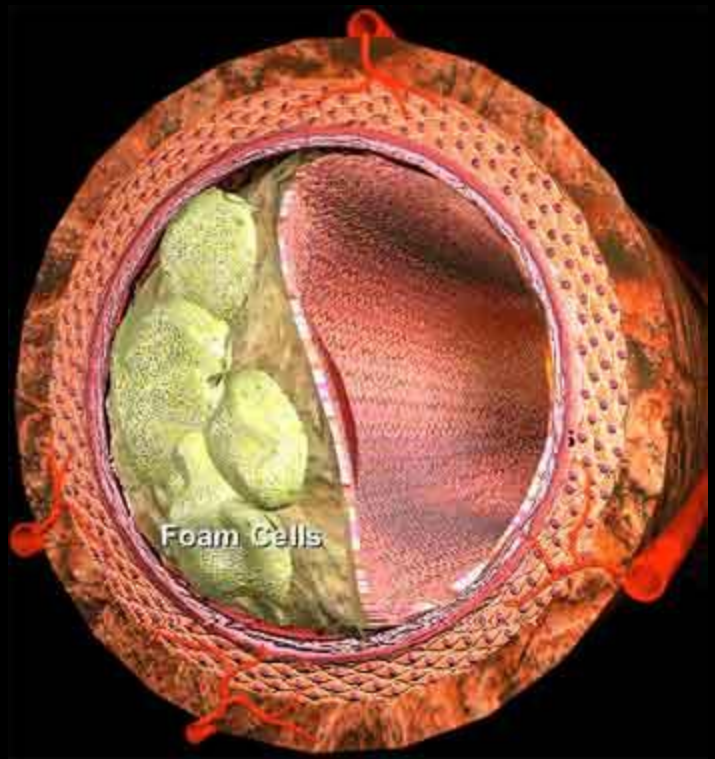
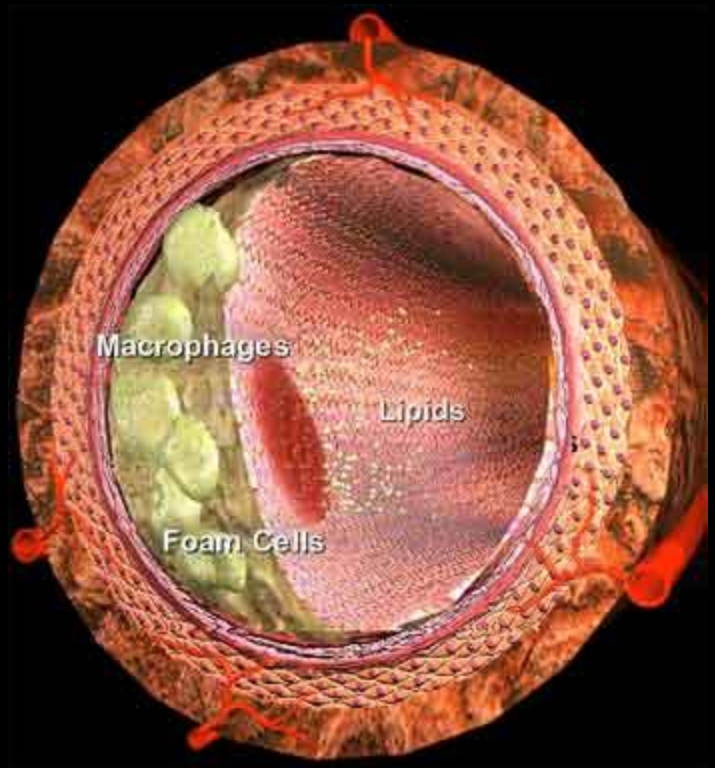
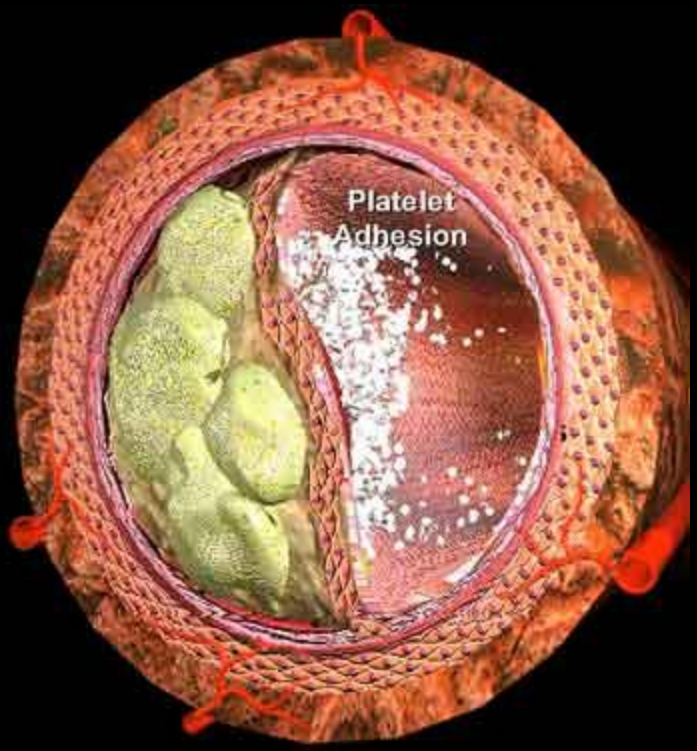


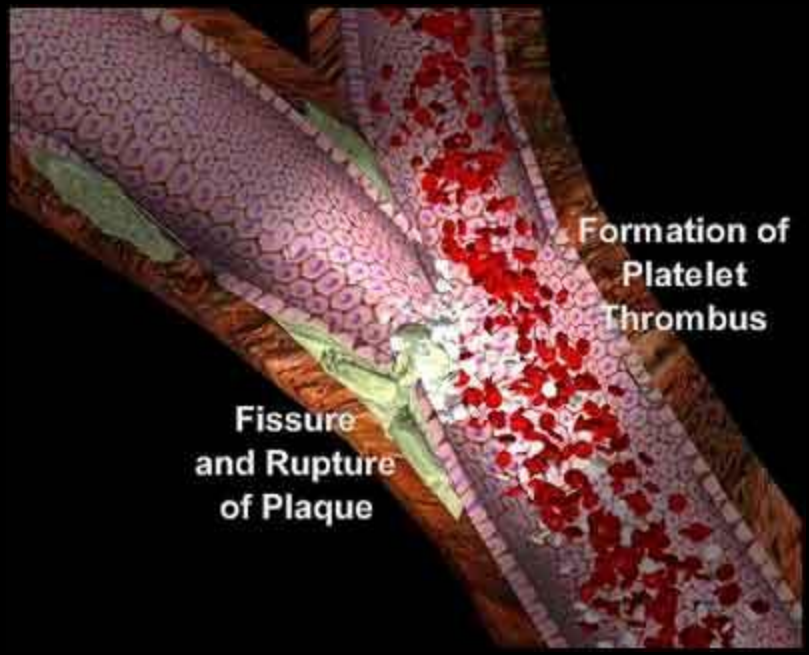
Atherosclerosis and Thrombus Formation Role of Monocytes and T-Lymphocytes in the Transformation to Foam Cells



Role of Platelets

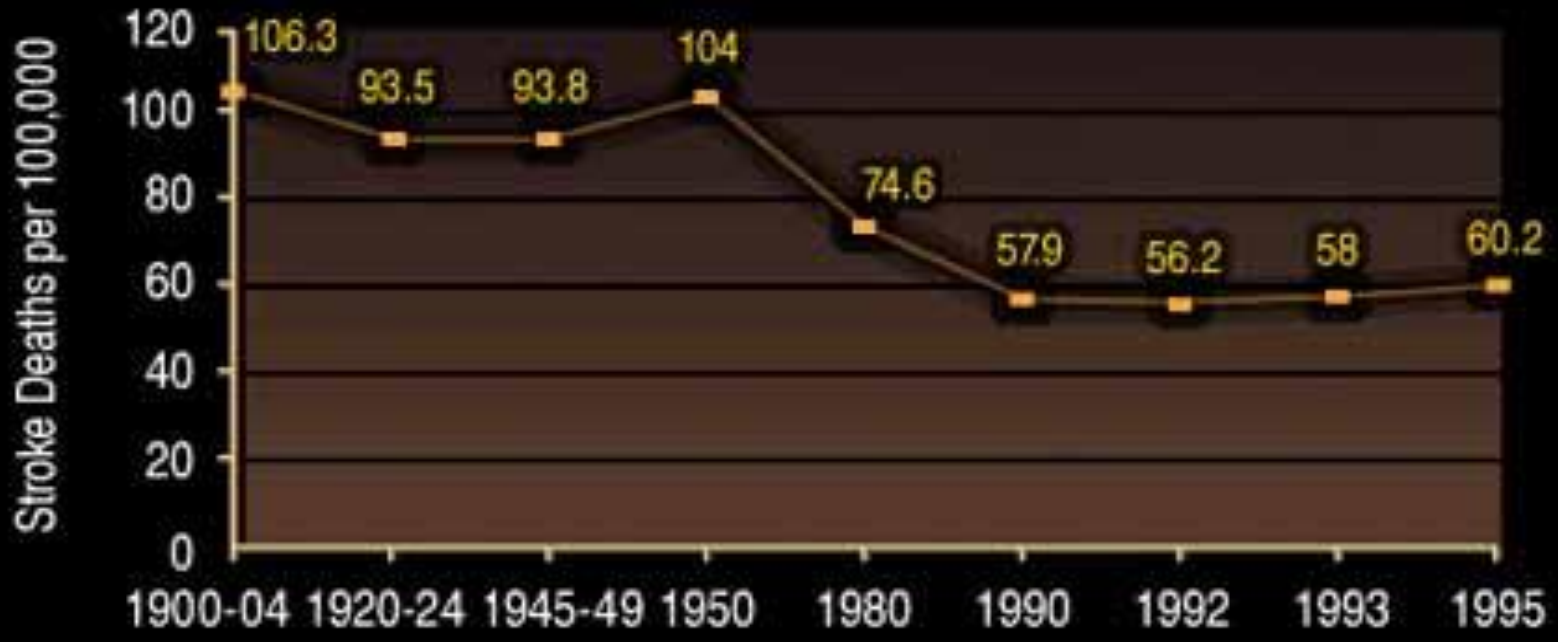


Plaque Fissuring and Formation



Atherosclerosis and Thrombus Formation

Death Rates from Stroke: 1900-1995

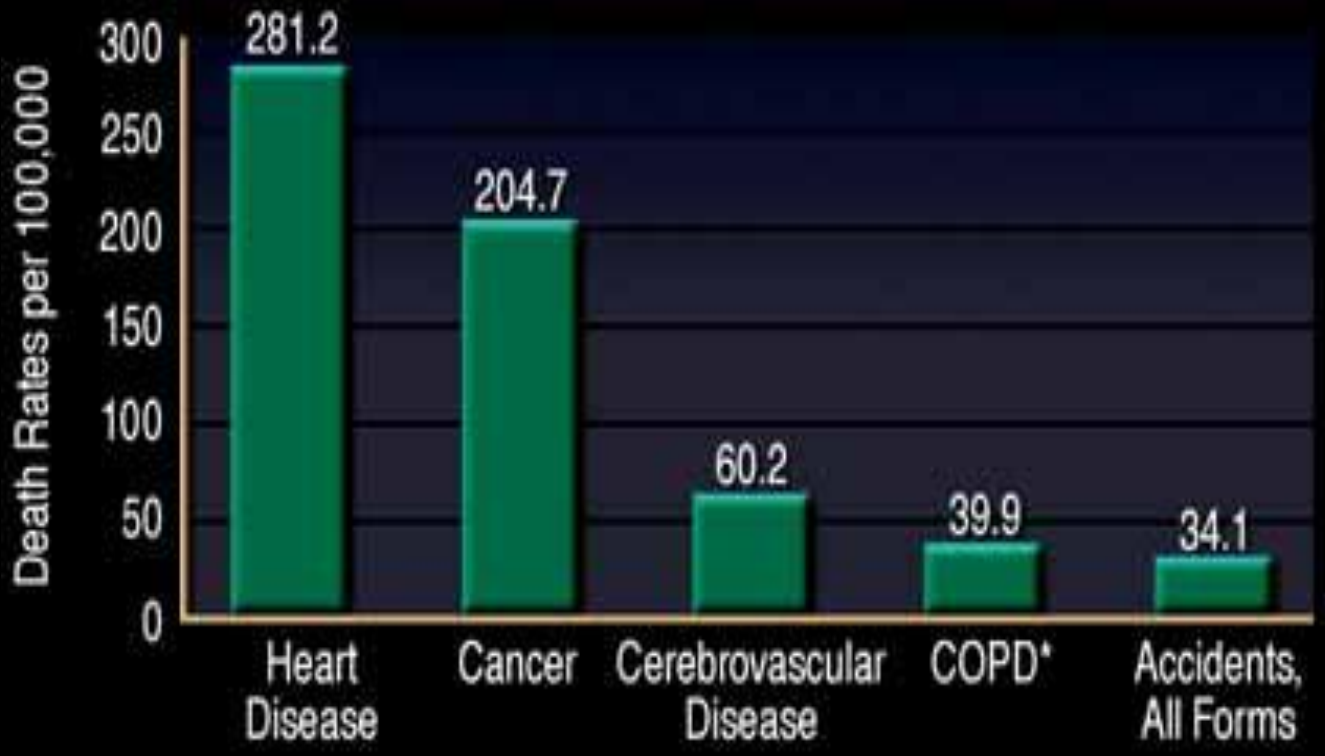


Source: Department of Health and Human Services, National Center for Health Statistics.

Stroke survivors

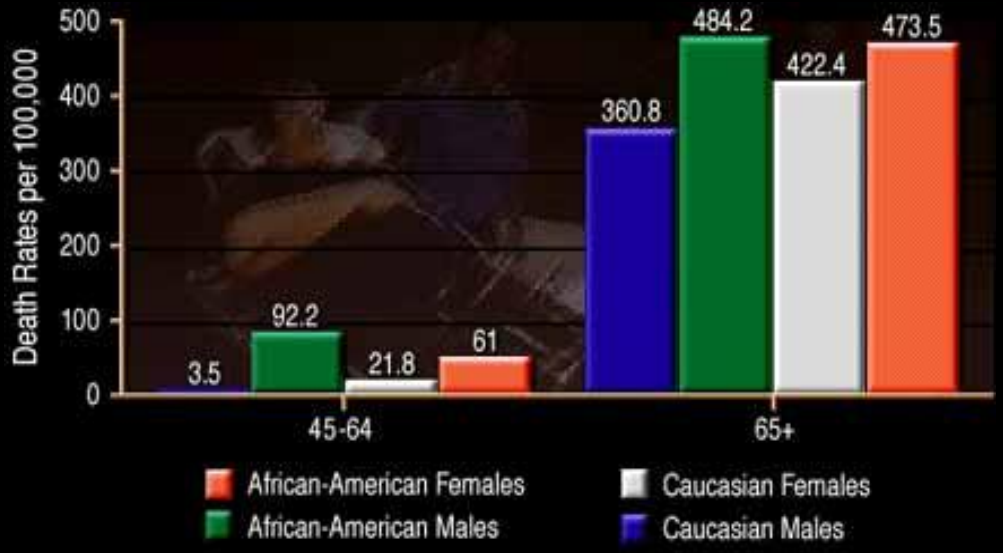
Source: Information based on the Framingham Heart Study as cited in *Heart and Stroke Facts: 1996 Statistical Supplement* Dallas: American Heart Association; 1996.

Death rates per 100,000

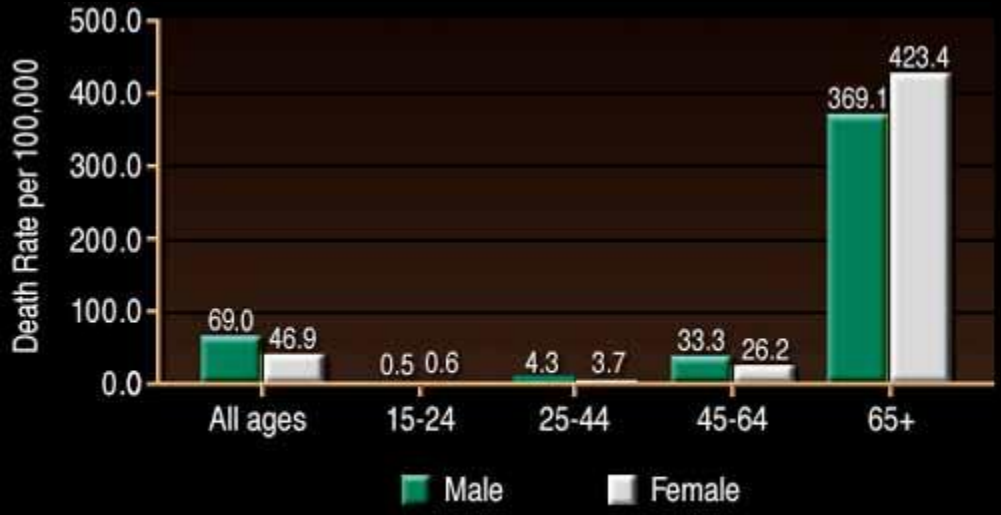


*COPD = chronic obstructive pulmonary disease

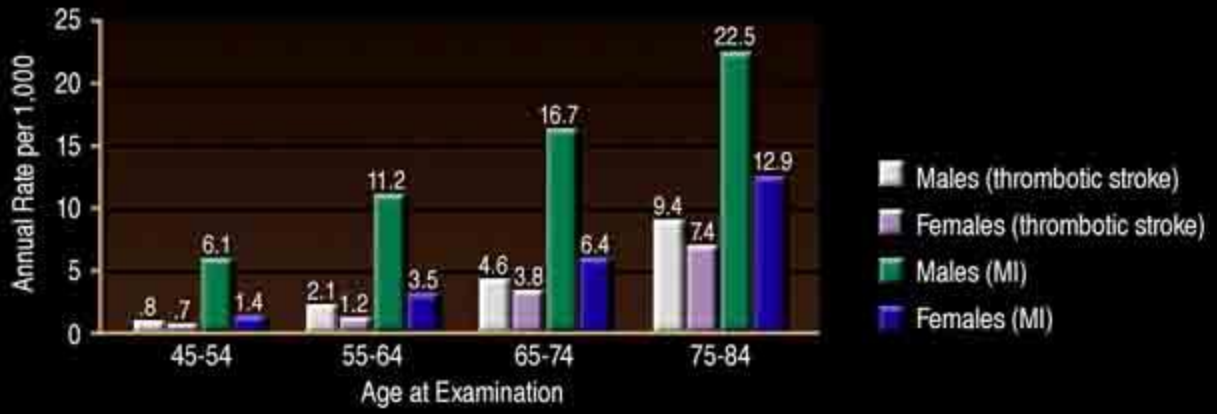
Source: Rosenberg HM, et al. Births and deaths: United States, 1995. *Monthly Vital Statistics Report.* 1996;45(3), Suppl 2.



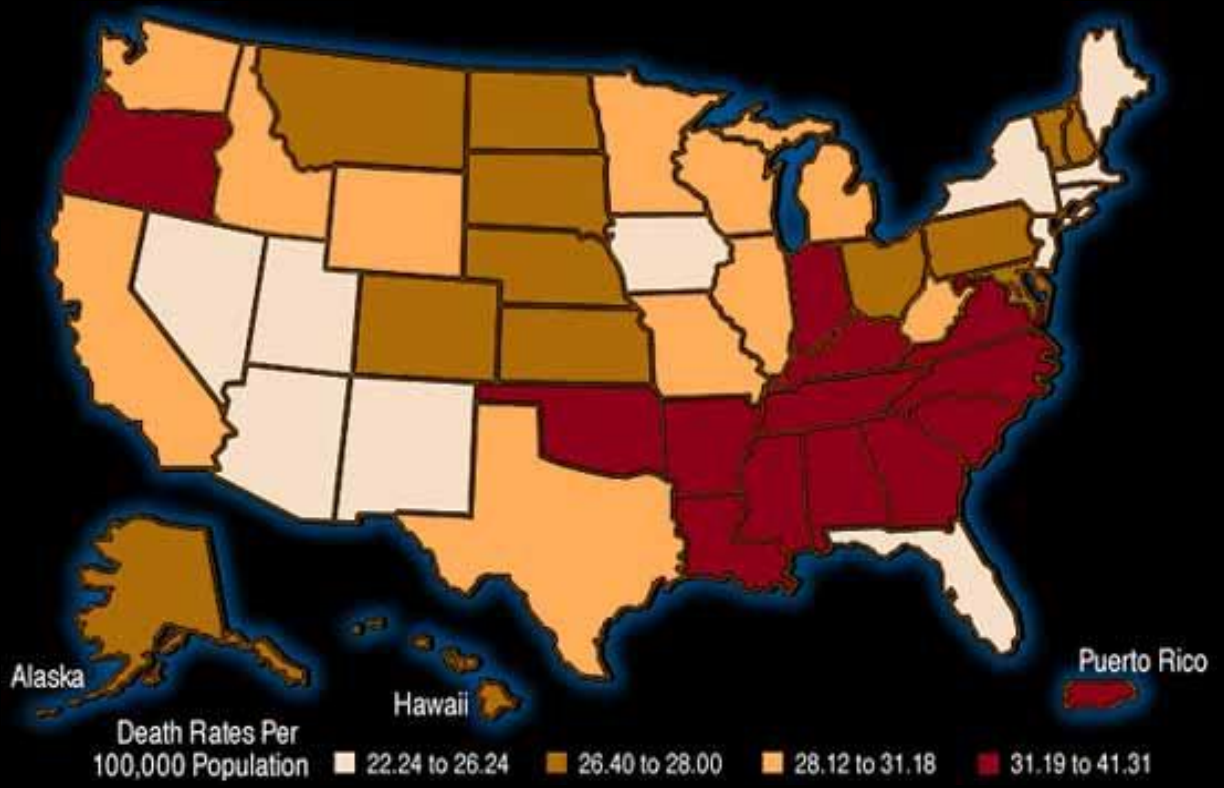
Source: Adapted from Gardner P, Hudson BL. Advance report of final mortality statistics, 1993. *Monthly Vital Statistics Report.* 1996;44 (7, suppl):1-83.

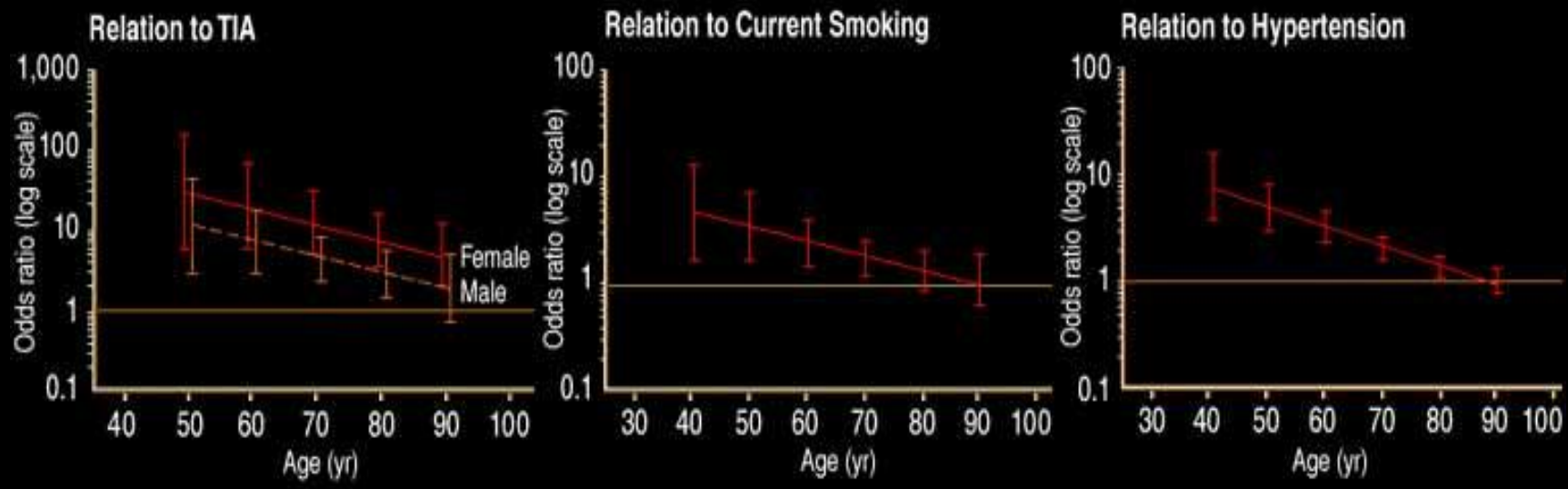


Source: Adapted from Gardner P, Hudson BL. Advance report of final mortality statistics, 1993. *Monthly Vital Statistics Report.* 1996;44 (7, suppl):1-83.

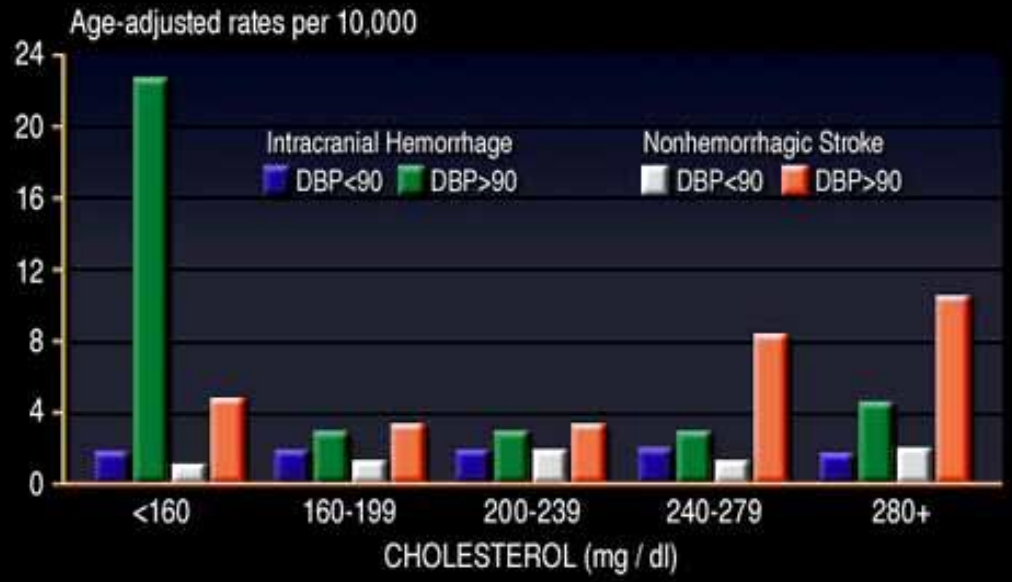


Source: Adapted from Wolf PA, et al. Epidemiology of stroke. In: Barnett HJM, et al (eds). *Stroke. Pathophysiology, Diagnosis and Management.* New York, Churchill-Livingstone, 1992.


Alaska
Hawaii
Puerto Rico
Death Rates Per
100,000 Population
22.24 to 26.24
26.40 to 28.00
28.12 to 31.18
31.19 to 41.31



Source: Adapted from Whisnant JP, et al. *Neurology*. 1996;47:1420-1428.



Sources: Iso H, et al. *N Engl J Med* 1989;320:904. Wolf PA, et al. In: Barnett HJM, et al (eds). *Stroke. Pathophysiology, Diagnosis and Management*. New York, Churchill Livingstone, 1992.

Series	Atherothrombosis (%)	Embolism (%)	Lacune (%)	Hematoma (%)	*SAH
Harvard Stroke Registry (1978)	50	23	11	8	7
Michael Reese Stroke Registry (1983)	41.5	11	N/A	N/A	N/A
Stroke Data Bank (1988)	20	13	13	3	1
Lausanne Stroke Registry (1988)	29	30	14	6	N/A
University of California, San Diego, Stroke Registry (1993)	23	12	12	N/A	N/A

Numbers represent percentage of each stroke type preceded by transient ischemic attack.

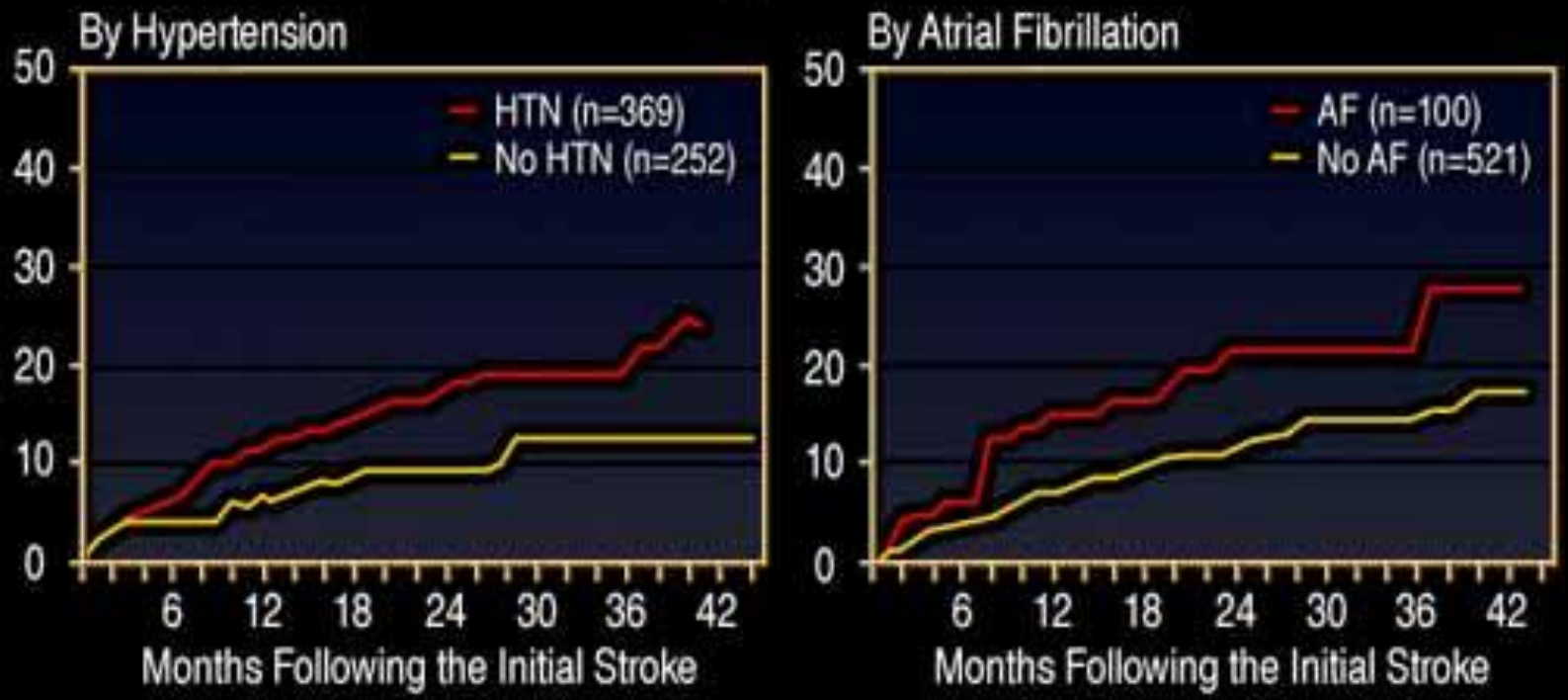
*SAH indicates subarachnoid hemorrhage.

Source: Adapted from Feinberg WM, et al, for the Ad Hoc Committee on Guidelines for the Management of Transient Ischemic Attacks of the Stroke Council of the American Heart Association. *Stroke*. 1994;25:1320-35.

Time Post-TIA	Risk of Stroke (%)
1 Month	4 - 8
1 Year	12 - 13
5 Years	24 - 29

Source: Adapted from Feinberg WM, et al. *Stroke.* 1994;25:1320.

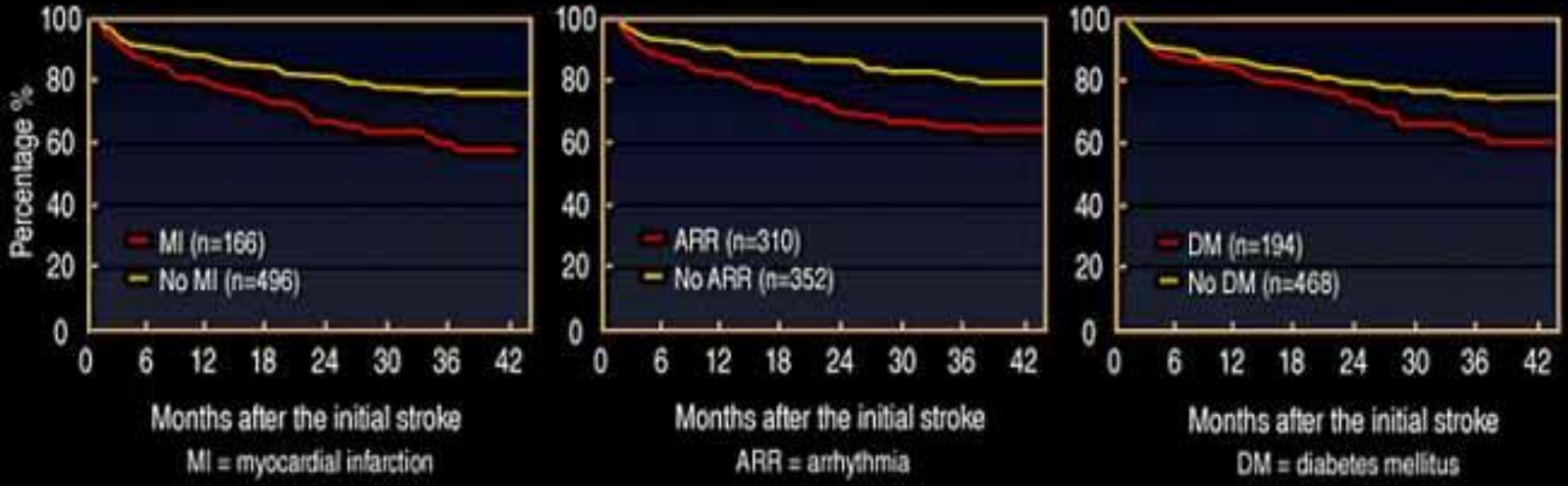
Kaplan-Meier Estimates of Cumulative Risk of Second Stroke in the Lehigh Valley (Pa) Stroke Cohort (N = 621)



Source: Lai et al. *Stroke*. 1994;25:958-962.

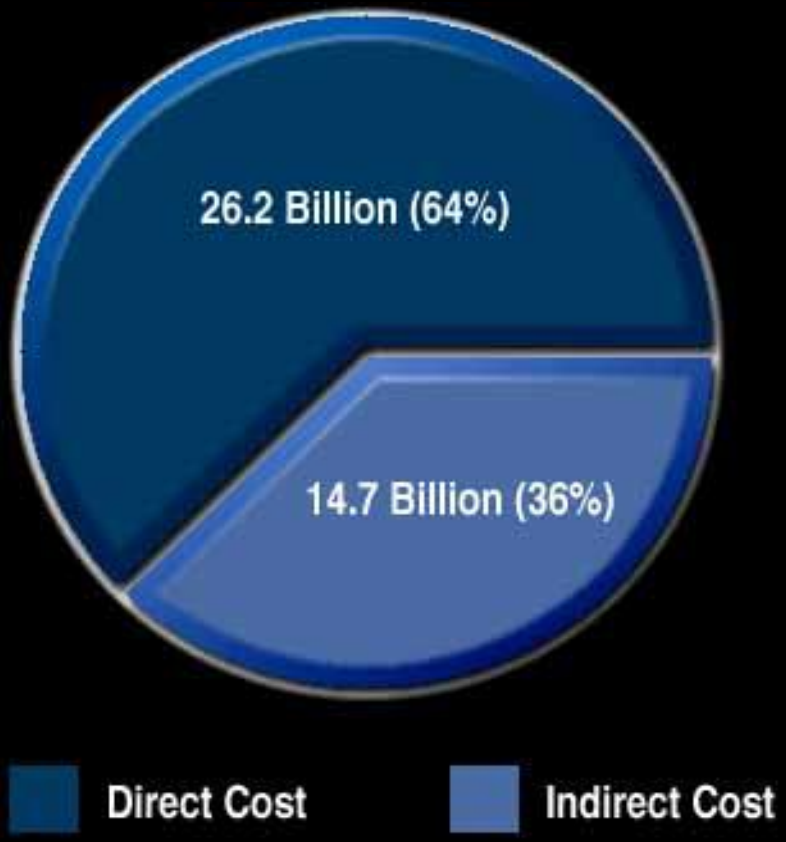
Age Group (years)	No. With Strokes	Strokes With Atrial Fibrillation (%)
30 - 39	4	0.0
40 - 49	11	0.0
50 - 59	89	6.7
60 - 69	161	8.1
70 - 79	150	21.3
80 - 89	47	36.2
Total	462	14.7

Source: Wolf PA, et al. In: Barnett HJM, et al (eds). *Stroke. Pathophysiology, Diagnosis and Management.* New York, Churchill Livingstone, 1992. Wolf PA, et al. *Arch Intern Med.* 1987;147:1561.

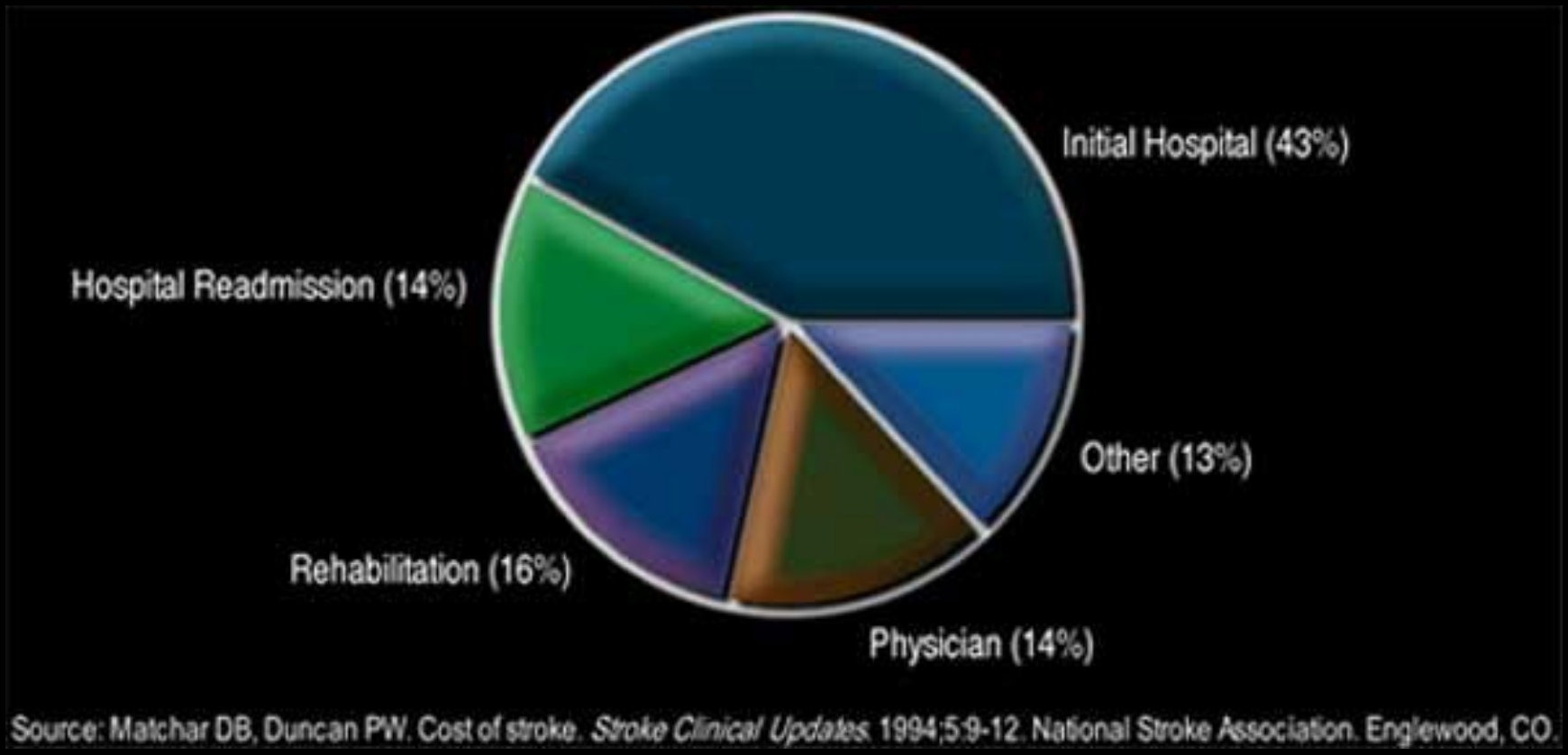


Source: Lai SM, et al. *Stroke*. 1995;26:2011-5.

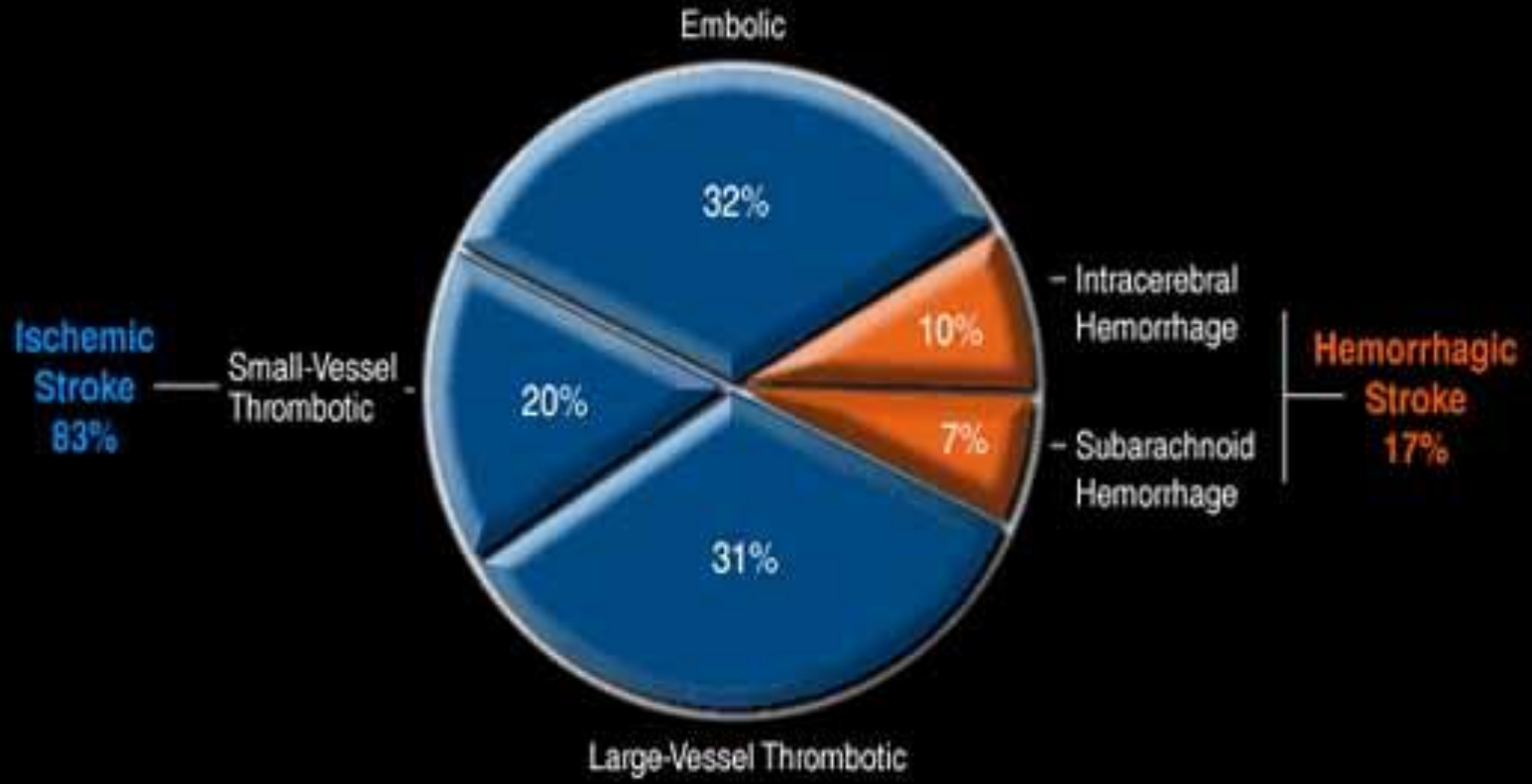
Estimated Direct and Indirect Cost of Stroke, 1997



Source: Adapted from American Heart Association, 1997 Heart and Stroke Statistical Update.



Source: Matchar DB, Duncan PW. Cost of stroke. *Stroke Clinical Updates* 1994;5:9-12. National Stroke Association. Englewood, CO.



Source: Adapted from *Stroke/Brain Attack Reporter's Handbook*. Englewood, Colo: National Stroke Association, 1997.

Study	Period	Overall	Thombotic	Embolic	Intracerebral hemorrhage	Subarachnoid hemorrhage	Unspecified
30 - Day Survival							
Rochester[1]	1955-69	72 %	81 % (combined)*		16 %	48 %	N/A
Framingham[2]	1971-81	72 %	81 % **	73 %	36 % (combined)		67 %
Oxfordshire[3]	1981-86	81 %	90 % (combined)*		50 %	54 %	23 %
1 - Year Survival							
Oxfordshire[3]	1981-86	69 %	77 %		38 %	52 %	16 %

* Referred to as cerebral infarction. ** Referred to as atherothrombotic brain infarction.

Sources: [1]Matsumoto N, et al. *Stroke*. 1973;4:20. [2]Kelly-Hayes M, et al. *Arch Phys Med Rehab*. 1988; 69:415. [3]Bamford J, et al. *J Neurol Neurosurg Psychiatry*. 1990;53:16.

Age-Adjusted Relative Odds of 2-Year Death After Stroke: 1990 vs 1980

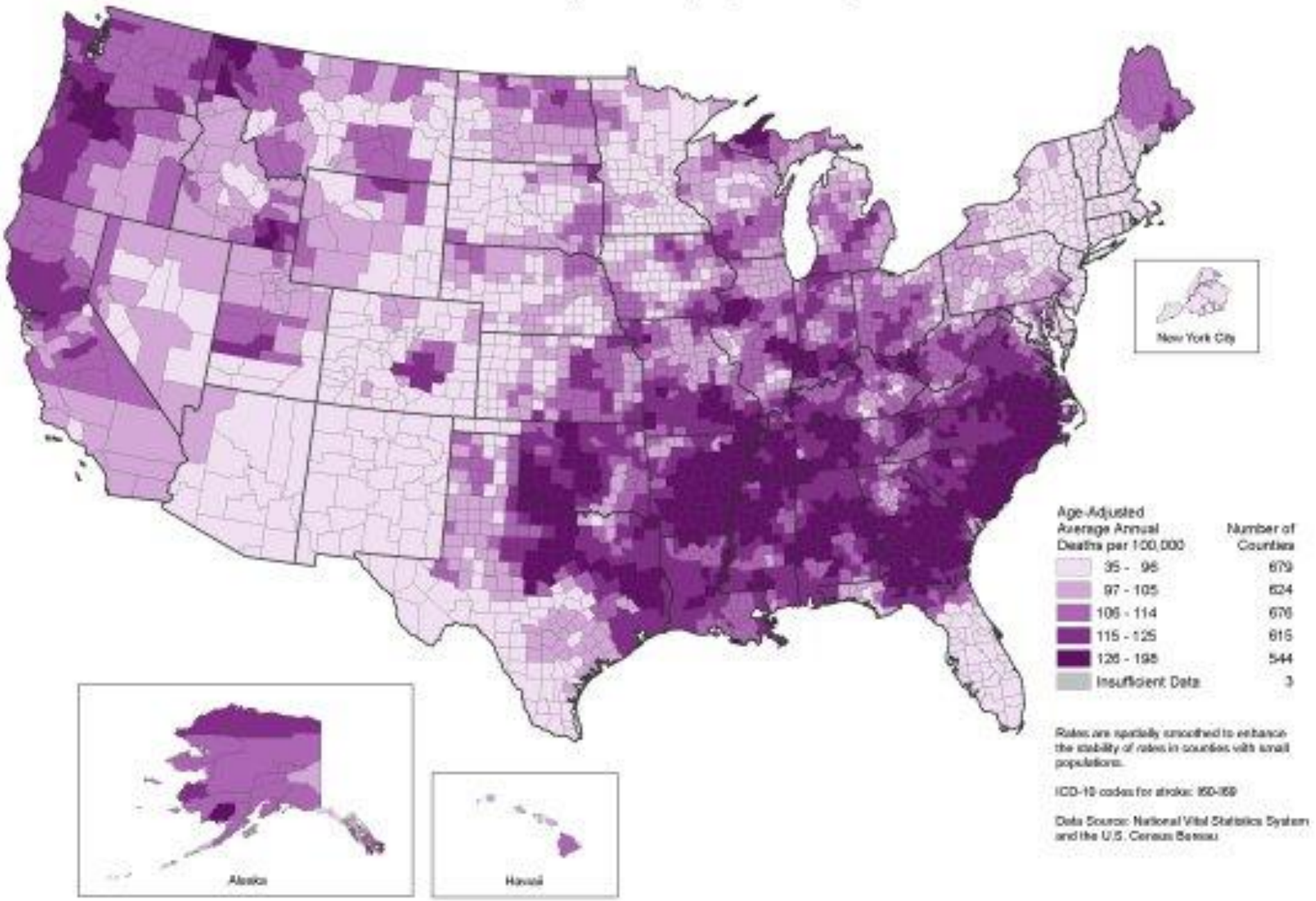
	Thrombotic	Possibly Embolic	Hemorrhagic	Undetermined Type
All Patients (Male and Female)	0.42 (0.25 - 0.70)	0.78 (0.41 - 1.49)	1.01 (0.44 - 2.31)	0.42 (0.16 - 1.14)

Source: Adapted from Shahar E, et al. *Stroke*. 1995;26:1.

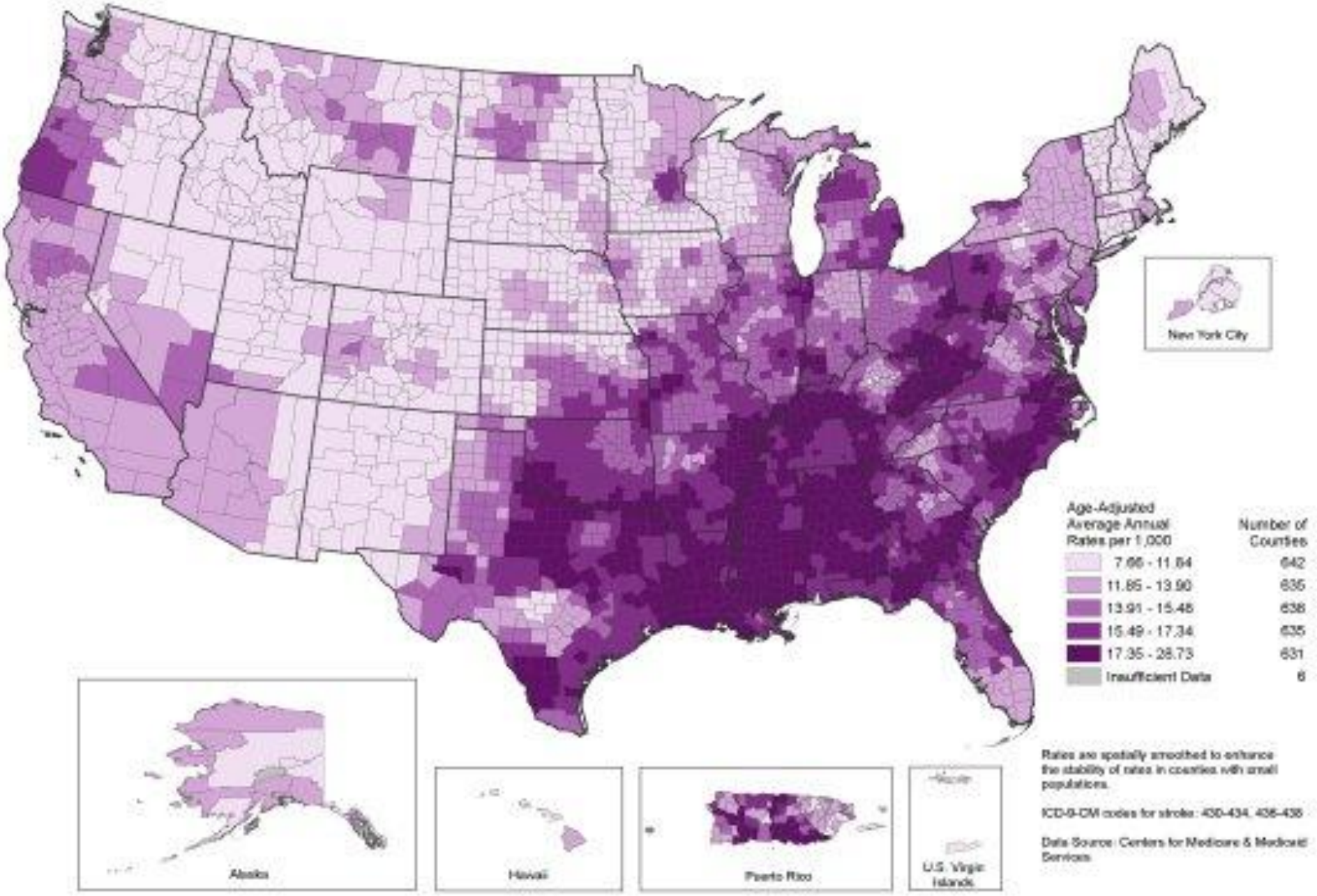
Study	Period	Months of Follow-up	% Survival After Lacunar Infarction
Rochester [1]	1960-84	12	97
		60	75
Oxfordshire [2]	1981-84	1	99
		12	90
Brainin et al [3]	1988-89	12	89
Clavier et al [4]	1985-91	24	90
		48	80
		60	75
Salgado et al [5]	1990-93	12	95
		24	92
		60	86

Sources: [1]Sacco SE, et al. *Stroke*. 1991;22:1246. [2]Bamford J, et al. *Stroke*. 1987;18:545. [3]Brainin M, et al. *Neuroepidemiology*. 1992;11:190. [4]Clavier I, et al. *Stroke*. 1994;25:2005. [5]Salgado AV, et al. *Stroke*. 1996;27:661.

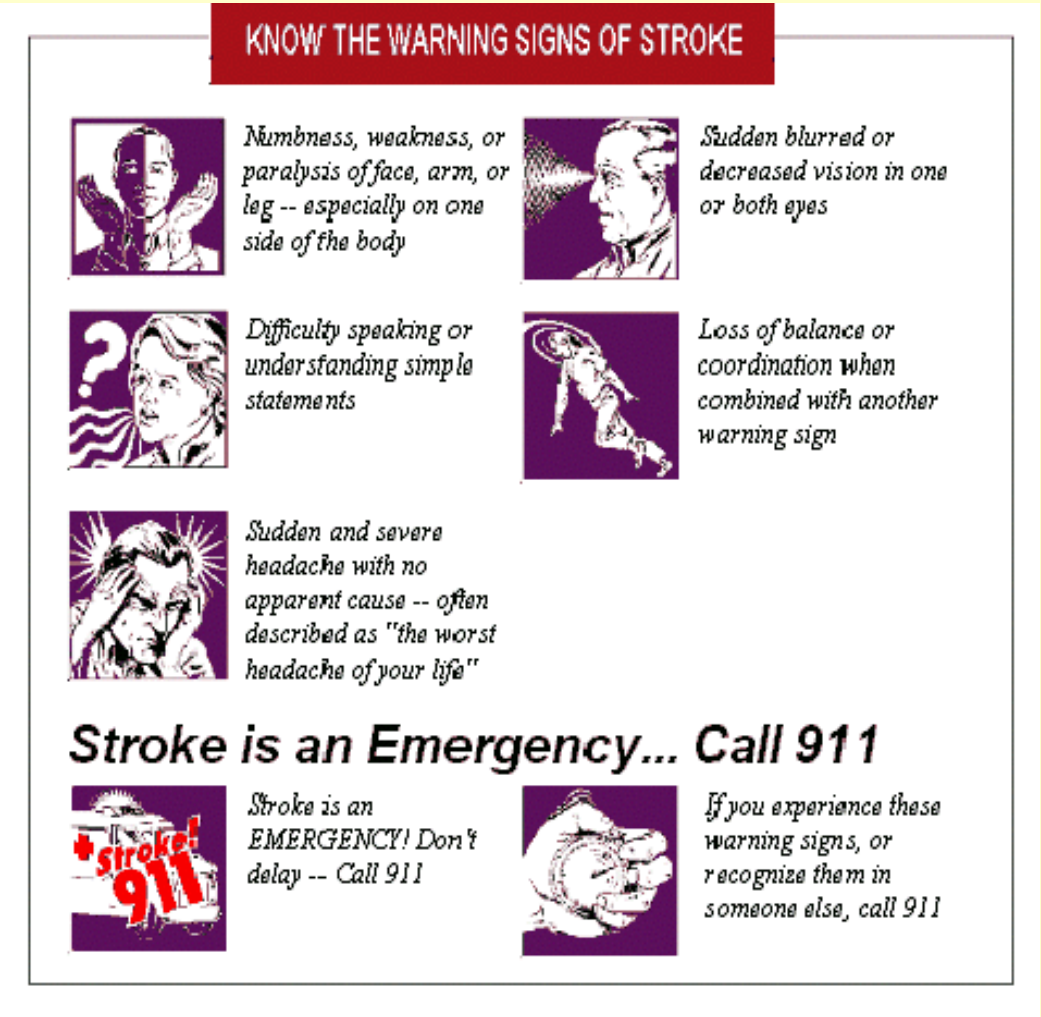
Stroke Death Rates, 2000-2006
Adults Ages 35+, by County



Stroke Hospitalization Rates Among Medicare Beneficiaries, 2000-2006
Adults Ages 65+, by County



Warning signs of stroke



Warning Signs of Stroke

1. **Sudden weakness, paralysis, or numbness of the face, arm and the leg on one or both sides of the body**
2. **Loss of speech, or difficulty speaking or understanding speech**
3. **Dimness or loss of vision, particularly in only one eye**
4. **Unexplained dizziness (especially when associated with other neurologic symptoms), unsteadiness, or sudden falls**
5. **Sudden severe headache and/or loss of consciousness**

Risk Factors for Stroke That Cannot Be Changed

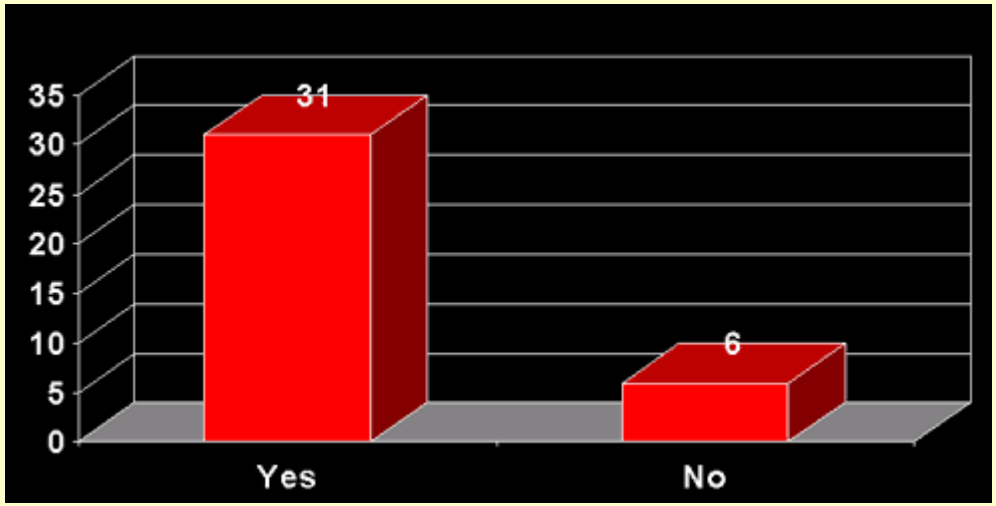
- Increased age
- Being male
- Race (e.g., African-Americans)
- Diabetes mellitus
- Prior stroke/transient ischemic attacks (TIA)
- Family history of stroke
- Asymptomatic carotid bruit

Source: American Heart Association. Heart and Stroke Facts. 1996

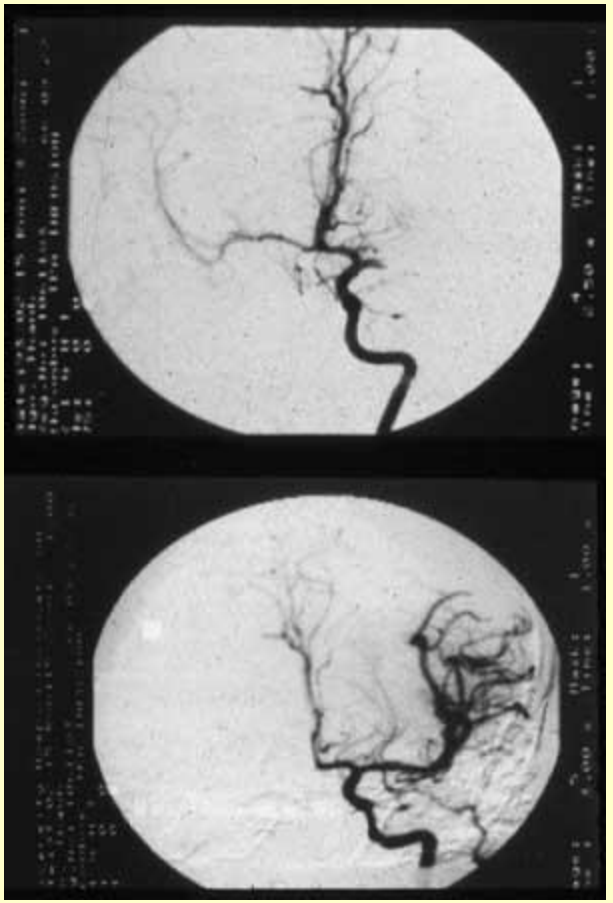
Less Well Documented (perhaps partly modifiable)

- Geography/climate
- Socieconomic factors

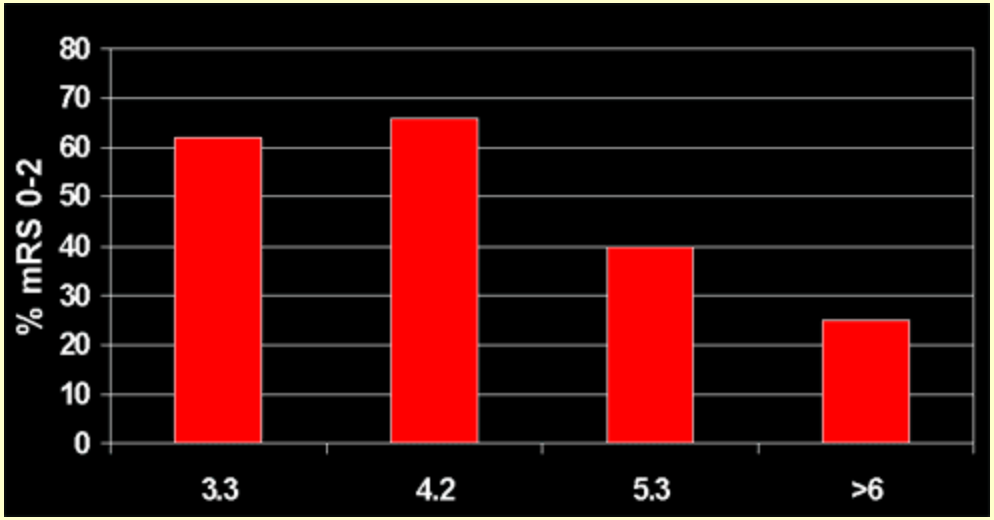
- Source: American Heart Association. Heart and Stroke Facts. 1996


35
30
25
20
15
10
5
0
31
6
Yes
No

Intra-arterial Thrombolysis

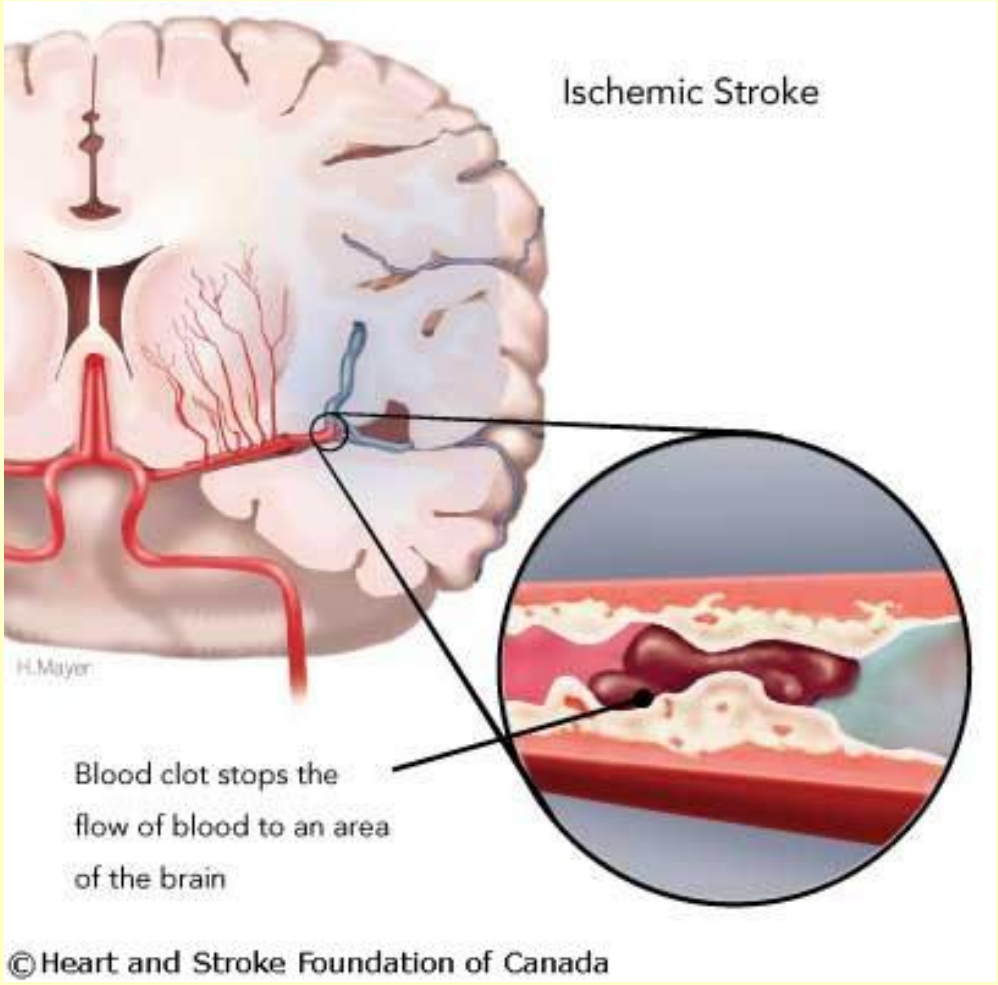


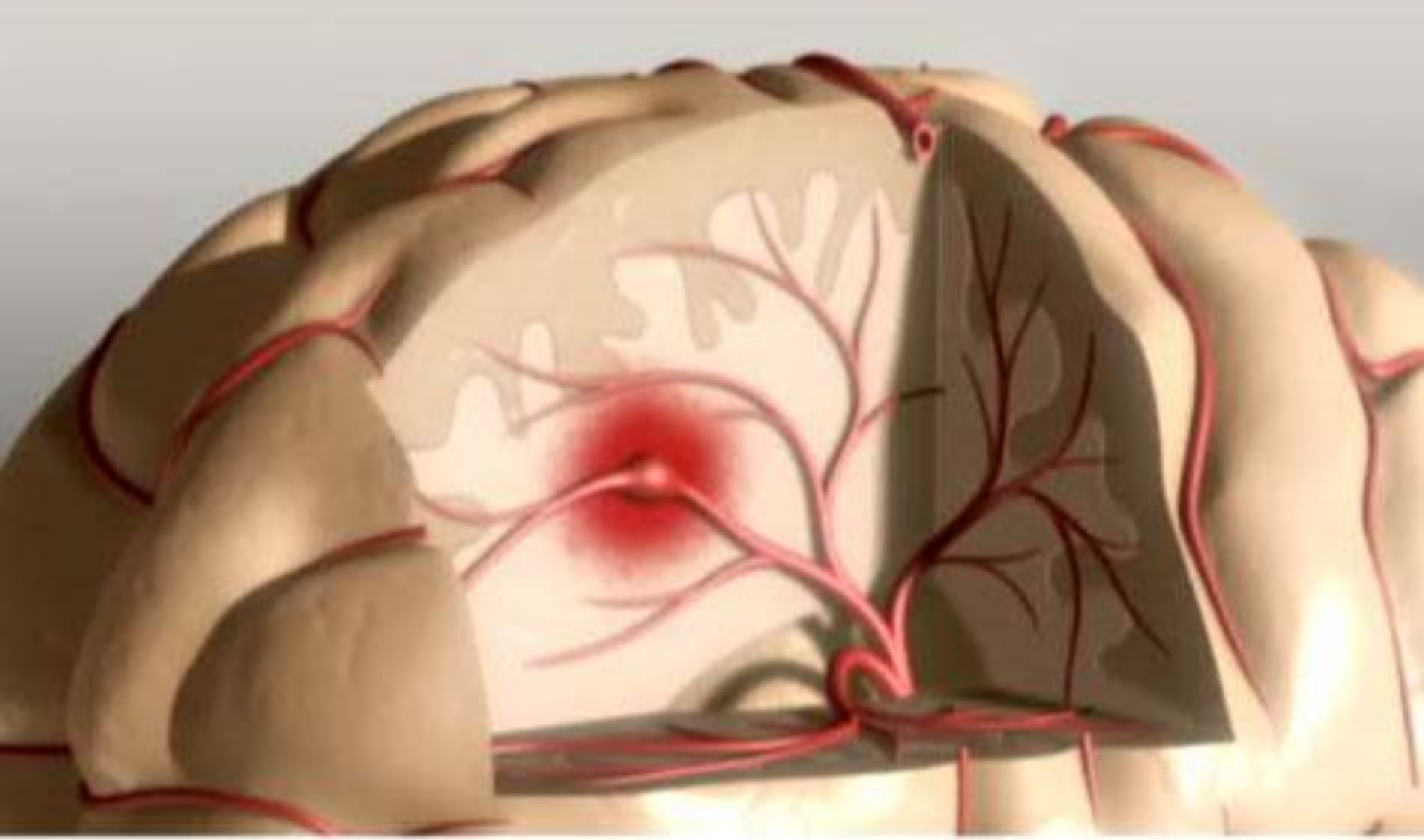
Intra-arterial Thrombolytic Efficacy vs. Time of Delivery



Hemorrhagic stroke

Ischemic stroke



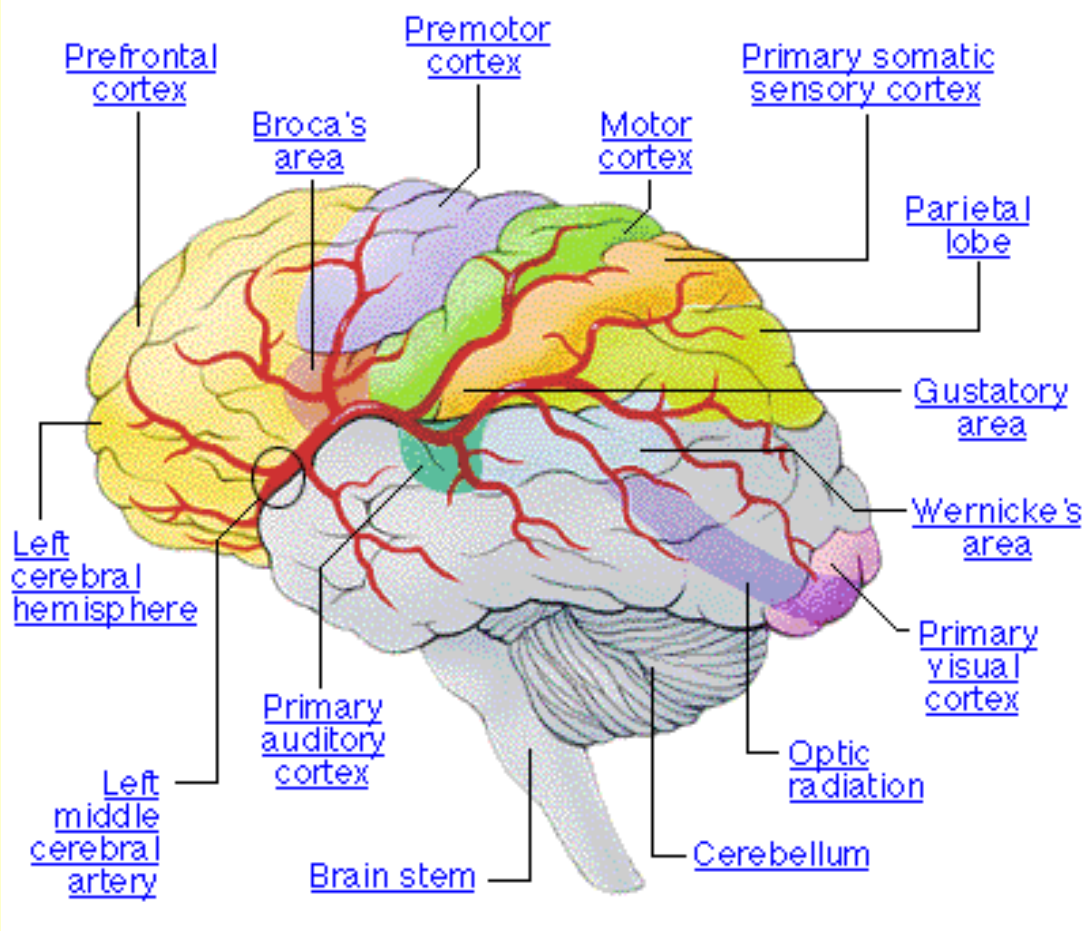


HealthiNation

What Happens During a Hemorrhagic Stroke?

Acute middle cerebral artery (MCA) stroke

Brain


Prefrontal cortex
Premotor cortex
Primary somatic sensory cortex
Broca's area
Motor cortex
Parietal lobe
Gustatory area
Wernicke's area
Left cerebral hemisphere
Primary visual cortex
Primary auditory cortex
Optic radiation
Left middle cerebral artery
Cerebellum
Brain stem

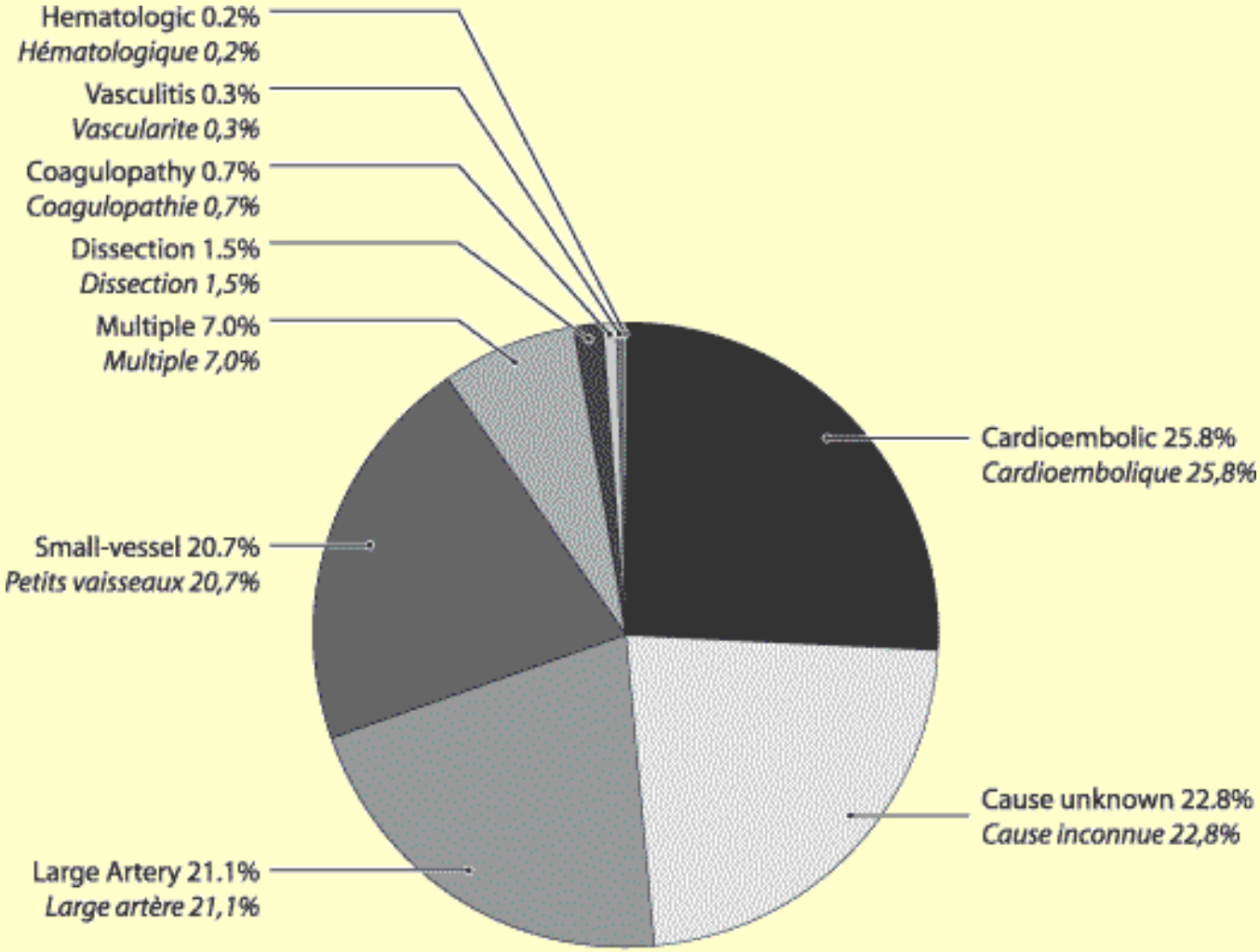
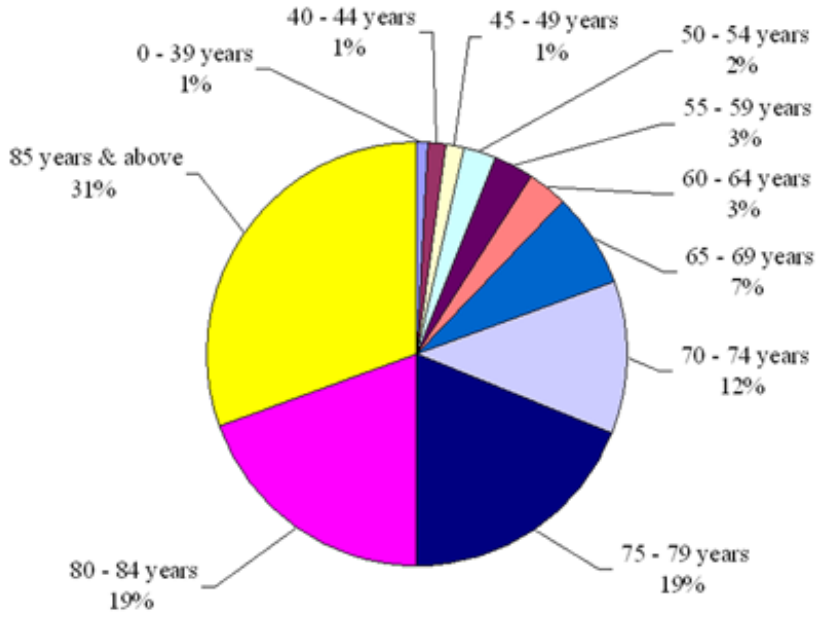


Figure 4. Subtypes of ischemic stroke.
Figure 4. Sous-types d'accidents ischémiques cérébraux.

Percentage of Cerebrovascular Diseases Death by Age Group, 2006

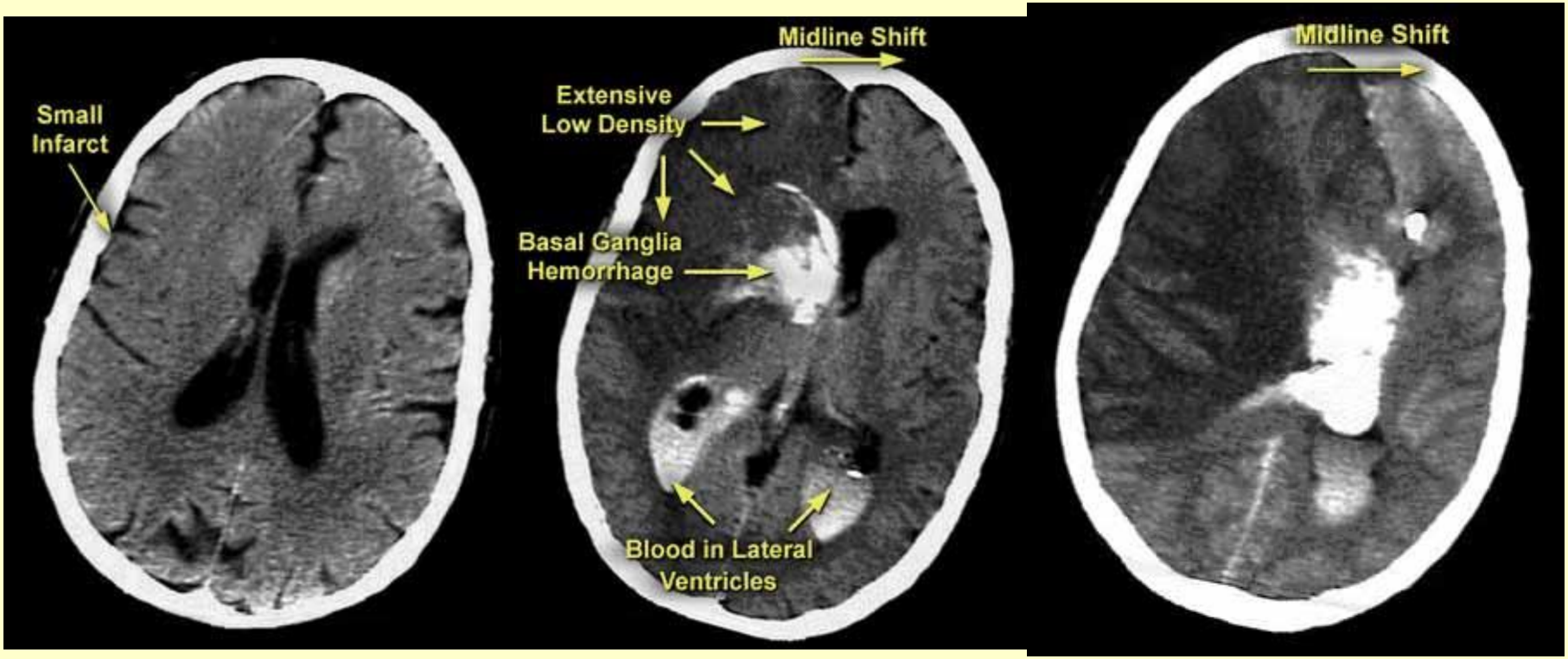


Note(s): Percentage may not add up to 100% due to rounding.

Stroke diagnosis

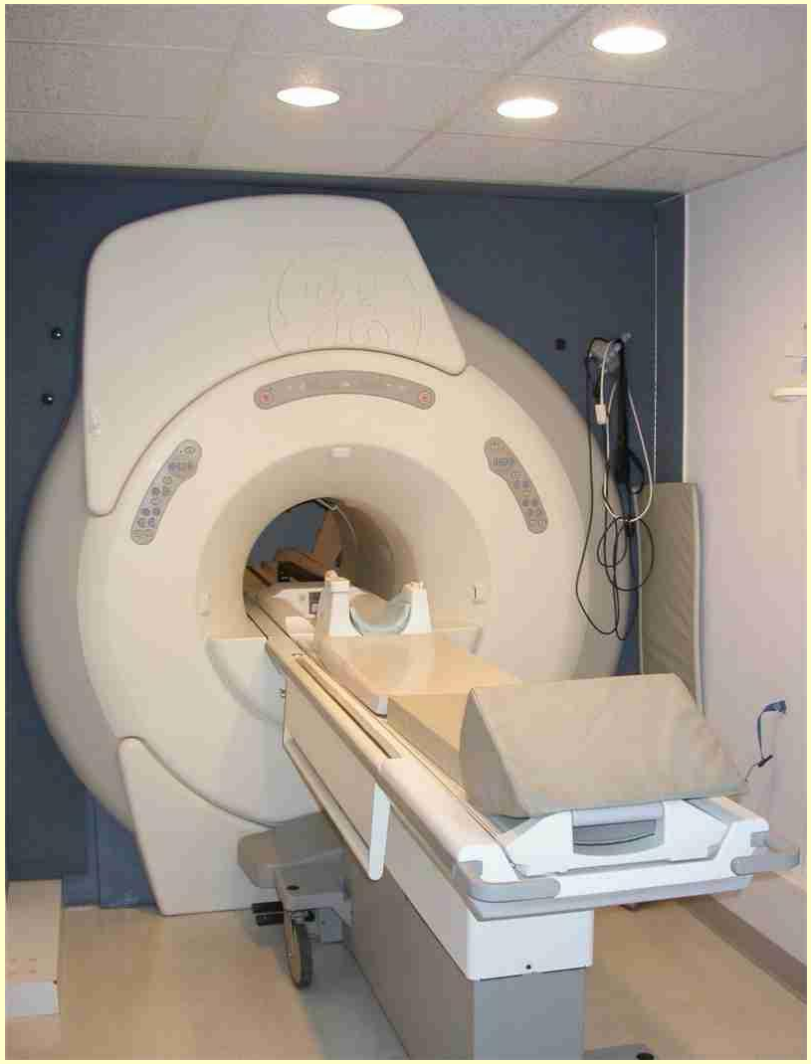
Stroke

Hemorrhagic Conversion




R
R
L
L

MRI

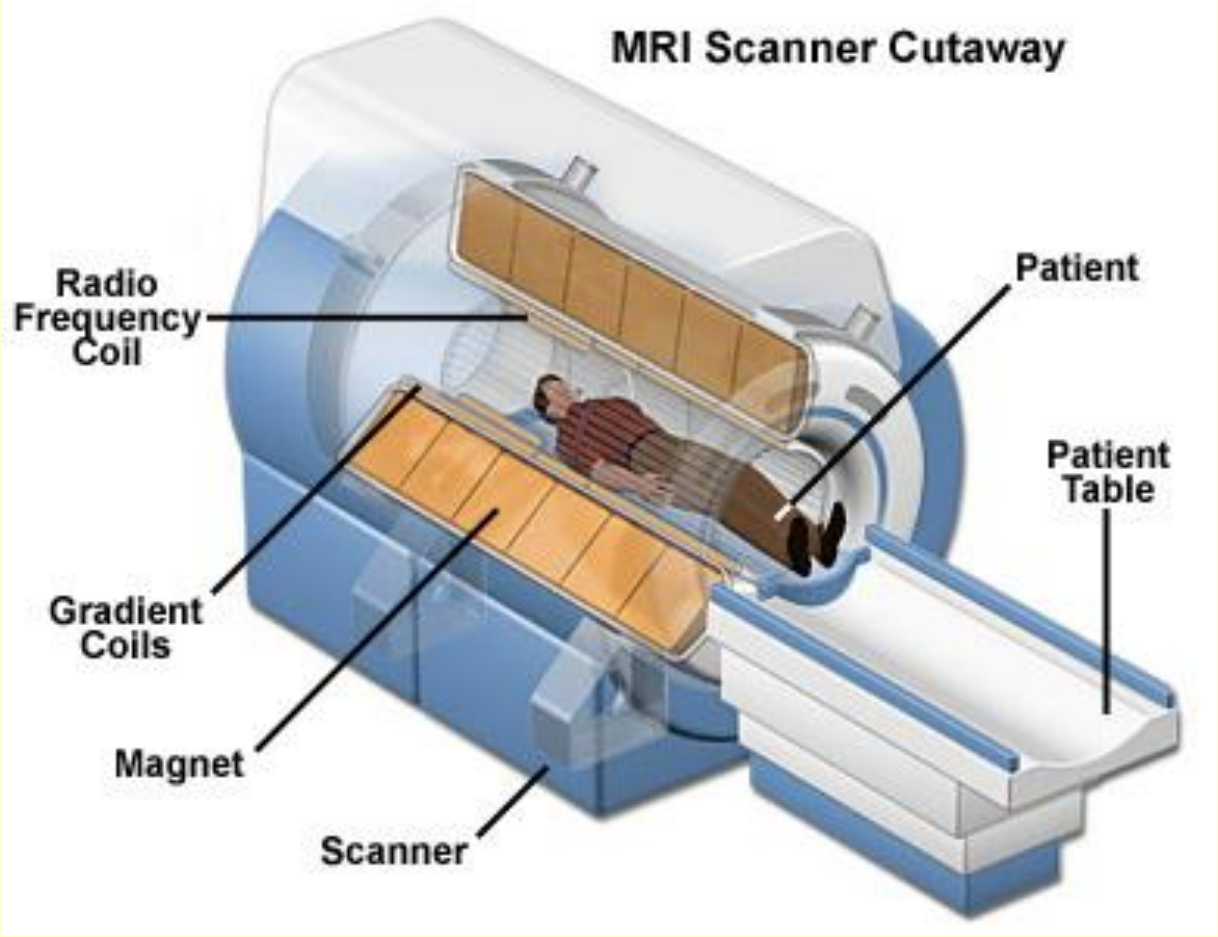


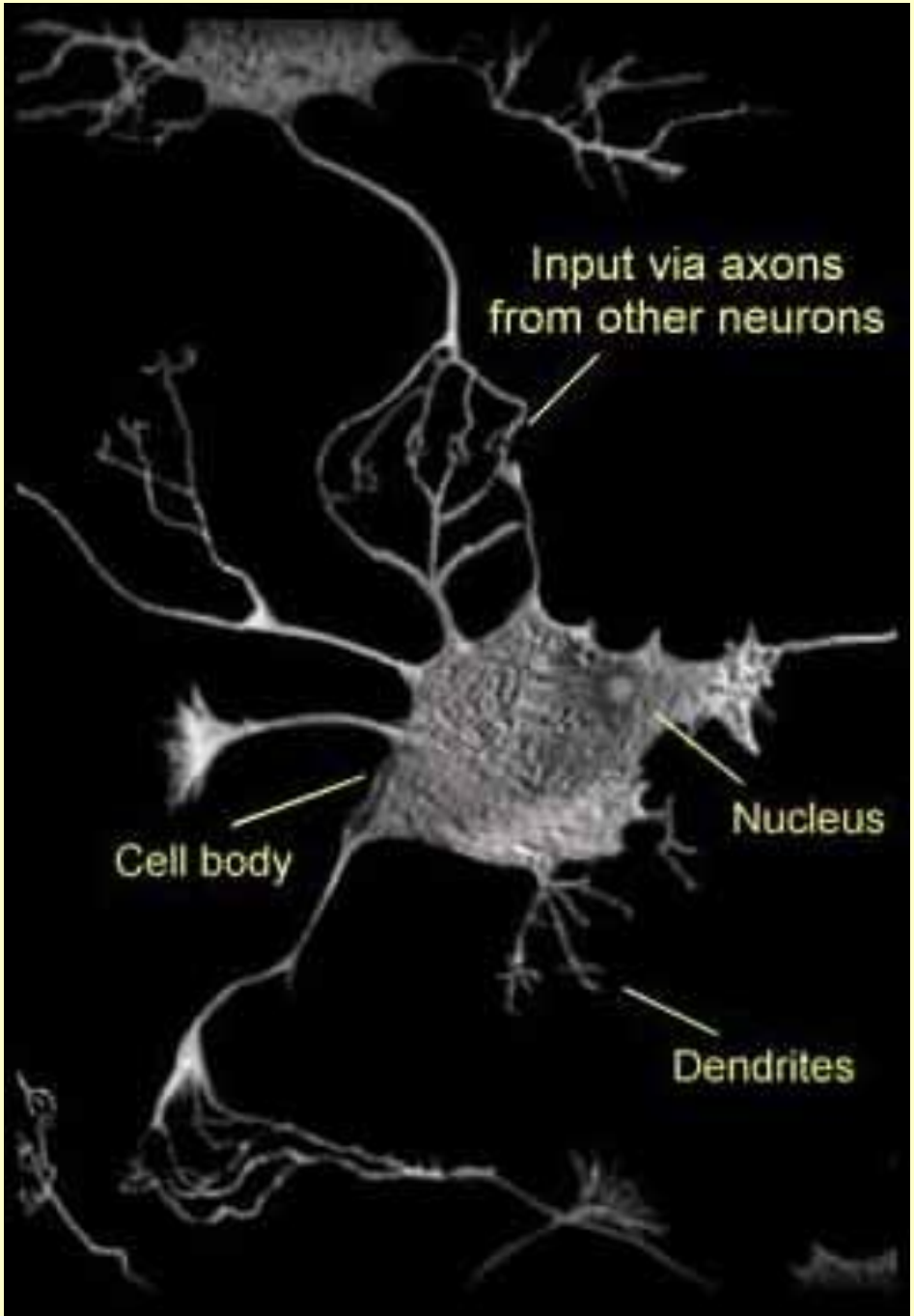
MRI

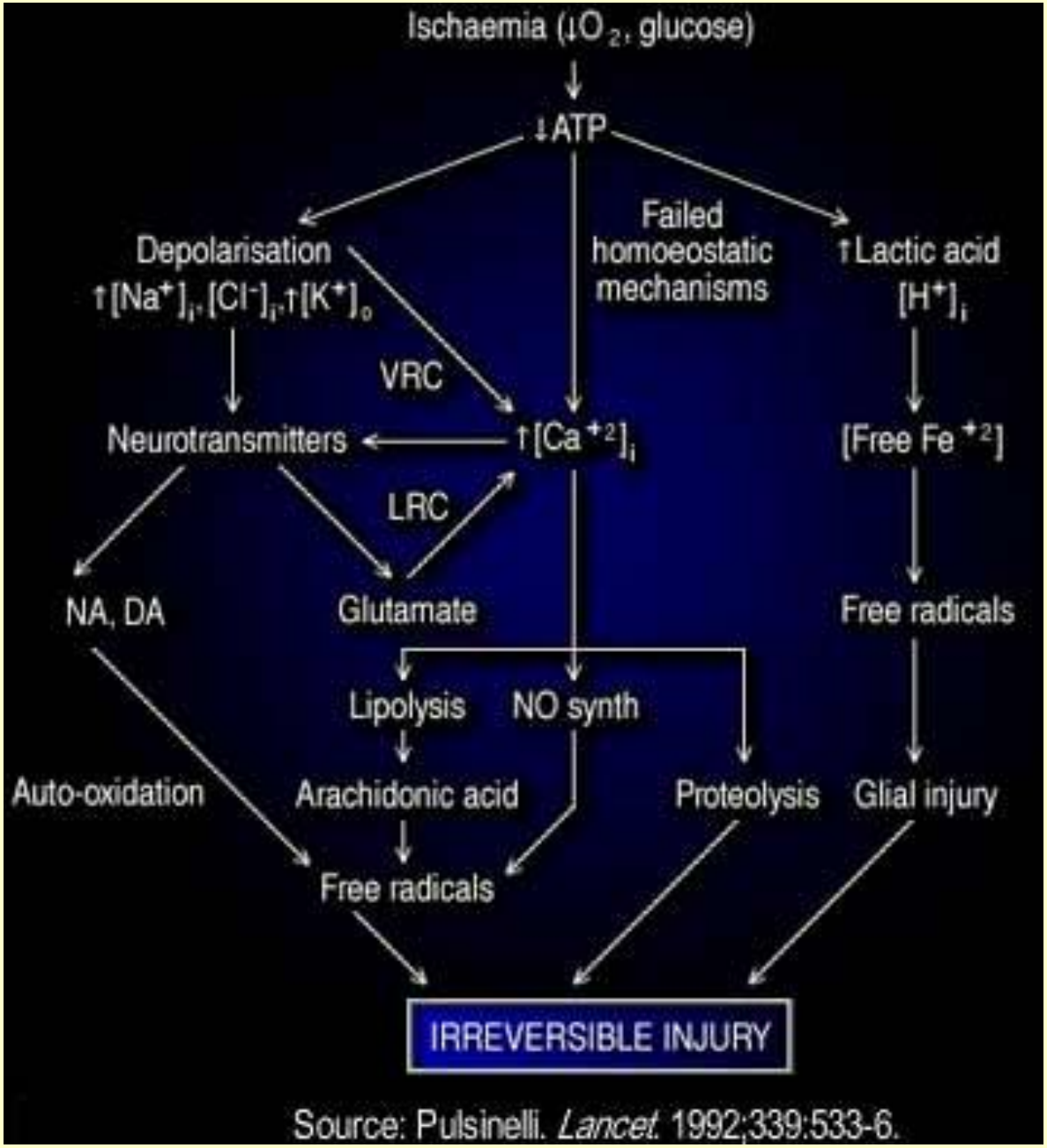
Spiral CT

CT

MRI

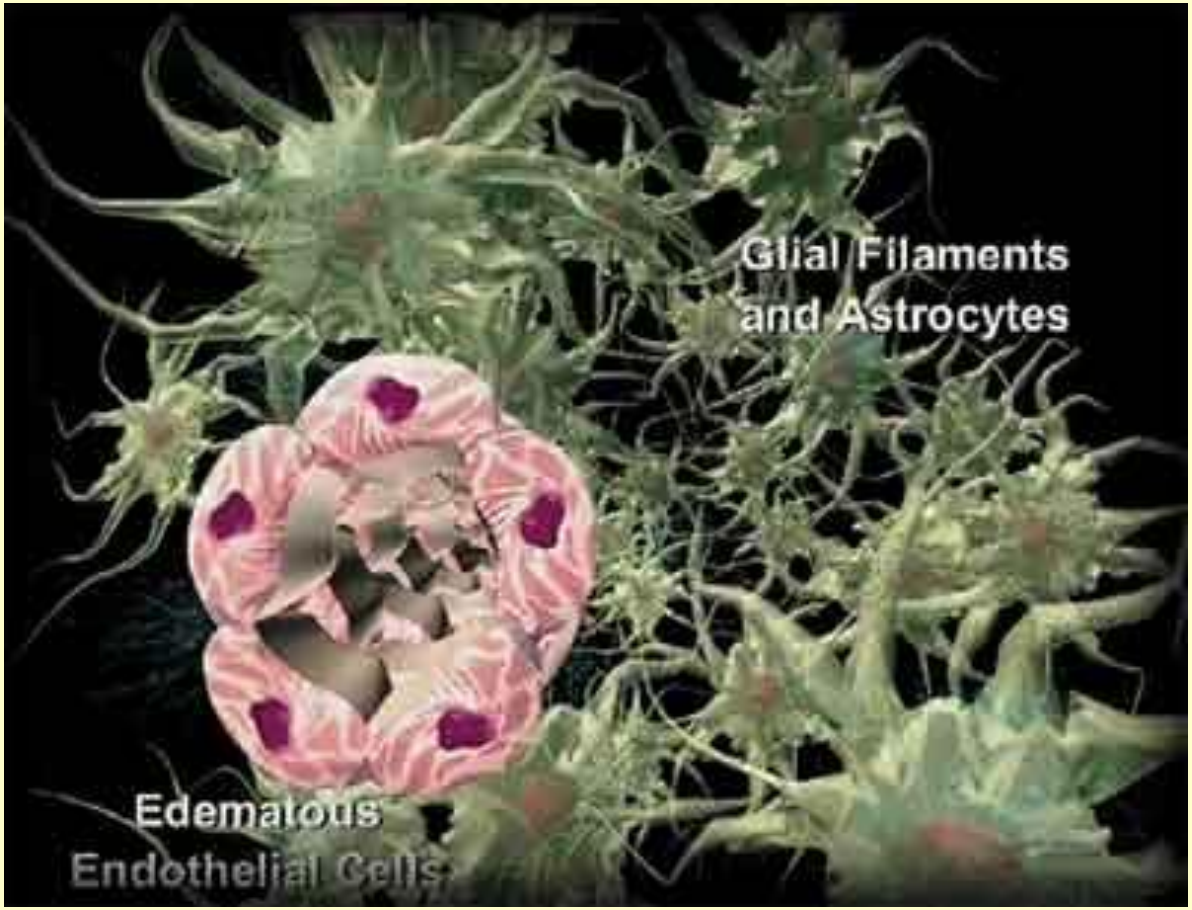

MRI Scanner Cutaway
Radio Frequency Coil
Patient
Patient Table
Gradient Coils
Magnet
Scanner


Input via axons
from other neurons
Nucleus
Cell body
Dendrites

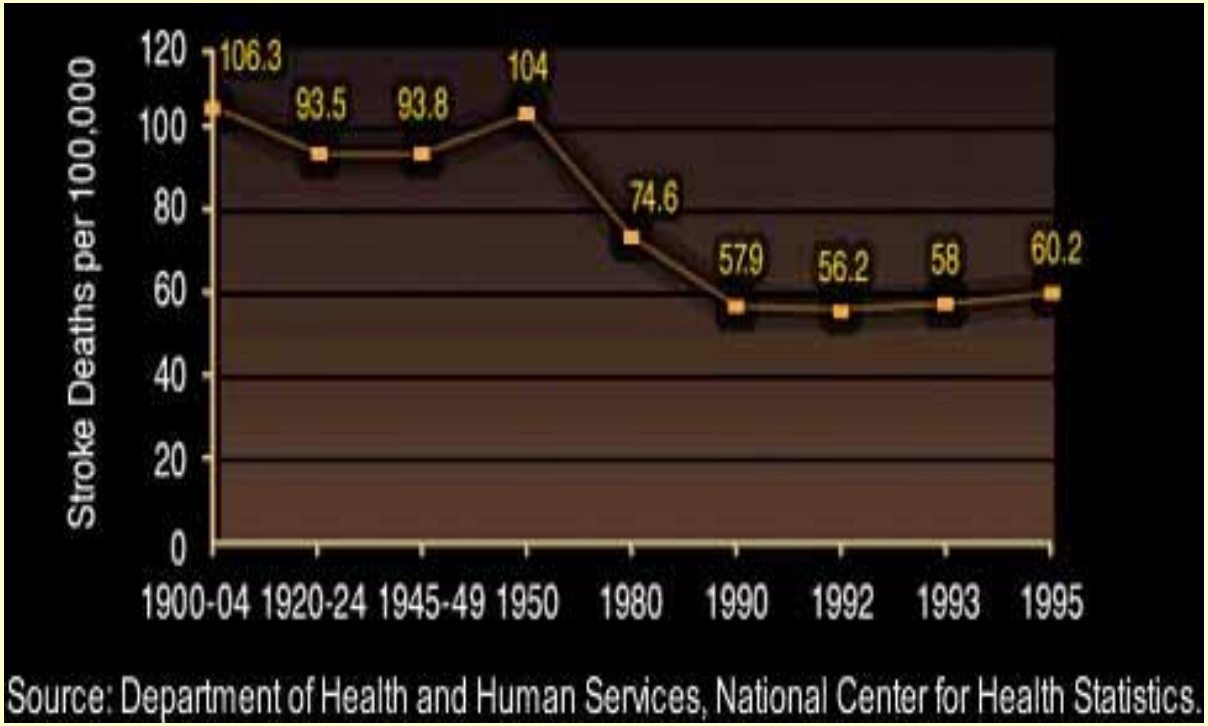


Source: Pulsinelli. *Lancet.* 1992;339:533-6.

Cellular Injury During Ischemia
Edema Formation



stroke mortality rate (stroke deaths per 100,000 population) in the United States



Stroke

YU Qi MD

TCM Etiology and Pathogenesis

1. Unconsolidated channels with invasion of exterior wind
2. Improper diet
3. Emotional stress
4. Prolonged exhaustion

1.Unconsolidated channels with invasion of exterior wind

1. The protective qi is unsolidated → exterior pathogenic invasion →
2. The exterior wind trigger pre-existing phlegm hidden internally → obstruct channels

2. Improper diet

- Could → impair spleen →generate phlegm → cover the heart orifice & obstruct channels

3. Emotional stress

- Excessive emotional stimulations → heart fire explosively flares up & hyperactive liver yang generate liver wind upward → Qi & blood rush to the brain

4. Prolonged exhaustion

- Being exhausted → liver & kidney Yin deficiency → liver Yang raising → Qi, blood & phlegm upward with liver Yang → obstruct channels or cover orifices

Daignosis

1. Channel involvement or organ involvement
2. Closed disorder or abandon disorder
3. Prognosis
4. Wind stroke or wind-like stroke
5. Differential diagnosis

1. Channel involvement or organ involvement

1. Channel involvement: Do not loss of consciousness
2. Organ involvement: Loss of consciousness

2. Closed disorder or abandon disorder

1. Closed disorder: locked jaws, clenched fist. Rigid limbs, fecal and urinary retention, forcefully pulse
2. Abandon disorder: Flaccidity of muscles, fecal and urinary incontinence, profuse sweating, minute weak pulse

Treatment of stroke

Channel involvement:

Exterior wind invading into the unconsolidated channels

- **Da Qin Jiao Tang**
- Qin Jiao, Fang Feng, Bai Zhi, Xi Xin, Qiang Huo and Du Huo---
- Shu Di Huang, Dang Gui, Shao Yao and Chuan Xiong---
- Bai zhu and Fu Ling---

Wind-Yang disturbing upwards with liver and kidney Yin deficiency

- **Zhen Gan Xi Feng Tang**
- Gui Ban, Bai Shao, Xuan Shen and Tian Men Dong---
- Long Gu, Mu Li and Dai Zhe Shi---
- Niu Xi---

Organ involvement:

Heat-type of closed disorder

- **Zhi Bao Dan or An Gong Niu Huang Wan** and **Ling Jiao Gou Teng Tang (tube feeding)**
- Ling Yang Jiao and Gou Teng---
- Sang Ye and Ju Hua---
- Sheng Di Huang and Bai Shao---
- Bei Mu and Zhu Ru---

Cold-type of closed disorder

- **Su He Xiang Wan and Di Tan Tang (tube feeding)**
- Ban Xia, Ju Hong, and Fu Ling---
- Zhu Ru---
- Shi Chang Pu and Dan Nan Xing---
- Zhi Shi---

Abandon disorder

- **Shen Fu Tang and Sheng Mai San**
- Ren Shen---.
- Fu Zi---
- Mai Men Dong---
- Wu Wei Zi---

Sequelae

Hemiplegia associated with Qi deficiency and blood stasis

- **Bu Yang Huan Wu Tang**
- Huang Qi---
- Tao Ren, Hong Hua, Dang Gui Wei, Chuan Xiong and Chi Shao---
- Di Long---

Bu Yang Huan Wu Tang

- **Chief---Huang Qi** (radix astragali membranacei) **120g**
- **Deputy---Dang Gui** (radix angelicae sinensis) 6g
- **Assistant---Chuan Xiong** (radix ligustici chuanxiong) 3g
- **Assistant---Chi Shao** (radix paeoniae rubrae) 5g
- **Assistant---Tao Ren** (semen persicae) 3g
- **Assistant---Hong Hua** (flos carthami tinctorii) 3g
- **Assistant---Di Long** (lumbricus) 3g

Hemiplegia associated with Yin deficiency and Yang rising

- **Tian Ma Gou Teng Yin**
- Tian Ma, Gou Teng and Shi Jue Ming---
- Zhi Zi and Huang Qin---
- Yi Mu Cao---
- Niu Xi---
- Du Zhong and Sang Ji Sheng---

Dysphasia associated with wind-phlegm obstructing the channels

- **Jie Yu Dan**
- Tian Ma, Quan Xie, Dan Nan Xing and Fu Zi---
- Yuan Zhi and Shi Chang Pu---
- Qiang Huo---

Dysphasia associated with kidney essence deficiency

- **Di Huang Yin Zi**
- Shu Di Huang and Shan Zhu Yu---
- Rou Cong Rong and Ba Ji Tian---
- Mai Men Dong, Shi Hu and Wu Wei Zi---
- Shi Chang Pu, Yuan Zhi and Fu Ling---

Facial paralysis

- **Qian Zheng San**
- Bai Fu Zi---
- Jiang Can and Quan Xie---

Acupuncture treatment of stroke

- **Scalpe needles**: motor line, DU20, DU24, 3 temple needles…
- **Body needles**: GB20, LI4, LI11, SJ5, BA Xie, ST36, ST40, GB 34, LV5

Acupuncture treatment for Channel involvement

- GV20 Baihui,
- BL7 Tongtian,
- GV16 Fengfu

Supplementary points

- - **Paralysis of the upper limbs**. + LI l5 Jianyu; LI ll Quchi; TE 5 Waiguan;
- LI 4 Hegu
- - **Paralysis of the lower limbs**. + GB 30 Huantiao; ST 36 Zusanli; ST 41 Jiexi;
- GB34 Yanglingquan
- - **Facial paralysis**. + ST 4 Dicang; ST 6 Jiache; LI 4 Hegu; ST 44 Neiting

Acupuncture treatment for Organ involvement

Closed disorder:

- GV20 Baihui,
- GV26 Renzhong,
- ST40 Fenglong,
- LR3 Taichong,
- KI l Yongquan,
- 12 Jing-well points

Supplementary points

- - Locked jaws. + ST7 Xiaguan; ST6 Jiache; LI4 Hegu
- - Rigid tongue and aphasia. + GV15 Yarnen; CV23 Lianquan; HT5 Tongli

Abandon disorder

- Moxibustion:
- CV8 Shenque,
- CV6 Qihai,
- CV 4 Guanyuan

Personal clinical experience