

# EPILEPSY AND VASCULAR DISEASE

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# Stroke Facts

- Leading cause of serious long term disability
- USA: someone is having a stroke every 40 sec
- Stroke produces brain damage acutely and results in residual “structural change” as seen on imaging studies and under the microscope
- Structural damage is high risk factor for seizures and epilepsy

# KNOW THE SUDDEN SIGNS OF STROKE



**Stroke is a medical emergency.** Every minute counts when someone is having a stroke. Learn how to recognize the symptoms of stroke and what you can do to improve the chances for a successful recovery.

Join us for a special showing of the informative, upbeat video **Know Stroke: Know the Signs, Act in Time** produced by the National Institute of Neurological Disorders and Stroke.

**Date:**

**Location:**

**Time:**

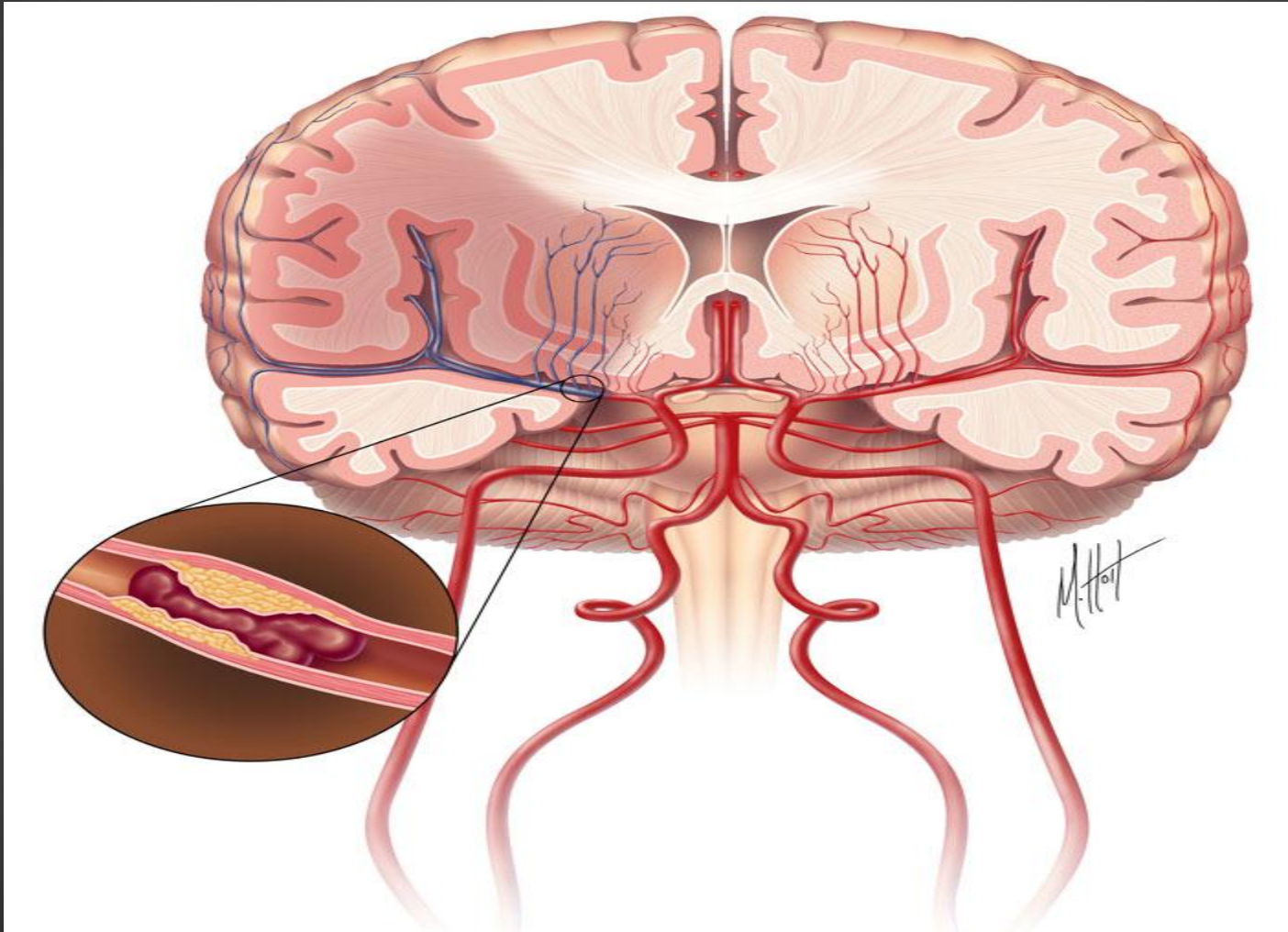
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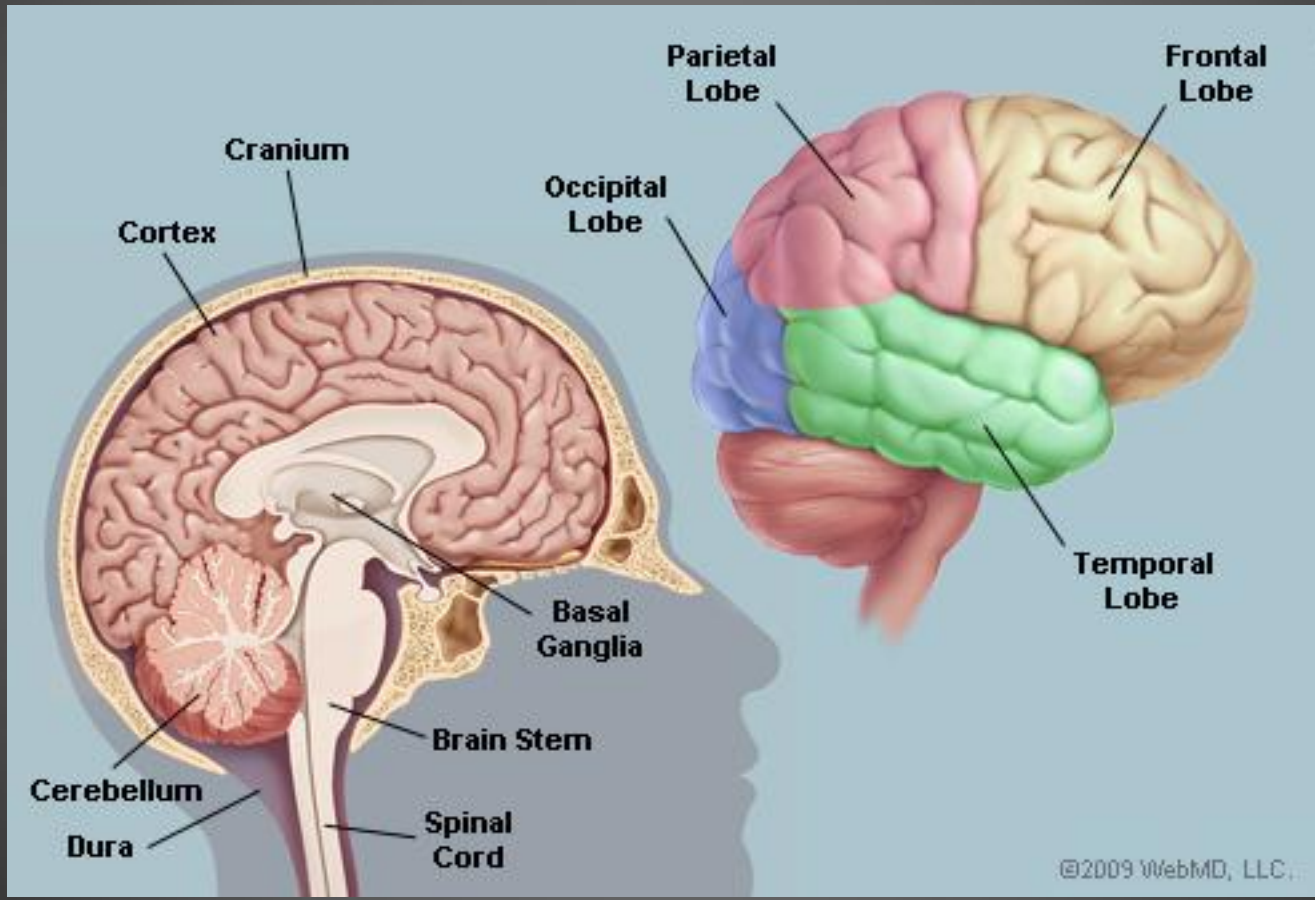


U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
National Institutes of Health  
National Institute of Neurological Disorders and Stroke

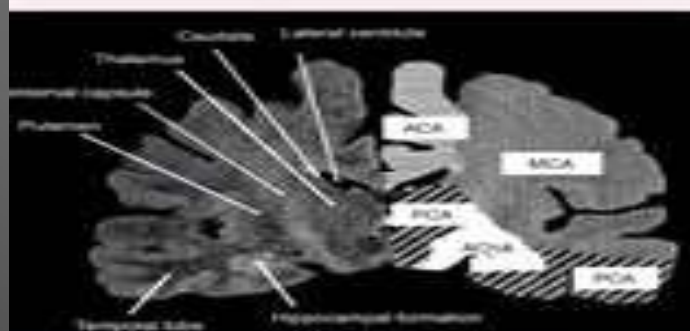
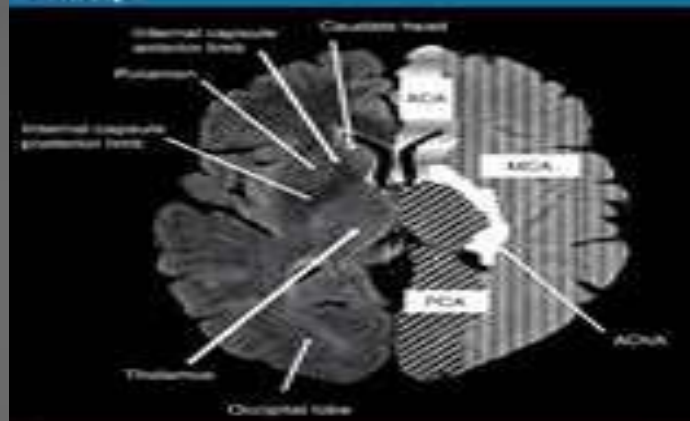
[www.stroke.ninds.nih.gov](http://www.stroke.ninds.nih.gov)  
1-800-352-9424







### Medbraspic



Source: Expert Plus Cardiovascular, Year: © 2000 Expert Reviews Ltd.

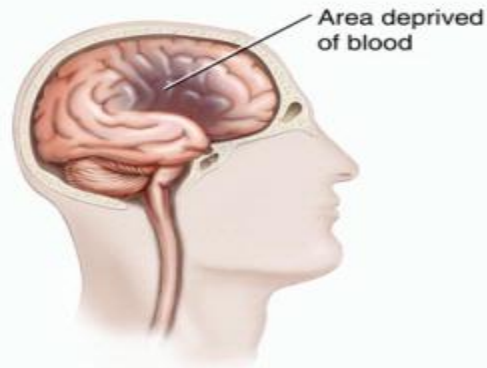
# Where do strokes occur in the brain?

**Table 5. Location of infarct on MR scan.**

	No.	%
Cortical	11	36.6
Lacunar	5	16.6
Brainstem	5	16.6
Basal ganglia	4	13.3
Cerebellar	2	6.6
Normal	2	6.6
Internal capsule	1	3.33

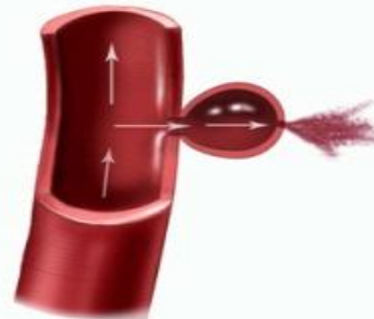
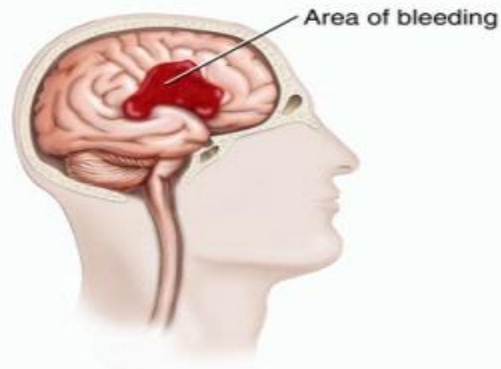
## Types of Stroke

### Ischemic Stroke



A thrombus or embolus blocks blood flow to part of the brain.

### Hemorrhagic Stroke



Blood spills out from break in blood vessel in brain.

# What kind of Strokes are there?

## Ischemic



Source: Rothrock JF, Hart RG. In: Colman RW, et al (eds). *Hemostasis and Thrombosis: Basic Principles and Clinical Practice, Third Edition*. Philadelphia, J.B. Lippincott Company, 1994:1438.

# Ischemic Stroke

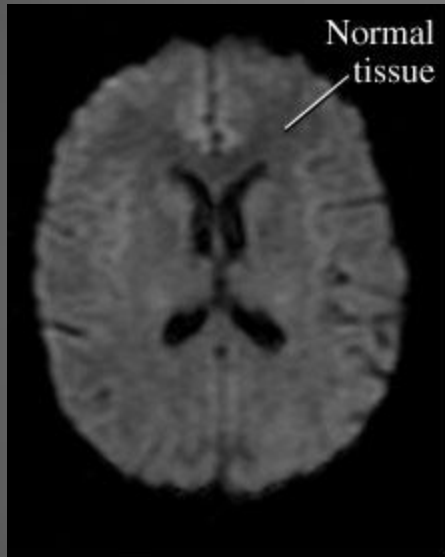


Figure 1

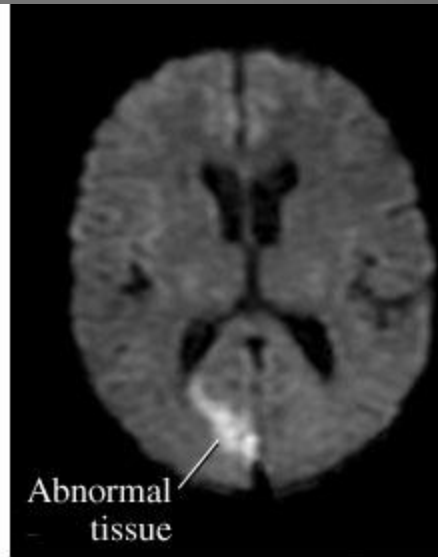


Figure 2

# Hemorrhage into the Brain

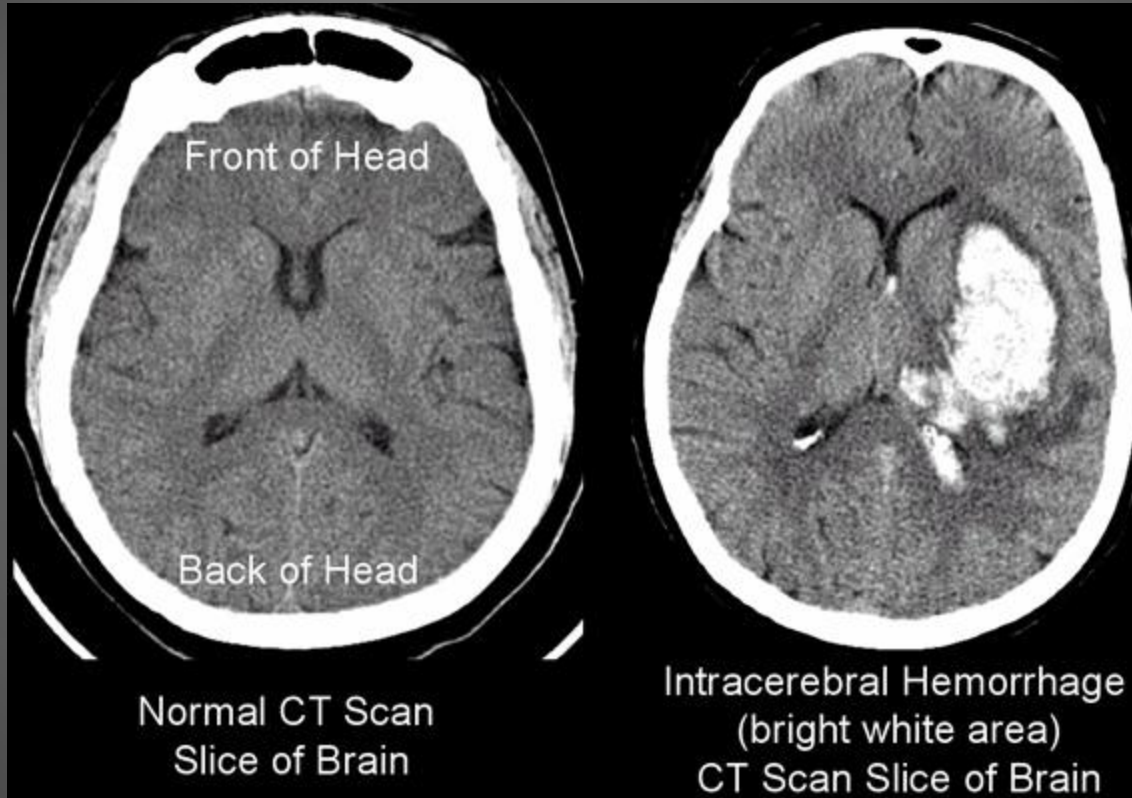
- Petechial or punctate hemorrhage
- Embolism with hemorrhage
- Ischemic with hemorrhage
- AVM/ aneurysm
- Trauma

Any blood into the brain increases the risk of seizure – effect of the iron molecule

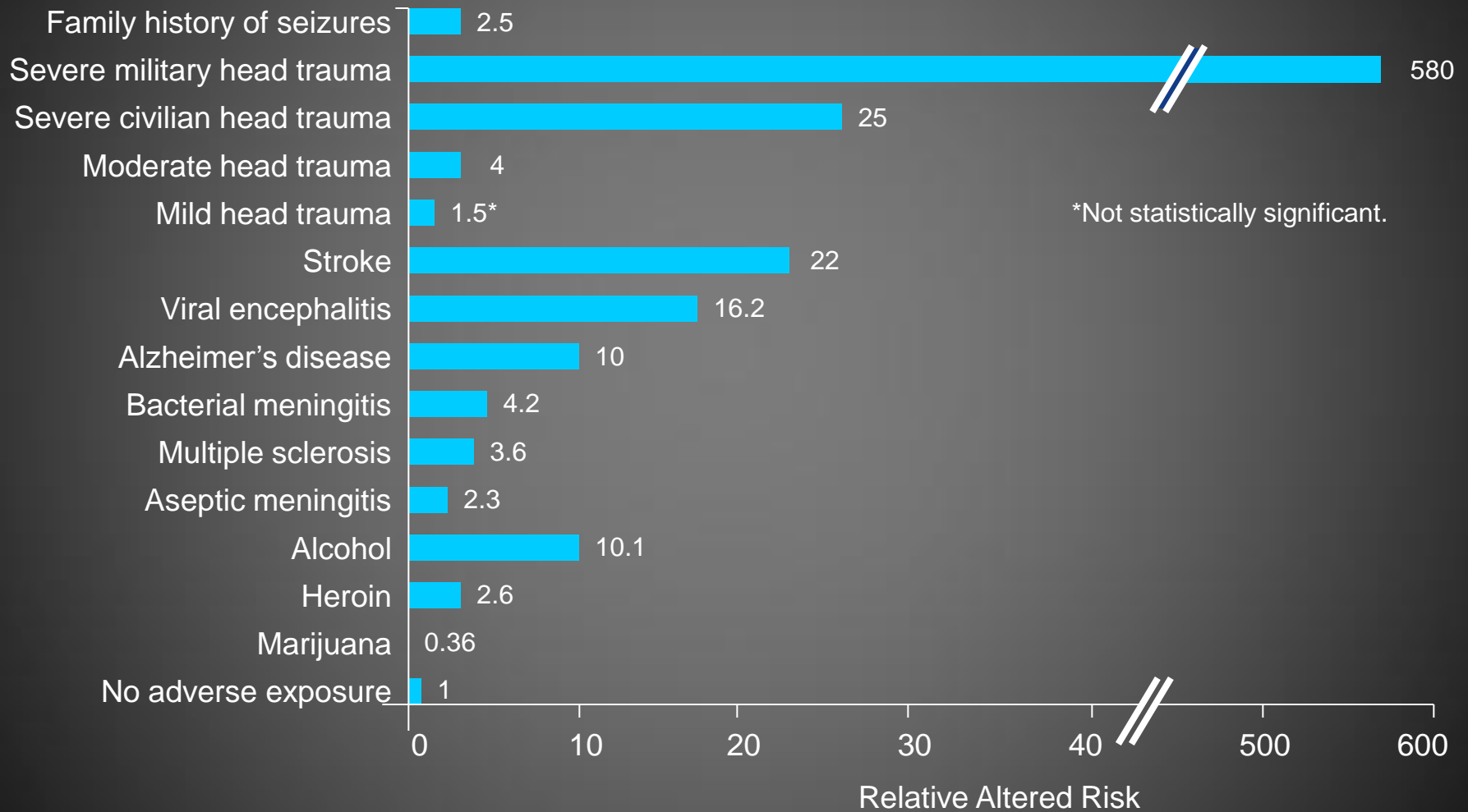
# Hemorrhage due to Hypertension



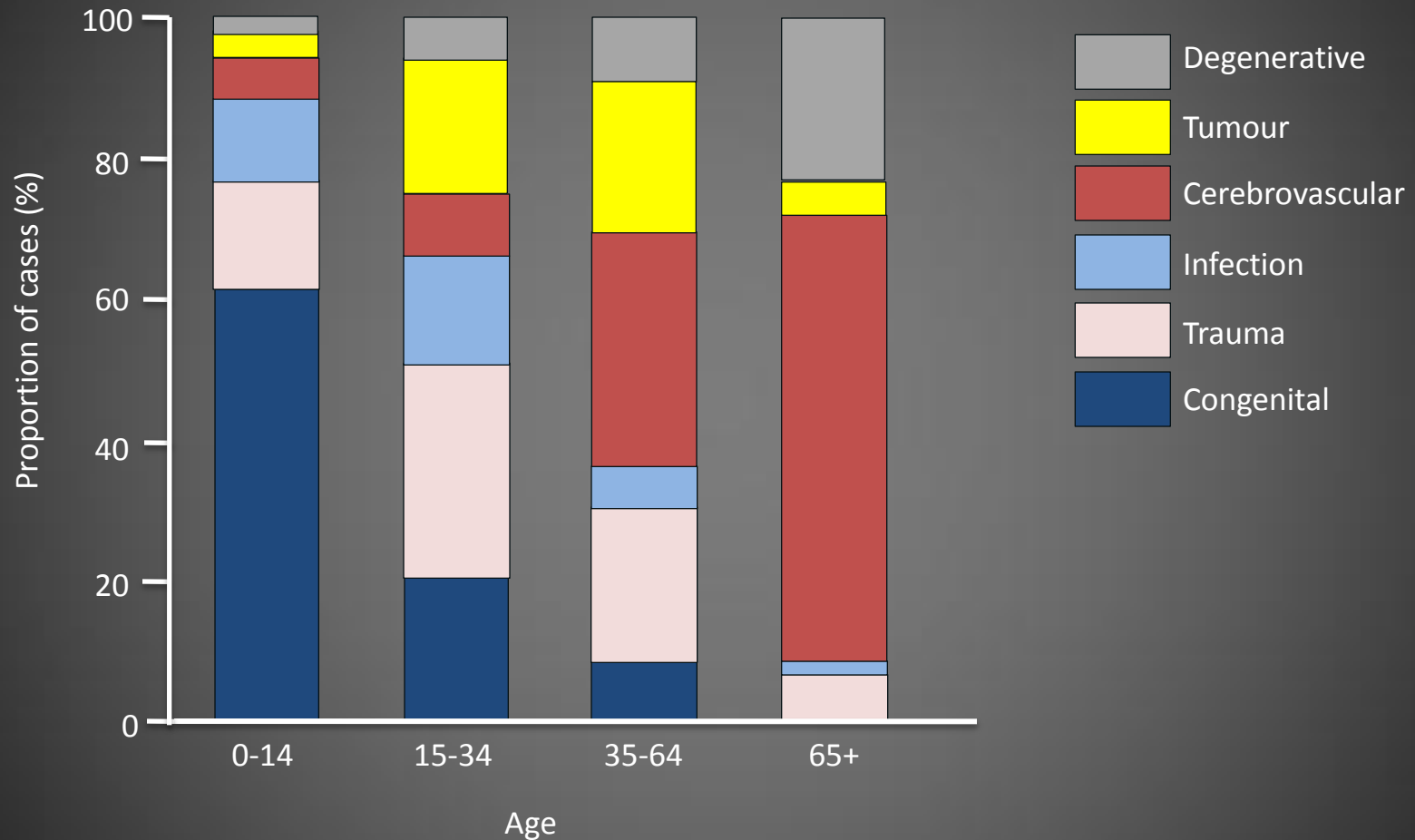
# Brain Bleed



# Factors Associated with an Altered Risk of Epilepsy



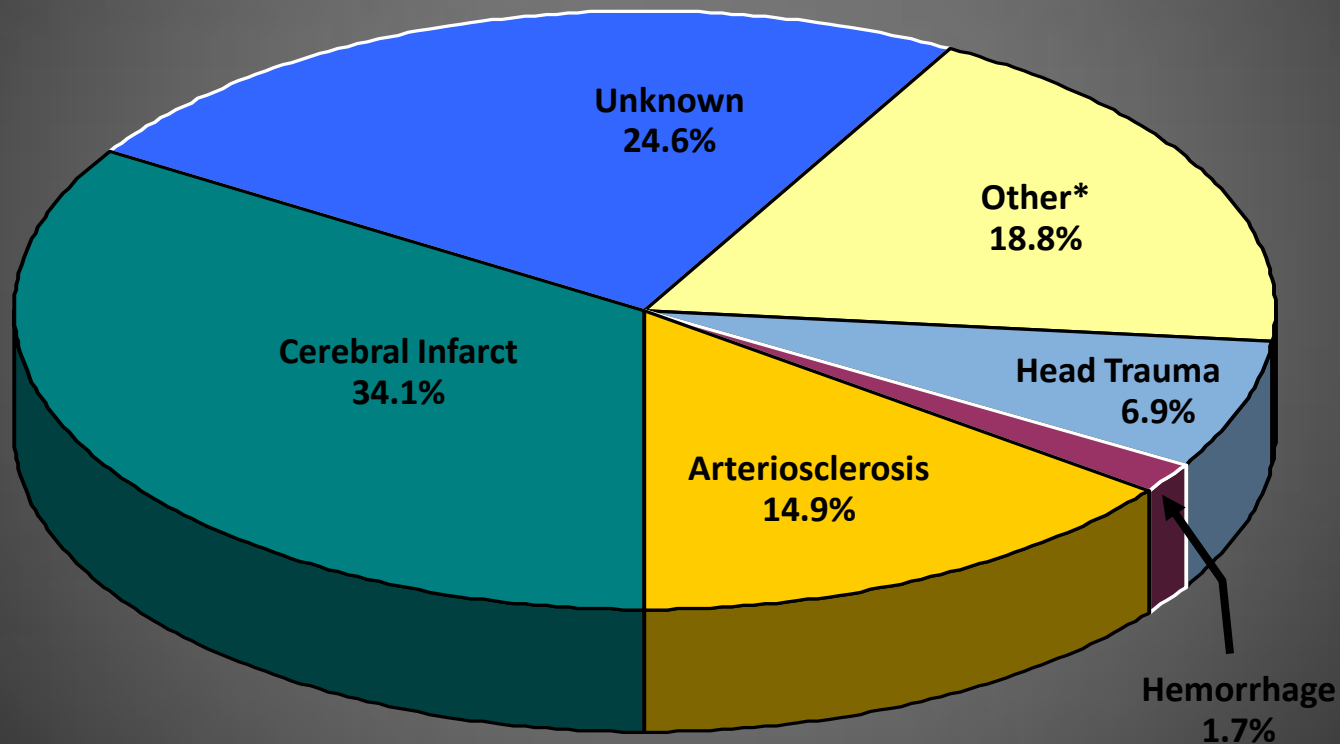
# Etiologies



Proportion of cases of newly diagnosed epilepsy to specific etiological categories within age groups among those with assigned etiologies.

# Etiology of Newly Diagnosed Epilepsy in Patients $\geq 60$ Years Old

VA Cooperative Study 428



\*Includes known etiologies such as arteriovenous malformation and venous angioma.

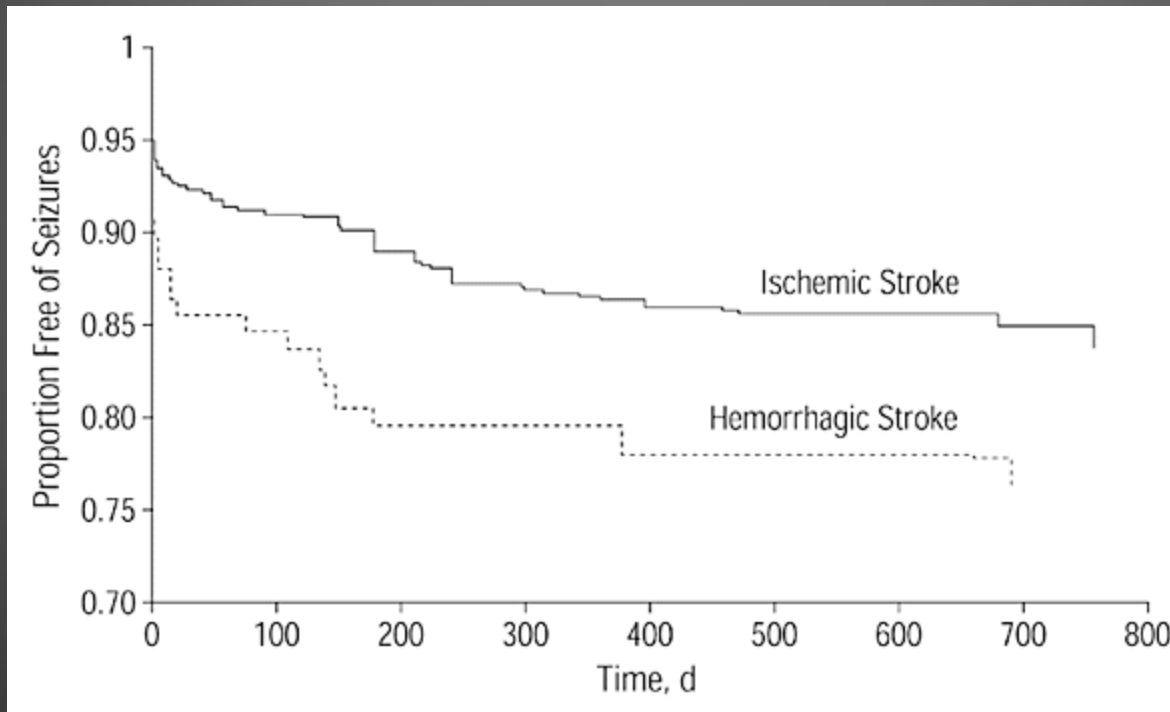
# Risk Factors for Developing Seizures

	Patients with Seizures, n (%)	Patients without Seizures, n (%)	Significance*
<b>Type of stroke</b>			
Ischemic	13 (7)	170 (93)	
Hemorrhagic	9 (25)	27 (75)	.01
<b>Location of lesion</b>			
Cortical	16 (17)	77 (83)	
Subcortical	6 (4.7)	120 (95.3)	.01
<b>Size of lesion</b>			
Large	14 (21.2)	52 (78.8)	
Small	8 (5.2)	145 (94.8)	.01

\*Chi-square test

# Epilepsy and Seizures: Prospective study

28% of the patients with seizure  
developed epilepsy

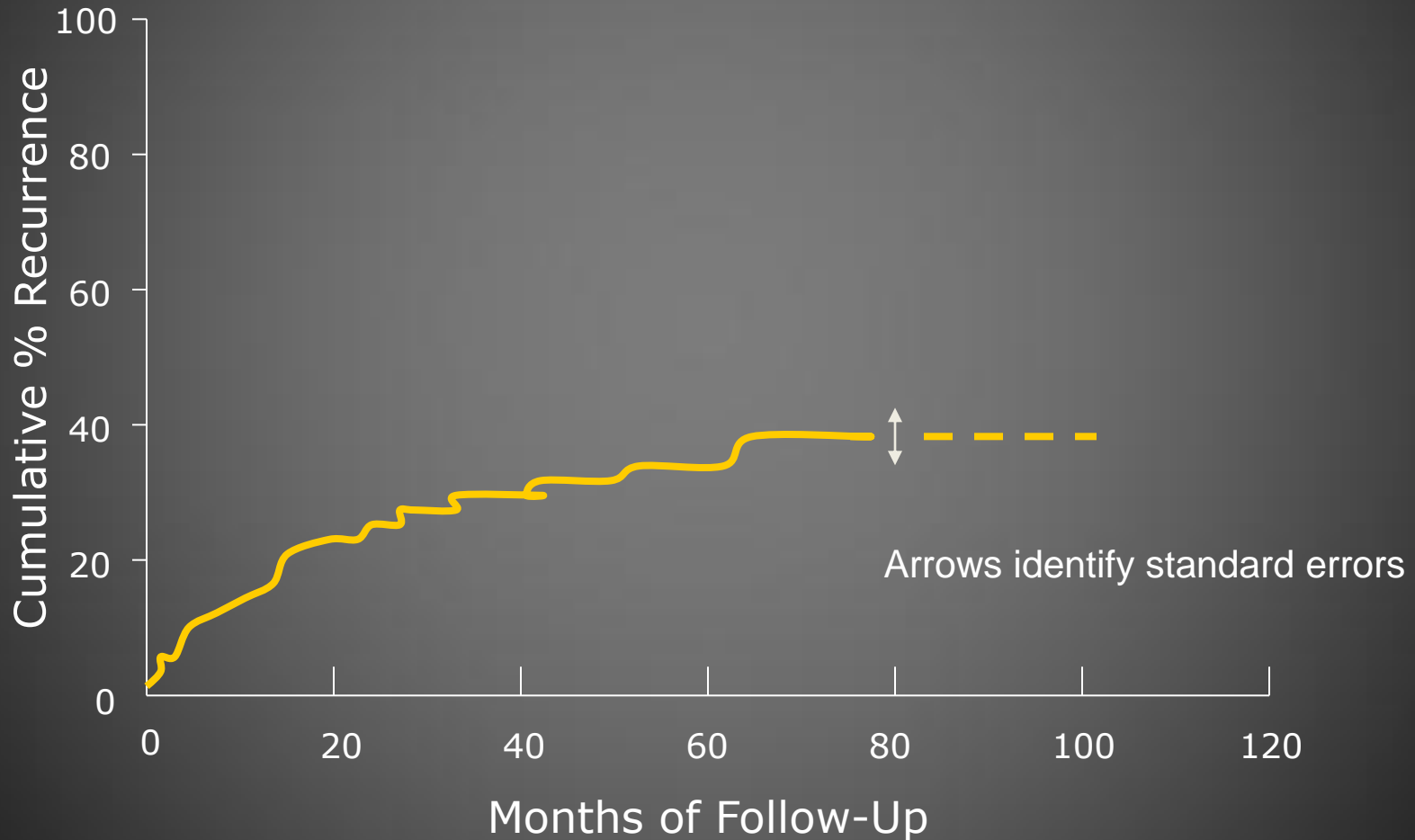


Bladin et al. Arch Neurol 2000;57:1617-1622. "Seizures after Stroke"

# How common are Seizures after Stroke

- By 5 years after stroke %
  - Ischemic 10
  - Hemorrhagic 27
  - Intracerebral hemorrhage 34

# Risk in Adults of Seizure Recurrence Following First Unprovoked Seizure



# Epilepsy after Stroke

- In all stroke survivors 2-4%
- Elderly with new epilepsy, 50% from stroke

# Postinfarct Epilepsy

Seizure Delay	No. of Patients	%
≤2 wk	14	24
>2 wk to ≤1 y	22	38
>1 y to ≤2 y	11	19
>2 y	11	19

Time between symptomatic supratentorial brain infarct and first seizure in 58 of 65 patients with postinfarct epilepsy, registered in the Maastricht Epilepsy Case Register (in 7, time of stroke was not certified).

Recurrence rate of new onset seizures in  
the elderly is reported to be between  
66 – 90%

So, et al. 1996; Heuts-van Raak, et al. 1996; Luhdorf, et al.  
1986; Sung and Chu. 1990; Paolucci, et al. 1997.

# Seizures followed by Epilepsy in Stroke

- Early seizures carry poor prognosis for recover with high mortality rate, especially with hemorrhage
- Late seizures at 6-24 months have high recurrence rate, ie epilepsy
- Predictors:
  - Anterior circulation
  - Large infarct
  - Parieto-temporal

# Principles of Control

- Freedom from seizures
- Minimize adverse effects
  - Sedation, cognitive, behavioral, systemic
- Minimize polytherapy
- Avoid barbiturates
- Compliance

# Treatment: Which Drug?

- Seizure type
- Balance
  - Acute risk of AE
  - Efficacy in trials
  - Long-term AEs

# Considerations in AED Choice

- Effects of co-medications on AED
- Effects of AED on co-medications
- Systemic diseases
- Formulations available
- Patient compliance
- Adverse event profile
- Cost/formulary

## French, et al. (cont.)

Age	0-17	18-34	35-54	35-64	>65	All	Age trend p
% with >1 co-med	75.08	77.93	86.7	93.03	97.29	82.09	<.001
% with >5 co-med	18.34	26.7	46.46	59.83	64.56	35.26	<.001
Mean co-med exposure	2.56	3.43	5.52	<b>7.1</b>	<b>7.04</b>	4.34	<.001

The risk of at least 1 co-med is 80% regardless of age; significantly higher for females; older patients; and patients with higher disease severity states.  
 Non vs. Inducing med 1.125

# Common Interactions

**SSRIs**

PHT, CBZ

**Anticoagulant**

PHT, CBZ

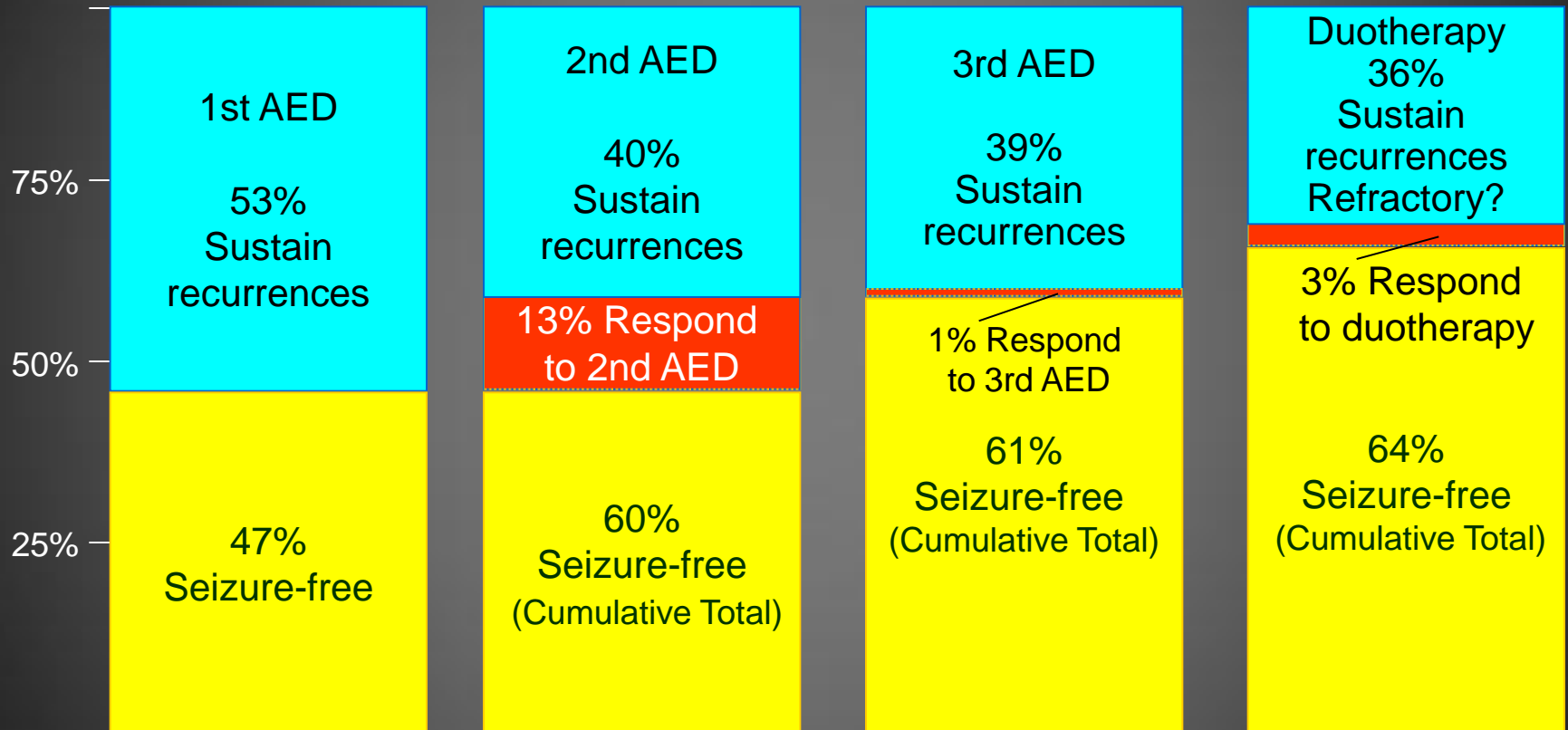
**Antidepressants**

PHT, CBZ

**ASA**

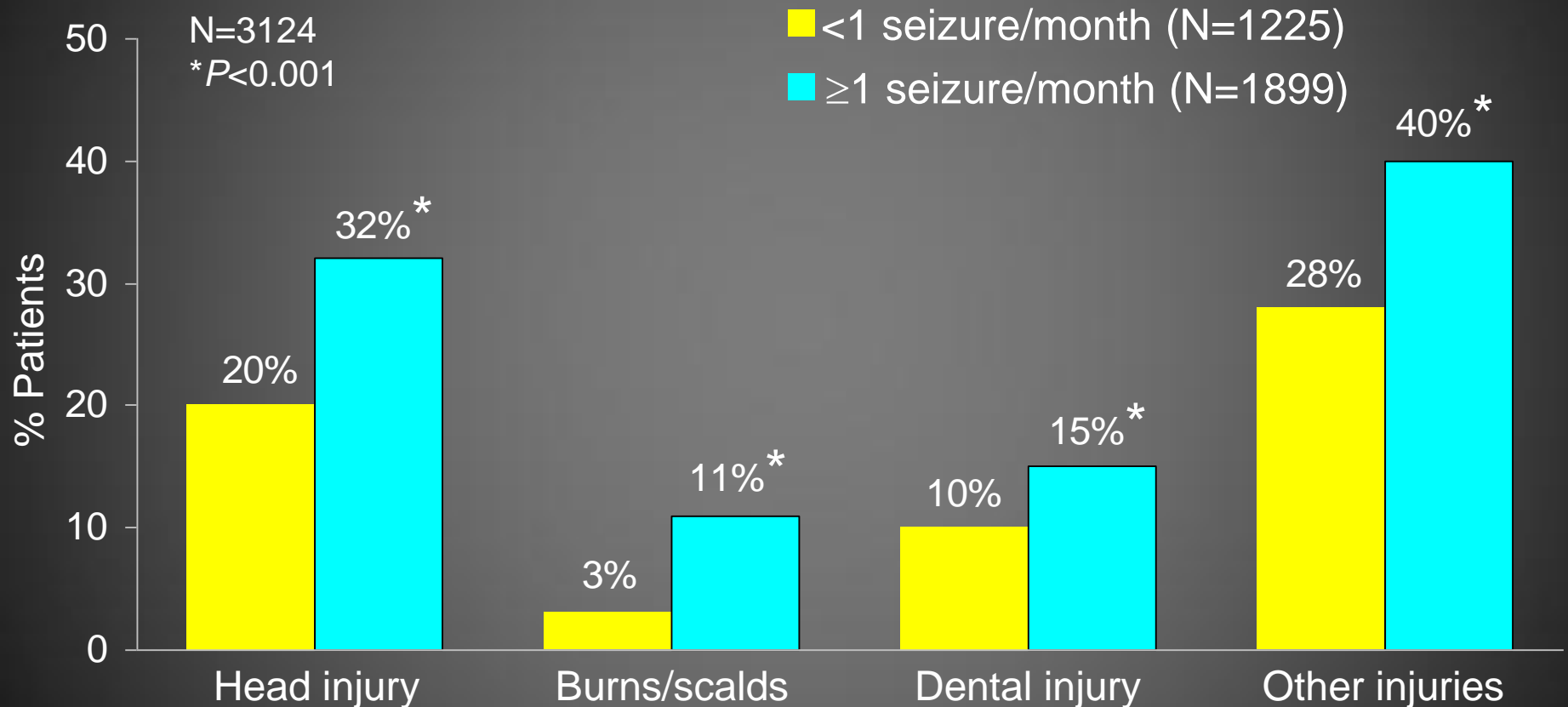
VPA

# Response Rates for Newly Diagnosed Epilepsy Patients



- Complete seizure control can be expected in about 70% of elderly patients
- Inadequate seizure control should raise the suspicion of poor adherence

# Seizure-Related Injuries Versus Seizure Frequency



# Risk of Injury of General Population

6 European countries enrolled epilepsy patients excluding symptomatic seizures with age and sex matched controls

	CONTROLS (%) WITH INJURY	PATIENTS (%) WITH INJURY
Total N Recruited	909	951
NUMBER	124 (14)	199 (21)
N EVENTS	140	270
PROBABILITY % AT 12 MO	12	17
PROBABILITY % AT 24 MO	17	27
2 SEIZURE	-	24%

# Risk of Injury: Mayo Clinic

- 247 patients; 39 (16%) with 62 injuries
  - Single injury 66%; multiple injuries 34%
  - Recurrent in 28%; >2 events in 15%
- None due to AED toxicity
- Major injury: 32%
  - Required admission 8%
  - Loss of work or school time 39%
- Predictive factor: seizure frequency
- Risk factors by multivariate analysis
  - # AED, less independent living skills, higher disability ranking, GTC or drop seizures, higher seizure frequency

- Most new seizures in older patients are partial in onset with or without secondary generalization
- Calcium and vitamin D and regular bone density measurements for patients at particular risk of osteoporosis.
- Low-dose drug regimens minimize adverse effects and drug interactions.
- Older patients have ↑ risk of side-effects and idiosyncratic reactions
- Older people may be particularly susceptible to the sedative and behavioral effects