

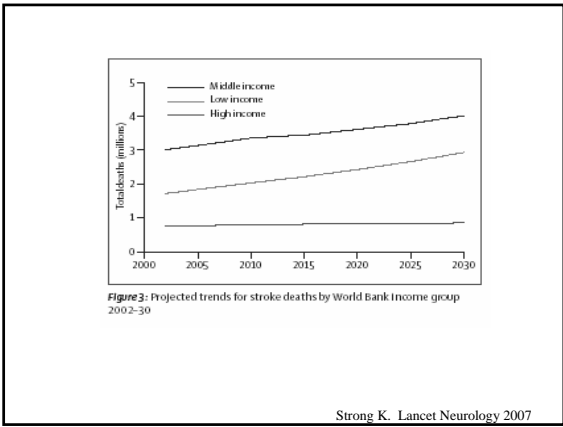
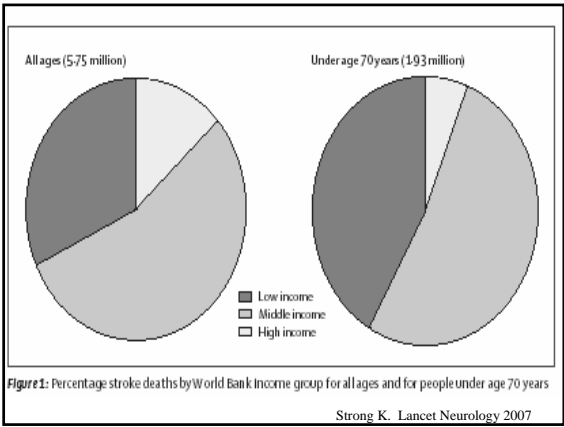
**FERNE / MEMC IV Neurological Emergencies Track:  
Stroke Management in Developing Countries  
Junaid A. Razzak PhD, MD, FACEP**

**Stroke Management in Developing Countries**

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**4 out of 5 strokes in the world occur in developing countries**

Mathers CD et al. Global Burden of Disease, 2006



**Stroke is not always the same disease in low income countries**

	Stroke pathology	Geographic distribution
<b>Infectious causes</b>		
Neurocysticercosis	Cerebral infarcts	Central and South America, sub-Saharan Africa, Asia
Chagas' disease	Cardioembolic infarcts	Central and South America
Cerebral malaria	Parenchymal haemorrhages, cerebral infarcts	Central and South America, Asia, Africa
Tuberculosis	Cerebral infarcts	Worldwide
Viral haemorrhagic fevers	Parenchymal and subarachnoid haemorrhages	South America, Asia, sub-Saharan Africa
Leptospirosis	Parenchymal and subarachnoid haemorrhages	Asia, Central and South America
Infective endocarditis	Cardioembolic infarcts, parenchymal and subarachnoid haemorrhages	Worldwide
<b>Non-infectious causes</b>		
Sickle cell disease	Cerebral infarcts, parenchymal haemorrhages	Africa, Central and South America
Snake bites	Cerebral infarcts, parenchymal haemorrhages	Worldwide
Cerebral venous thrombosis	Haemorrhagic cerebral infarcts	Asia, Central and South America

**Table 3:** Causes of stroke specific to developing countries\*

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Treatment options are limited  
or different



### Intravenous Thrombolysis

- tPA is not an approved drug in Pakistan
- It is however available to those who can afford it; at 30 times the average monthly income.
- For most people in developing countries this drug is not going to be available/affordable for the foreseeable future

### Neuro-Imaging

- Available in large centers
  - 3-4 tPA a month at AKU
- If patient can afford, it is much easier to get an MRI in Pakistan than in US
- But in acute setting with fee for service, even if patient makes it in time, they will likely not carry enough money to get a CT or MRI right away

### Other Interventions

- Intra-arterial thrombolysis
  - Available at our center
- Merci Device
  - Very expensive (3 times that of tPA); not used in Pakistan
- Ultrasound
  - Not used in our center

Stroke Care  
Small Success = Large Gains

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“If there were a 2% reduction per annum in stroke mortality (due to better management), this would result in 6.4 million fewer deaths from stroke between 2005 and 2015, with most deaths averted and years of life gained in low and middle-income countries.”

So What can be done?

**Focus on Inexpensive Interventions  
and System Improvement**

Early aspirin treatment for ischemic stroke reduces death or dependency by 12 people per 1000 treated, and coordinated care in stroke units by 56 per 1000 receiving such treatment.

**Focus on Prevention**

Over 60% of stroke mortality in low-income and middle-income countries, as well as high-income countries, is attributable to a few modifiable risks. In particular, high blood pressure causes an estimated 54% of stroke mortality in low-income and middle-income countries, followed by high serum cholesterol (15%) and tobacco smoking (12%).

**Summary**

- Stroke is a major public health problem in developing countries
- Diagnostic and therapeutic options are available in some places but availability is not consistent
- Focusing on simpler therapeutic and preventive strategies have a major chance of success

Thank You



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**Cost – Is it a real issue?**

- Two Health Systems
- Public System would not be able to afford newer modalities for a long time to come

**Human Resources**

- Number of Health Care Providers
- High Level Expertise

**Health System Challenges**

- Referral Networks
- Prehospital Care
- Emergency Care System
- Hospital System

Detection	Recognition of stroke signs and symptoms
Dispatch	Call 9-1-1 and priority EMS dispatch
Delivery	Prompt transport and prehospital notification to hospital
Door	Immediate ED triage
Data	ED evaluation, prompt laboratory studies, and CT imaging
Decision	Diagnosis and decision about appropriate therapy
Drug	Administration of appropriate drugs or other interventions

**At least 80% of all cardiovascular disease and type 2 diabetes and over 40% of cancer could be avoided through a healthy diet, regular physical activity and avoidance of tobacco use**

- Death from Stroke in developing countries (low and middle income countries) accounted for 85.5% of stroke deaths worldwide
- The number of disability adjusted life years (DALYs) is 7 times compared to high income countries

Mathers CD et al. Global Burden of Disease. 2006

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“the current global burden of stroke is 16 million. First-ever strokes, 62 million stroke survivors, 51 million DALYs, and 5.7 million deaths in 2005. Without additional population-wide interventions, . Figures are predicted to increase to a staggering 23 million . First-ever strokes, 77 million stroke survivors, 61 million DALYs, and 7.8 million deaths by 2030.”

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