# Organization of Stroke Services in High, Middle and Low Income Countries

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World Stroke Organization

LUDHIANA CHRISTIAN MEDICAL COLLEGE


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States and Union Territories
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Shimla
Chandigarh
PUNJAB
PAKISTAN
Ludhiana
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CHINA (TIBET)
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Gangtok
BHUTAN
Itanagar
UTTAR PRADESH
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Dispur
NAGALAND
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MEGHALAYA
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YANAM (Pondicherry)
BAY OF BENGAL
ARABIAN SEA
Panaji
GOA
KARNATAKA
Bangalore
Chennai (Madras)
PONDICHERRY (Puduchchery)
KARAIKAL (Pondicherry)
LAKSHADWEEP
MAHE (Pondicherry)
TAMILNADU
KERALA
Thiruvananthapuram
Port Blair
ANDAMAN & NICOBAR ISLANDS
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Map not to Scale

# Christian Medical College, Ludhiana (CMC)-History

- Dr Edith Mary Brown- Scottish Missionary, graduate of London School of Medicine
- 1894, 4 staff and 4 students- North India School of Medicine for Christian Women

www.cmcludhiana.in

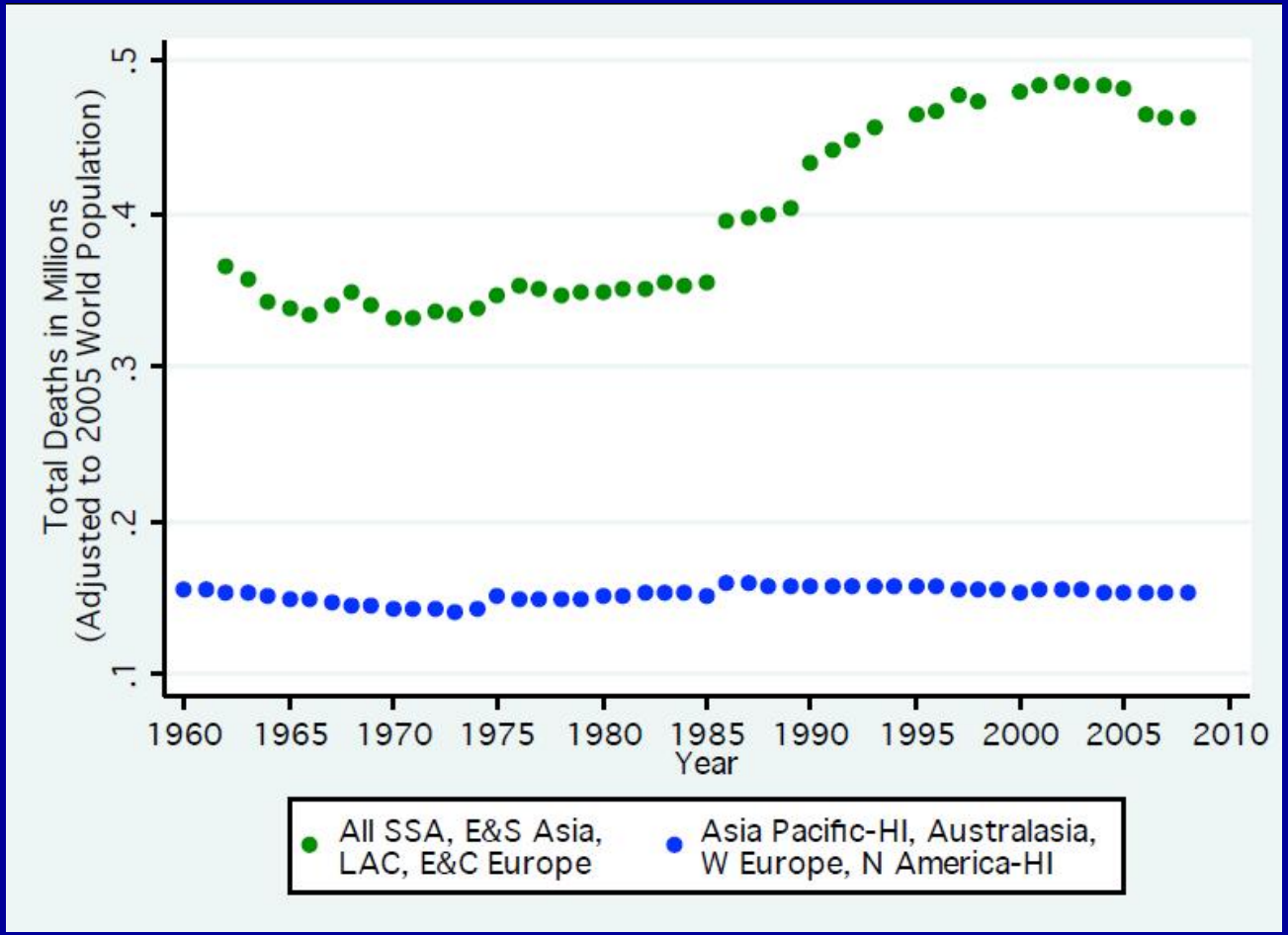
# Why do we need stroke care services?

# Stroke Burden: Trends

- 42% decrease in stroke incidence in high-income countries and greater than 100% increase in low to middle income countries
- The incidence of intracerebral haemorrhage and subarachnoid haemorrhage in low to middle income countries are significantly greater than the incidence and frequency in high-income countries
- Early stroke case fatality in low to middle income countries in the past decade is 25% higher than early stroke case fatality in high-income countries

Valery L Feigin, Carlene M M Lawes, Derrick A Bennett, Suzanne L Barker-Collo, Varsha Parag *Lancet Neurol* 2009; 8: 355–69

# Trends in total number of stroke deaths in the world*




•Preliminary data from Institute for Health Metrics and Evaluation,

•University of Washington. GBD Project, Stroke Experts Group 2010

# GBD Project 1990-2005: Preliminary Results

- **Stroke incidence and mortality in low to middle income countries have now, for the first time, exceeded those in high income countries**

**We are facing worldwide epidemic of stroke**

# Stroke Care Pathway

- Pre-hospital assessment (Transport)
- Acute Care
  - Stroke Units
  - Thrombolysis
  - Rehabilitation (acute and long term)
- Secondary prevention (stroke/TIA clinic)
- Community support
- Socio-cultural factors
- Education and Research

# Factors Influencing Stroke Care Services

- Local health care and economy
- Need of different patient groups
- Views of patients and families: fragmentation of services
- Resources

# What are the effective treatments available for stroke?

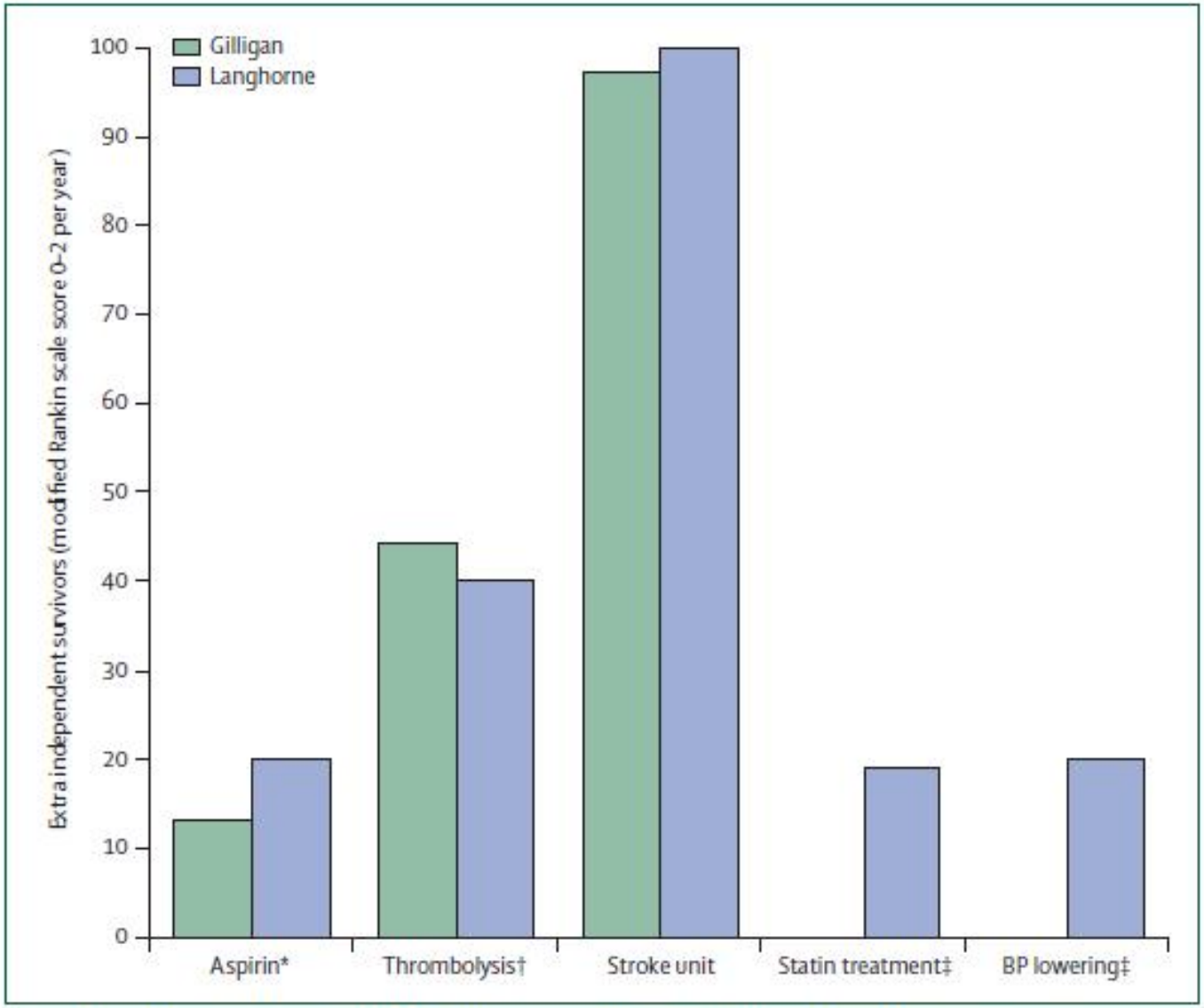



***Figure 1*: Potential population effect of stroke interventions in a district of one million population**
The population effect is shown for a hypothetical district of 1 000 000 population with 2500 strokes per year. Estimates are shown for the number of extra independent survivors (modified Rankin scale score 0–2 points) resulting from an intervention during 1 year. The assumptions and calculations are detailed by Gilligan and colleagues[37] and Langhorne and colleagues.[7] BP=blood pressure. *Acute aspirin treatment. †0–6 h of thrombolysis. ‡Prevention.

*Peter Langhorne, Linda de Villiers, Jeyaraj Durai Pandian* ***Lancet Neurol* 2012; 11: 341–48**

# Evidence Base for Stroke Care Services

- **<u>Comprehensive stroke service:</u>** **stroke service that covers most of the needs of patients with stroke, and which is integrated in a way that provides a continuous patient journey—a “seamless service”**

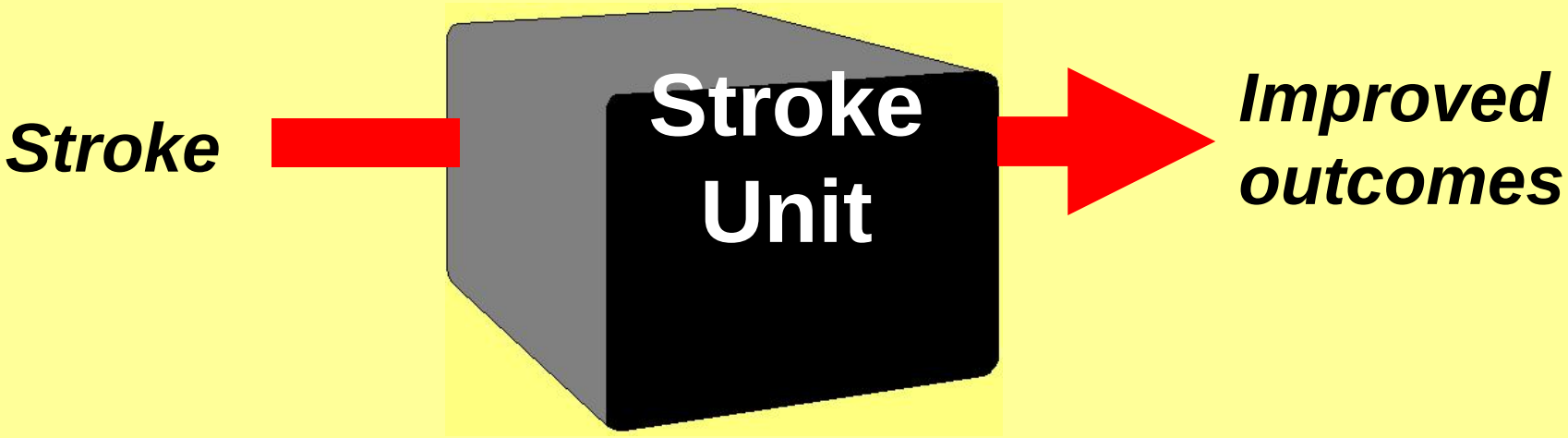
# Organized Inpatient (Stroke-unit) Care

- Stroke services in hospitals organized within stroke units

# What is a Stroke Unit?

- **A stroke unit can be defined as: “an area within a hospital where stroke patients are managed by a co-ordinated multidisciplinary team specializing in stroke management”**

# Rationale for Care of Patients in Stroke Units

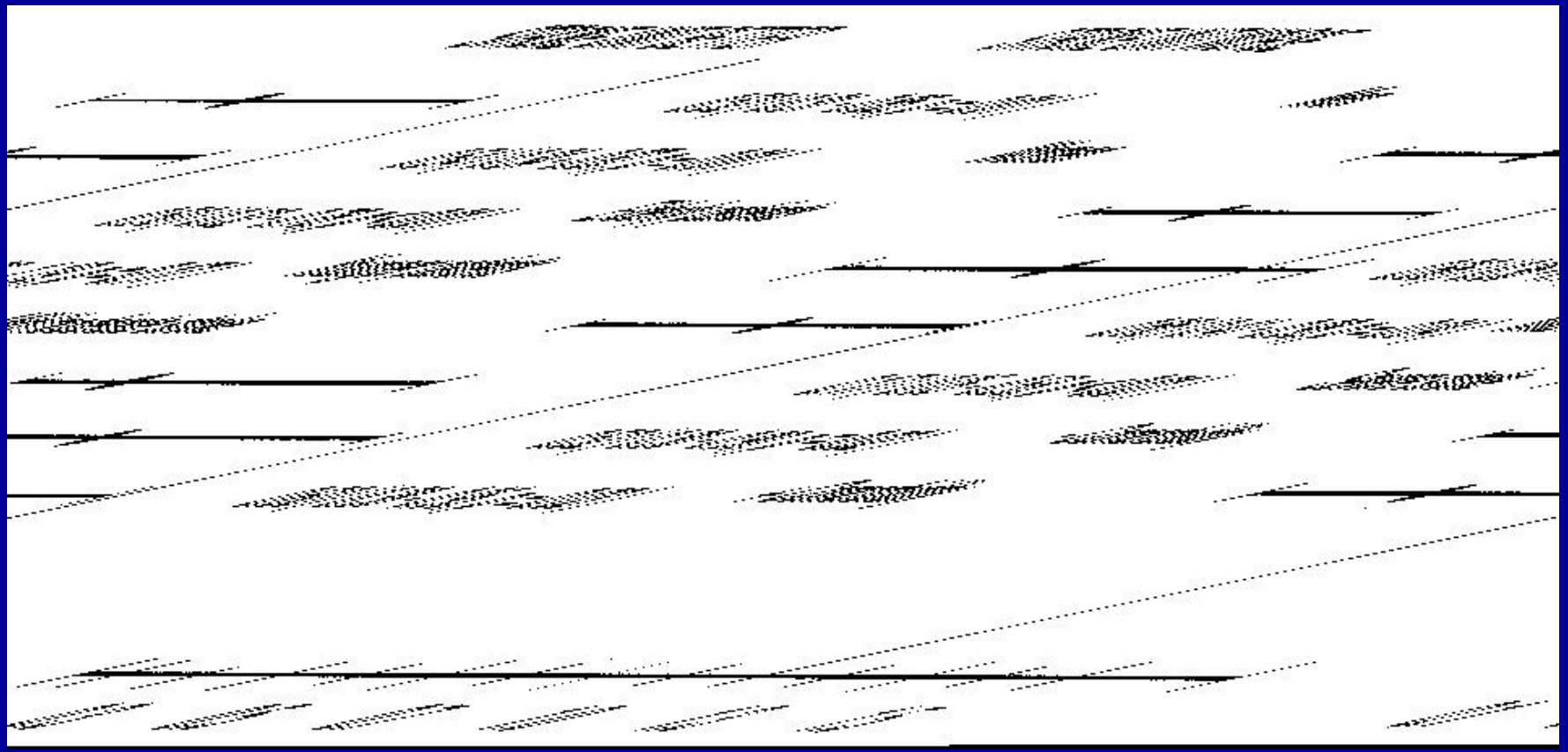

Stroke
Stroke Unit
Improved outcomes

# Stroke Unit Care

- Stroke patients who are admitted to a multidisciplinary stroke unit are more likely to survive, return home and regain independence
- These improvements in outcome appear to persist for several years
- The impact of stroke unit care is likely to be of greater magnitude than other stroke therapies
- Stroke units may also improve the patients' quality of life

# Who benefits from Stroke Unit care?

## Death during hospital stay or discharge to Nursing Home



Jorgensen Stroke 2000;31:434-439

# SU vs GMW Care

## *Operational Issues*

**TABLE 2. Differences in Organization of Care in the SU and the GWs**

| | SU | GW |
|---|---|---|
| Team approach | +++ | + |
| Systematic team work | +++ | − |
| Systematic observation | +++ | + |
| Standardized evaluation | +++ | + |
| Staff education in stroke care | +++ | + |
| Staff education in stroke rehabilitation | +++ | + |
| Physiotherapy performed in the unit/ward | +++ | + |
| Physiotherapy | | |
| Motor relearning approach | +++ | − |
| Bobath approach | − | ++ |
| Nursing, integrated | +++ | + |
| Involvement of relatives | +++ | + |
| "Enriched environment" | +++ | ++ |

+++ indicates much; ++, moderate; +, little; and −, not present.

- **•Teamwork**
- **•Standardised Care**
- **•Expertise**
- **•More Early Rehab**
- **•Motivation**

**Indredavik et al Stroke 1999;30:917**

# SU vs GMW Care

*Patient's Perspective*

**Compared to a GMW, patients on a SU**

- **spend less time in bed**
- **spend more time in activities to promote independence**
- **receive more interaction if drowsy, cognitively-, or speech-impaired**
- **spend more time with visitors**

**•Pound et al Age Ageing 1999;28:433**

# SU vs GMW Care

## *Care Delivered*

**TABLE 5. Treatment Offered in the SU and GMW**

| Treatment | SU (n=279) | GMW (n=271) | OR (95% CI) |
|---|---|---|---|
| Mobilization out of bed <24 h ★ | 44.0 | 26.5 | 2.18 (1.47–3.24) |
| Parenteral fluid, % ★ | 97.0 | 32.7 | 67.3 (31.9–142) |
| Aspirin <12 h, % ★ | 55.9 | 18.8 | 5.47 (3.72–8.04) |
| Aspirin 12–24 h, % | 14.1 | 25.7 | 0.47 (0.31–0.73) |
| Aspirin >24 h (%) | 6.7 | 29.3 | 0.17 (0.10–0.30) |
| Acetaminophen, % ★ | 56.7 | 27.2 | 3.50 (2.45–5.01) |
| Penicillin, % | 15.2 | 10.9 | 1.47 (0.89–2.43) |
| Antibiotics except penicillin, % ★ | 23.3 | 7.6 | 3.70 (2.18–6.26) |
| Insulin, % | 6.3 | 3.3 | 1.99 (0.87–4.55) |
| Warfarin, % | 10.4 | 14.9 | 0.66 (0.40–1.11) |
| Low-molecular-weight heparin, % | 11.1 | 44.6 | 0.16 (0.10–0.24) |
| β-Blocker, % | 16.7 | 12.7 | 1.38 (0.85–2.22) |
| Diuretics, % | 25.9 | 23.9 | 1.11 (0.76–1.64) |
| Calcium antagonists, % | 18.1 | 21.7 | 0.80 (0.52–1.22) |
| Other antihypertensive agents, % | 20.4 | 19.9 | 1.03 (0.68–1.56) |

OR indicates odds ratios; CI, confidence interval.

**Ronning et al Stroke 1998;29:586**

# Why are Stroke Units effective?

- Geographical concentration of stroke care expertise
- Team approach
- Focused attention on stroke care specifics:
  - Factors that worsen outcome
  - Prevention, early detection & treatment of complications
  - Early implementation of secondary prevention strategies
  - Early rehabilitation
- Motivation of “Team” motivates patients/families

# Cochrane Review 2013: Stroke Unit Trialists Collaboration

- **Stroke patients who receive organised inpatient care in a stroke unit are more likely to be alive, independent, and living at home one year after the stroke**
- **The benefits were most apparent in units based in a discrete Ward**

**(Cochrane Database Syst Rev. 2013 Sep 11;9:CD000197)**

# Models of Stroke Units

# Acute Stroke Unit

- Policy of rapid admission of the stroke patient to the stroke unit (USA, Germany)
- Ward areas with facilities for intensive monitoring of physiological functions (cardiac, respiratory, and neurologic)
- Interventions are introduced to correct these abnormalities (e.g., raised intracranial pressure, systemic hypertension)

# Acute Stroke Unit

- Intensive-care units, which can offer all monitoring (including intracranial monitoring) and life-support options (e.g., respiratory support)
- “Semi-intensive” units are similar to coronary-care units, where monitoring and intervention focus on physiological variables but not life-support (hyperacute stroke units)

# Comprehensive Stroke Unit

- **Most successfully implemented model which admits patients acutely and then provides at least a few weeks of rehabilitation (Norway, Sweden)**

# Rehabilitation Stroke Units

- Admit patients a few days after stroke onset and continue rehabilitation for several weeks

# Mobile Stroke Units

- **Stroke team working across several general wards may improve aspects of the processes of care (e.g., access to specialist assessments) but cannot achieve patient outcomes as good as those of a team based in a stroke unit**

# Transfer from Hospital to Community

- Early supported discharge (ESD) services aim to accelerate discharge home from the hospital but provide more continuity of rehabilitation in the home setting
- MDT
- Hospital based or Community based

# ESD

- **Reduces hospital stay by about one week and provide input in the patient's home for up to three months, but this has been shorter with hand-over to other community services (Langhorne P. *Lancet* 2005; 365:501–506)**

# ESD

- **For every 100 patients randomized to early supported discharge services, an extra 4 remained at home and/or were independent at 6 to 12 months after the stroke (Langhorne P. *Lancet* 2005; 365:501–506)**

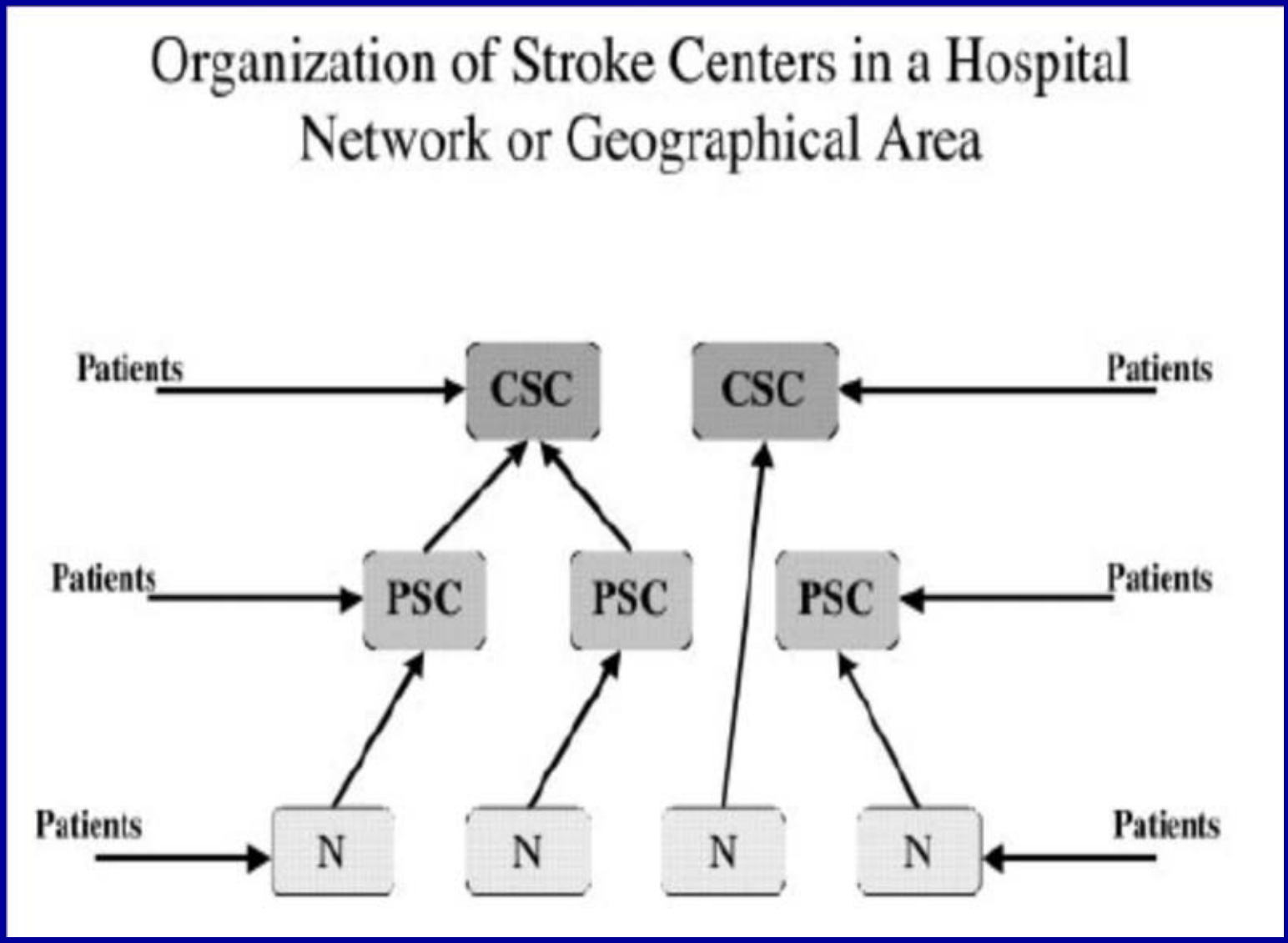
# Stroke Services in different Regions

# Brain Attack Coalition 2000 (USA)

- **Primary stroke center (PSC): necessary staffing, infrastructure and programs to stabilize and treat acute stroke patients**

# Brain Attack Coalition 2000

- Comprehensive stroke center (CSC): programs to diagnose and treat stroke patients who require a high intensity of medical and surgical care, specialized tests, or interventional therapies
- Patients with large ischemic strokes or hemorrhagic strokes, those with strokes from unusual etiologies or requiring specialized testing or therapies




Alberts et al, 2005

# Comprehensive Stroke Center

- Director
- Neurologists, Neurosurgeons, Vascular surgeon
- Radiologist
- Interventional Radiologist/Neurologist
- ED services and personnel
- Neurosonology
- Radiology technicians
- Nurses
- Therapists
- Social workers

# Scandinavia (Norway, Sweden, Denmark, Finland)

- Publicly funded hospitals
- Comprehensive stroke unit
- >90% hospitals have stroke unit
- 70 to 80% have access to stroke units
- ESD

# United Kingdom (England, Scotland, Wales, Northern Ireland)

- Public funded
- 100% of hospitals have stroke unit
- 80% of patients gained access to the unit
- ESD 66% of hospitals

# West Continental Europe (France, Germany, Austria, Switzerland, the Netherlands)

- Mixed health care economies
- Neurology services (intensive care or semi-intensive care units)
- Rehabilitation stroke units

# Mediterranean Europe (Spain, Portugal, Italy, Greece)

- Public funding and mixed model
- Organized (stroke-unit) care has been developed in Poland and Hungary
- Post-discharge services appear to be quite variable

# Australia and New Zealand

- Mixed health economy
- Initiatives have been implemented in Australia to develop stroke units in both acute settings and rehabilitation units
- New Zealand: rehabilitation medicine specialists or in departments of geriatric medicine

# Canada

- Neurology, rehabilitation medicine, and general (internal) medicine
- Stroke-unit care has been available in an increasing number of hospitals
- Post-discharge services exist, which appear variable in nature

# Telestroke

# Long-term outcome after thrombolysis in telemedical stroke care

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TEMPiS Group

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## ABSTRACT

**Background:** IV thrombolysis represents the most effective acute stroke therapy. However, it is almost exclusively performed in stroke centers and is not available in most community areas. The Telemedical Pilot Project for Integrative Stroke Care (TEMPiS) was started in February 2003. Twelve community hospitals with no or very limited stroke thrombolysis experience and two stroke centers were connected via a network providing online neurologic examination and transfer of neuroradiologic scans. Following recently published preliminary results on acute phase safety of telethrombolysis, the present study reports on its long-term functional outcome.

**Methods:** Modified Rankin Scale (mRS), Barthel Index (BI), and mortality rate were prospectively collected 3 and 6 months after IV thrombolysis in patients of community network hospitals (telemedical group) and the stroke centers. Values of 95/100 for the BI and 0/1 for the mRS were defined as a favorable outcome.

**Results:** Over the first 22 months, 170 patients were treated with tPA in the telemedical hospitals and 132 in the stroke center hospitals. Mortality rates were 11.2% vs 11.5% at 3 months ($p = 0.55$) and 14.2% vs 13% at 6 months ($p = 0.45$). A good functional outcome after 6 months was found in 39.5% of the telemedical hospitals vs 30.9% of the stroke centers ($p = 0.10$) for the mRS and 47.1% vs 44.8% ($p = 0.44$) regarding the BI.

**Conclusions:** Mortality rates and functional outcomes for telemedicine-linked community hospitals and stroke centers were similar and comparable to the results from randomized trials.
*Neurology*® 2007;69:898-903

# REACH, Georgia

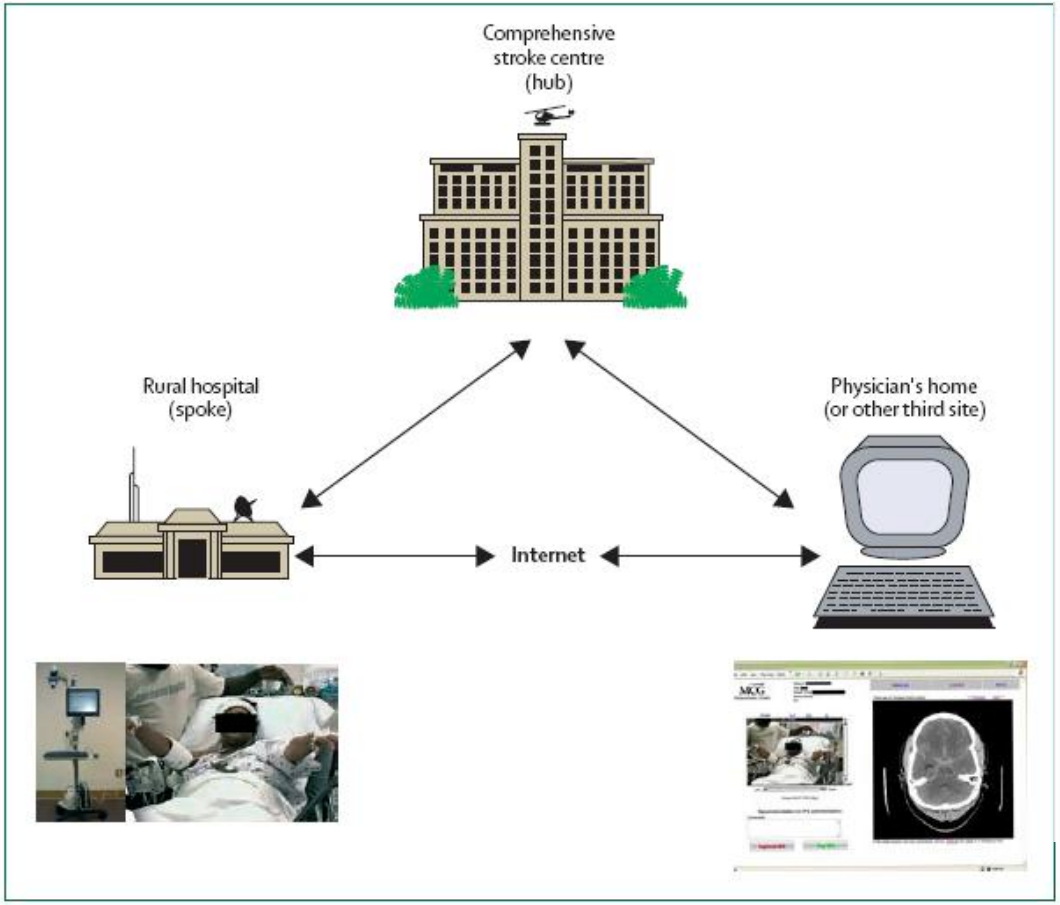


*Figure 1:* **The REACH system**
A cart with a video camera and computer workstation is in the rural hospital. The rural hospital contacts the tertiary care hospital, which contacts the stroke consultant on call. The consultant logs onto www.reachmcg.com and does the consultation from any point with broadband internet access. Live patient video, CT scan images, and other patient data from the rural site is incorporated into one screen using custom-built software. The consultant records the NIHSS score with a drop down-menu and indicates the decision "for" or "against" treatment with alteplase by clicking on the screen. The CT scan shows a patient with a subarachnoid haemorrhage.

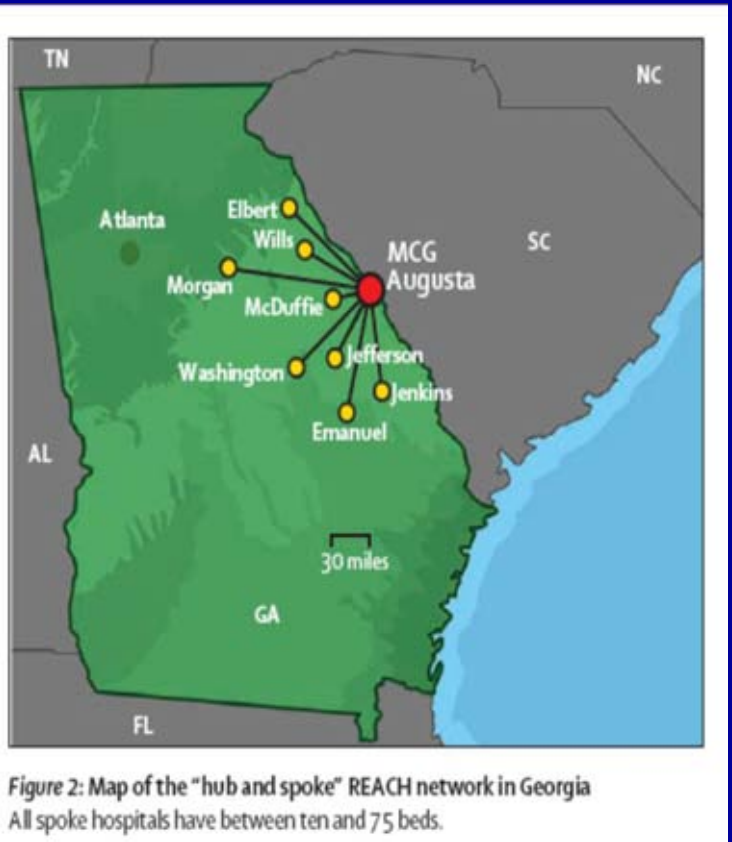


*Figure 2:* **Map of the "hub and spoke" REACH network in Georgia**
All spoke hospitals have between ten and 75 beds.

# Middle and Low Income Countries

# Challenges in Setting up Stroke Care services in middle and low income countries

- Availability of infrastructure (Stroke unit and Rehabilitation)
- Personnel
- Community support
- Alternative medicines

# Average Population Per Neurologist

| Country | Population |
|---|---|
| United States | 26200 |
| Canada | 53000 |
| United Kingdom | 164000 |
| Latin America | 202000 |
| Middle East | 613000 |
| Asia | 902000 |
| Sub-Saharan | 1540000 (711856-5009908) |
| India | |
| 1998 | 3200000 |
| 2002 | 2180000 |
| Present position | 1250000 |

**800 Neurologists for ~1.2 billion population**

**Gourie Devi 2008**

# India

| Number of Physiotherapists | Number of Occupational therapists | Number of Speech therapists |
|---|---|---|
| 32800 registered in Indian Association of Physiotherapists till 2011 | 3000 registered in Indian Association of Occupational Therapists till 2011 | Currently, 1700 registered in Indian Association of speech therapists<br>500 registered in Rehabilitation Council of India |

# Mauritius Research Council 2012 (1.28 million population)

| UK/US model | HR available in Mauritius (Public Sector) | Comments |
|---|---|---|
| Neurologist | 1 | 2 in the private sector + 2 visiting consultants |
| Neurosurgeon | 5 | + 6 visiting consultants (foreign) |
| Physical and Rehabilitation Medical Specialist | 4 | None |
| Rehabilitation Nurses | Unknown | In general Specialist Nurses appear not to be acknowledged, except in the case of HIV |
| Dietician | 16 | Not involved directly |
| Physiotherapist | 17 | +33 assistants |
| Occupational Cadre | 27 | Includes OTs & their assistants |
| Speech Therapist/audiologist | 4 | +10 assistants |
| Clinical Psychologist | 4 | Patients not referred |
| Recreational therapist | 0 | Does not exist |

# Are stroke units effective in less wealthy areas?

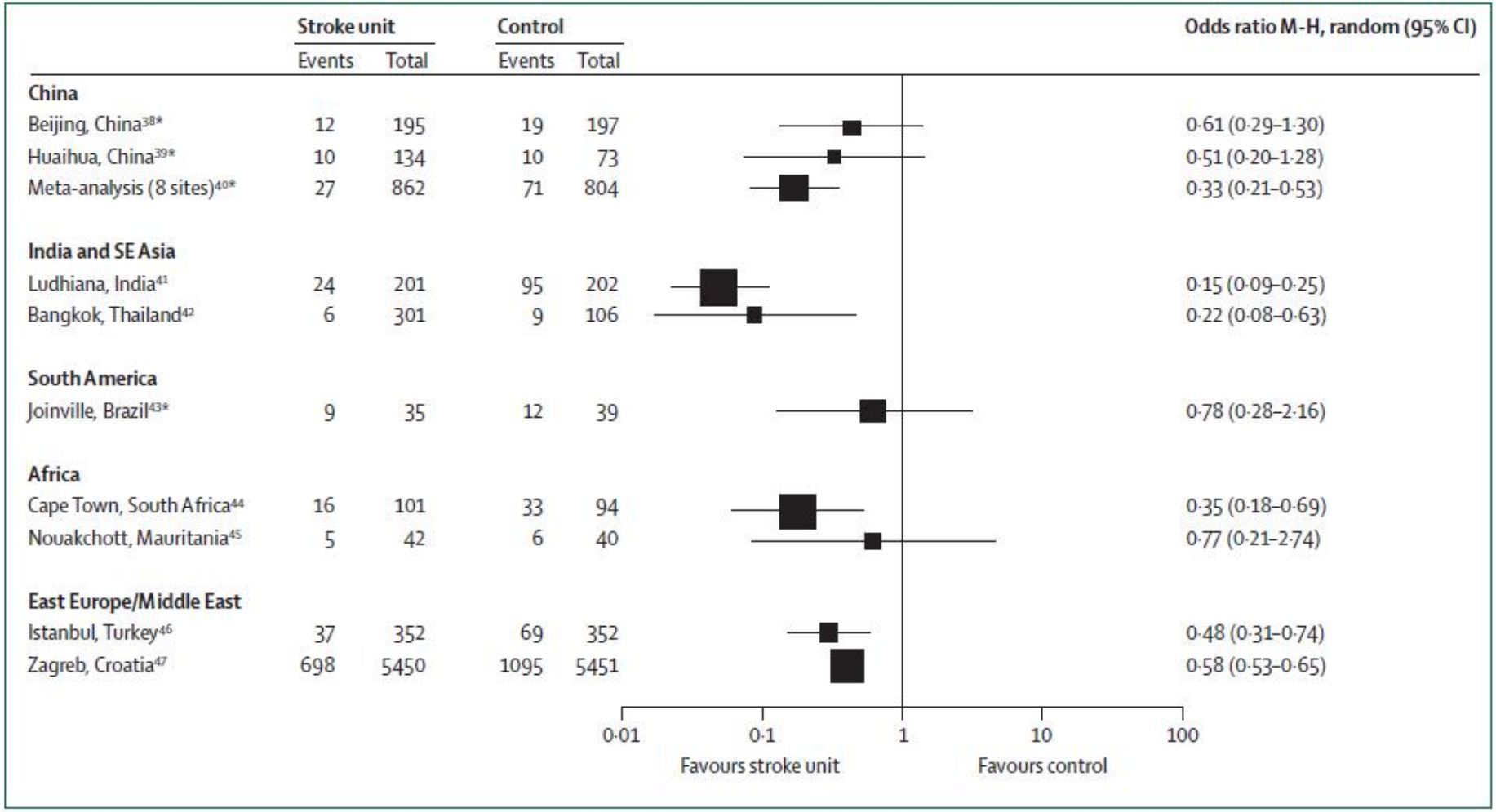


***Figure 2:*** **Effect of stroke units in low-income and middle-income countries**

Case fatality at the end of scheduled follow-up. Figure shows the study, deaths (events), study group population (total), and the odds ratio for death in a stroke unit *vs* a general ward (calculated with a Mantel-Haenszel random effects model with Revman [version 5.0]). In one study[47] data were estimated from percentage outcomes. *Randomised controlled trials or controlled clinical trials.

Peter Langhorne, Linda de Villiers, Jeyaraj Durai Pandian Lancet Neurol 2012; 11: 341–48

# Components of Stroke Unit

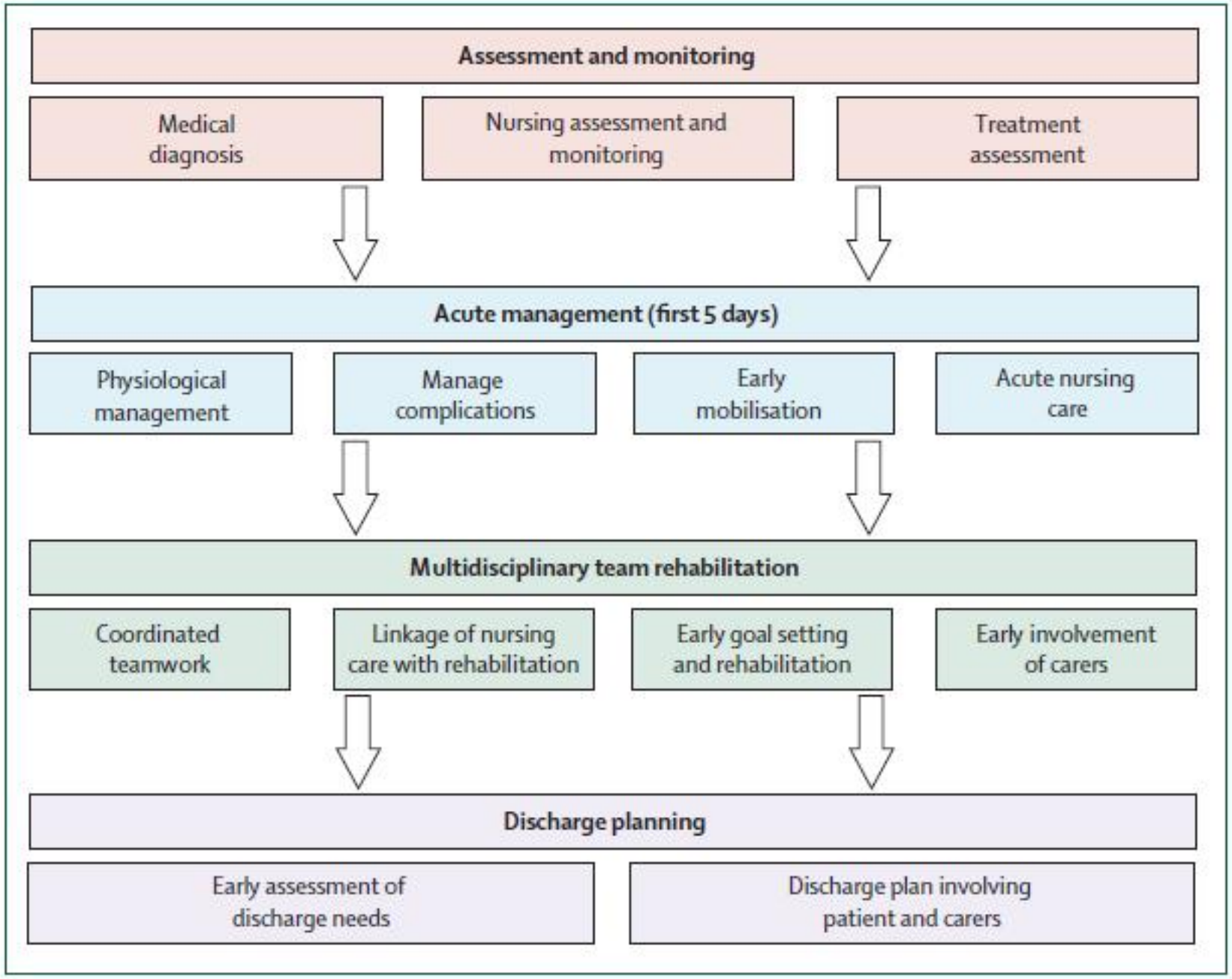


*Figure 3*: **Key components of stroke-unit care**

# Key Components

- Ward
- Staffing
- Multidisciplinary team
- Education and Training
- Protocols and care

# Ward

- Geographically defined area
- Beds 6
- Monitors
- Infusion pumps

# Staffing

- Nurses
- Doctors: Physicians, Neurologists, Neurosurgeons and a Radiologist
- Rehabilitation: Physiotherapist, Occupational therapist and Speech therapist
- Social worker

| | Independent evidence of benefit | Considerations in low-resource settings |
|---|---|---|
| **Fluid and food management** | | |
| Careful management of fluids and food (intravenous saline in the first 12–24 h; early nasogastric tube feeding if swallowing is unsafe) | Indirect evidence from stroke-unit trials only | Needs access to basic monitoring facilities |
| **Monitoring and management of physiological abnormalities** | | |
| Hypoxia | Might improve early neurological recovery[59] | Needs access to oxygen and oxygen monitor |
| Blood pressure | Acute reduction not usually needed | Based on simple clinical observations (antihypertensive intervention rarely needed) |
| Pyrexia (and infection) | Paracetamol might improve outcome if pyrexia related[60,61] | Based on simple clinical observations and basic drug treatments<br>Use acute-care protocol[62] |
| Hyperglycaemia (>10 mmol/L) | Part of effective acute-care protocol[62]<br>Intensive glucose control not needed[63] | Needs blood glucose measurements and insulin<br>Use acute-care protocol[62] |
| **Swallowing management** | | |
| Identification and management of impaired swallowing | Dysphagia management reduces complications[63]<br>Part of effective acute-care protocol[62] | Needs staff (and carer) training<br>Use acute-care protocol[62] |
| **Early mobilisation** | | |
| Careful positioning and handling | Basic protocol for positioning reduces chest infections[64] | Needs staff (and possibly carer) training<br>Basic protocol might be useful[64] |
| Able to sit, stand, and walk as soon as possible | Might improve recovery[65,66] | Needs staff (and possibly carer) training |
| **Nursing care** | | |
| Pressure-area care | Indirect evidence from stroke-unit trials only | Needs staff (and possibly carer) training; staffing levels are important |
| Continence management (avoid catheters if possible) | .. | Needs access to equipment |

Key components of early stroke management. Data from Stroke Unit Trialists' Collaboration[49] and World Stroke Academy.

***Table 1:*** **Basic care in a stroke unit**

| | Considerations in low-resource settings |
|---|---|
| **Skills and training** | |
| Staff skills in stroke and rehabilitation; regular education in stroke and rehabilitation | Access existing training resources (including online materials) |
| **Multidisciplinary teamwork** | |
| Formal multidisciplinary team meetings once a week to discuss individual patient progress, agree treatment goals, and plan management* | Incorporate teamwork into ward-round routine |
| Close linking of nursing with other multidisciplinary team care | Staff training might be needed<br>Shared clinical records |
| Early rehabilitation and goal setting | Staff (and carer) training might be needed |
| **Family involvement** | |
| Family (carers) are involved early in the rehabilitation process | Incorporate into ward-round routine |
| Family (carers) are provided with information about stroke causes, impairments, rehabilitation, recovery, and prevention | Access existing training resources (including online materials) |
| **Discharge planning** | |
| Early assessment of discharge needs; identification of recovery goals with patient and carer | Staff (and carer) training might be needed |
| Discharge plan involving patient and carers | Carer training important |
| Rehabilitation input in home setting | Carer training important<br>Consider telephone follow-up |

Data taken from Stroke Unit Trialists' Collaboration[49] and World Stroke Academy. *Some units use regular meetings of the core multidisciplinary team comprising nursing, medical, and physiotherapy staff.

***Table 2:*** **Key multidisciplinary skills, training, and communication activities**

| | Staff complement (WTE) in the stroke-unit trials | Considerations in low-resource settings where staffing levels might be few |
|---|---|---|
| Nursing (all grades) | 10 | Supplement with training and involvement of family or carers in daily patient care |
| Medical (all grades) | 1–2 | Protocols of care to guide nursing staff and junior medical staff (under supervision) |
| Physiotherapy (all grades) | 1–2 | Supplement with training and involvement of family or carers in daily patient care |
| Occupational therapy | 1 | Protocols of care to allow roles to be adopted by other staff (eg, nursing, physiotherapy staff) |
| Speech and language therapy | 0·5 | Protocols of care to allow roles to be adopted by other staff (eg, nursing, physiotherapy staff) |
| Social work | 0·5 | Protocols of care to allow roles to be adopted by other staff (eg, nursing, physiotherapy staff) |

Total staff complement in WTE for a stroke unit with ten beds. Staff complements represent (in WTE) all staff available (both on-duty and off-duty) per ten beds in the stroke unit. Data from Stroke Unit Trialists' Collaboration[49] and World Stroke Academy. WTE=whole-time equivalent.

***Table 3:*** **Indicative staffing levels**

# Planning a basic stroke unit development

- Engaging key decision-makers
- Evidence of stroke unit benefit
- Evidence for size and system of management of the stroke unit
- Demonstration of benefit (outcome measures)

# Who will run the Stroke Unit?

- Neurologist, Physician, Geriatrician, Rehabilitation Physician

**What is the best model for stroke rehab in less wealthy areas?**

# Home based Rehabilitation

- The early hospital discharge and home-based rehabilitation scheme was less costly ($8040) than conventional hospital rehab with community care ($10,054) for patients with stroke (Anderson et al, Stroke 2000;31(5):1032-7)

# Secondary Prevention

- **Stroke/TIA prevention clinic**
- **Education**

# Alternative Medicine

# Alternative therapies for stroke treatment in Asia

Jeyaraj Durai Pandian[1], Ming Liu[2], Jusuf Misbach[3], and N. Venketasubramanian*[4]

**Patients seek alternative therapies for stroke in Asia due to dissatisfaction with poststroke recovery. Most alternative therapies are of unproven benefit in rehabilitation. Well-conducted trials are needed to better define the role of alternative therapies in the process of poststroke recovery; the CHInese Medicine Neuroaid Efficacy on Stroke recovery is ongoing. However, further studies, better health education and rehabilitation services and centers are also required.**

Key words: alternative medicine, cerebrovascular disease, stroke, traditional medicine

Stroke is a major cause of death and disability in most regions of the world. In Asia, dissatisfaction with poststroke recovery has led many to opt for alternative therapies (AT) (1). However, most ATs are of unproven benefit (2). In East Asia, acupuncture/acupressure, moxibustion, herbal medicine, qigong and tai chi are used. In South Asia, ATs include ayurvedic massage, marma therapy, reiki therapy, herbal medicine and yoga; herbal baths, prayer, reflexology and 'energy transfers' are also used. Well-conducted trials are needed to better define the roles of ATs.

In an ongoing study from India, 48% of chronic stroke patients received AT, including ayurvedic massage (60%), homeopathy (12·5%), herbal medicine (12·5%), witchcraft (2·8%) and opium (9·6%) (3).

*Ayurvedic massage* (Fig. 1) of the entire body using medicated oils, followed by a steam bath may help prevent inactive muscles from degenerating, while medicated oils may help stimulate the circulatory system (4).

In *Marma therapy*, 'Marmasthans' claim to use energy 'chakras' and special energy points to 'unblock the channels of energies' (5).

*Reiki*, the energy healing system, is based on the belief that feelings and thoughts have the power to guide energy (6).

*Herbal medicine/homoeopathy* (Fig. 2) has also been tried, containing extracts such as *Matricaria recutita*, curcuma oil (turmeric) *Embelia ribes* Burm, *Bacopa monniera* and *Valeriana wallichii* (7).

*Yoga* may benefit chronic stroke patients (8).

ATs are used by 42–80% of stroke patients in China and 54% in Korea, especially by the less educated (9–12). Traditional Chinese medicines (TCMs) include herbal medicine, acupuncture/acupressure, moxibustion and qigong/tai-chi (13, 14); herbal remedies have also been used in Japan (15). Herbs are classified into two major dimensions. The first refers to temperature characteristics, namely hot (re), warm (wen), cold (han), neutral (ping) and aromatic. The second refers to the taste, namely sour (suan), bitter (ku), sweet (gan), spicy (xin) and salty (xian). Combinations of temperature and taste give the herb its properties, which can act on internal 'zang-fu' organs to influence the 'yin' and 'yang' energy patterns of the body.

*Acupuncture/acupressure* involves the stimulation of specific points on the skin, usually by the insertion of needles/pressure (16, 17); this process may be combined with aromatherapy (18). In *moxibustion* (Fig. 3), the herb *Artemisia vulgaris* (mugwort) is burned over the acupuncture site for the purpose of warming (19). Both are based on the theory that 'qi' (vital energy) and blood circulate in the body through a system of

**Fig. 1** Ayurvedic massage.

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# Complementary and Alternative Medicine Treatments Among Stroke Patients in India

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**Background:** Complementary and alternative medicine (CAM) is commonly used by persons with stroke throughout the world, particularly in Asia. **Objective:** The objectives of this study were to determine the frequency of CAM use and the factors that predict the use of CAM in stroke patients. **Methods:** This study was carried out in the stroke units of Christian Medical College, Ludhiana, and Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, India, from June 2010 to December 2010. Participants were interviewed using a structured questionnaire (≥6 months post stroke). Outcomes were assessed using a modified Rankin Scale (mRS). **Results:** Three hundred fourteen stroke patients were interviewed; mean age was 57.4 ± 12.9 years, and 230 (73.2%) patients were men. Of 314 patients, 114 (36.3%) had used the following CAM treatments: ayurvedic massage, 67 (59.3%); intravenous fluids, 22 (19.5%); herbal medicines, 17 (15%); homeopathy, 15 (13.3%); witchcraft, 3 (2.7%); acupuncture, 3 (2.7%); opium intake, 10 (8.8%); and other nonconventional treatments, 10 (8.8%). Patients with severe stroke ($P < .0001$), limb weakness ($P < .0001$), dysphagia ($P = .02$), dyslipidemia ($P = .007$), hypertension ($P = .03$), or hemorrhagic stroke ($P < .0001$) and patients with poor outcome (mRS >2; $P < .0001$) often used CAM treatments. **Conclusion:** More than one-third of the patients in this study opted for CAM. Presence of limb weakness, dysphagia, dyslipidemia, hypertension, hemorrhagic stroke, severe stroke, and poor outcome predicted the use of CAM. **Key words:** *complementary medicine, alternative medicine*

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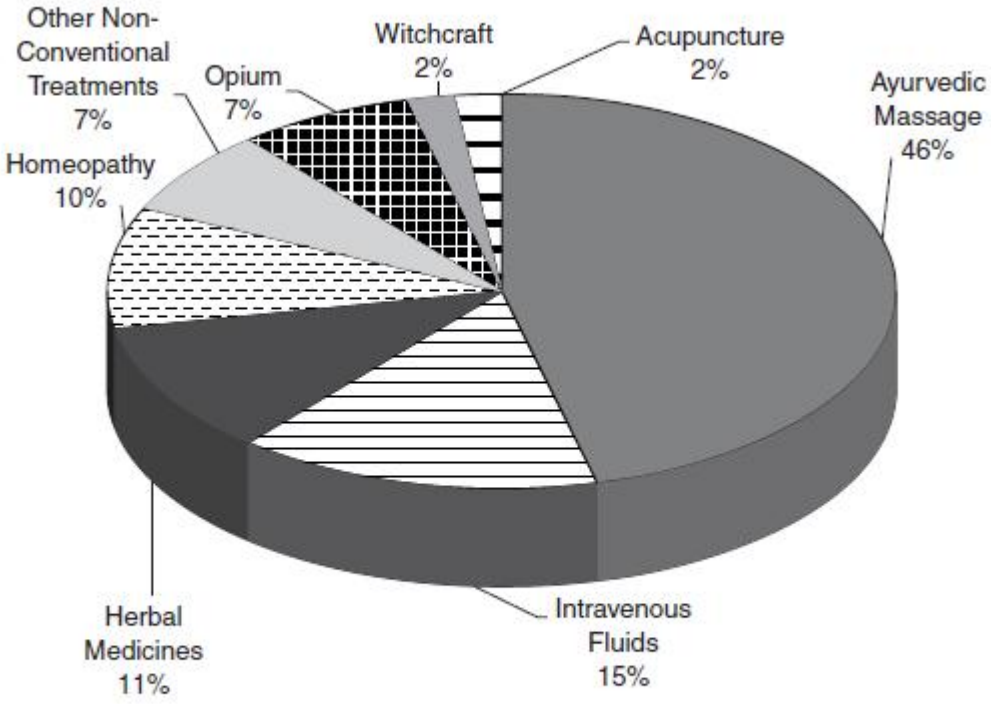


**Figure 1.** Types of complementary and alternative medicine used by patients.

**Pandian et al. Top Stroke Rehabil 2012;19(5):384-394**

# Conclusions

- Stroke care services are well developed in high income countries with differences based on health system
- Comprehensive stroke unit with ESD- greater benefit
- In middle and low income countries very few stroke units are available
- Basic stroke services are feasible
- Best model for rehabilitation ?home based

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EDITORIAL



# Essential Stroke Services – Introduction

Peter Langhorne, UK; Jeyaraj Durai Pandian, India;
and Linda De Villiers, South Africa

Stroke units are now seen as the central, effective component of a modern stroke service. However, most stroke unit developments have been carried out in high-income countries. This raises the question of whether such care is applicable to low- and middle-income countries (LMICs). This module demonstrates that:

1. Stroke units appear to offer important population health gains in LMICs.
2. We can identify many of the important components of a "lower technology" stroke unit including examples that have been established in LMICs.
3. We need to understand and address the barriers to establishing stroke units.

There are significant challenges to the widespread development of stroke units but these challenges are too important to avoid.

The new WSA Learning Activity can be accessed here. ■

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