

London Stroke Model

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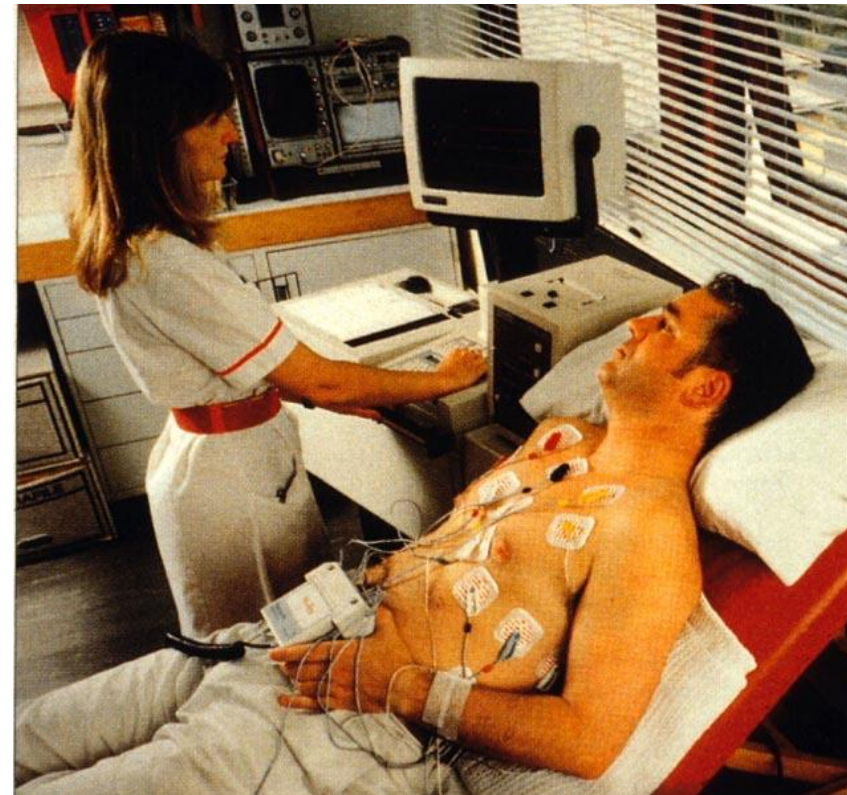
We know what a good stroke service should provide

- Effective primary prevention
- Public education about stroke symptoms and how to respond
- Hyperacute stroke care
- Rehabilitation stroke unit care for whole admission
- Early supported discharge
- Longer term rehabilitation as needed
- Vocational rehabilitation and psychological support
- Secondary prevention
- Patient and carer support and education
- Participation in research
- Continuous quality improvement

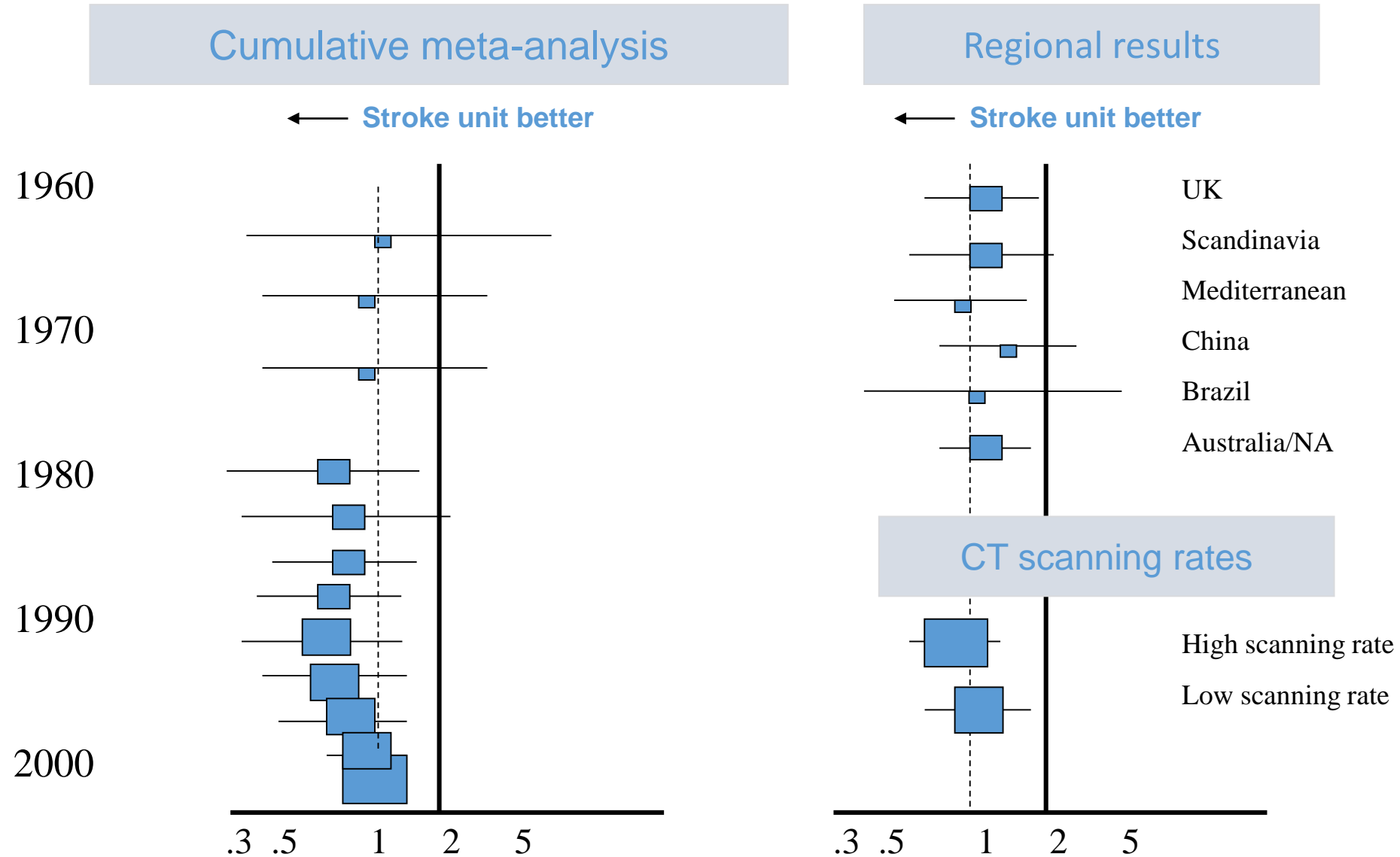
Treating Stroke: What really makes a difference?

Stroke Units

- Coordinated multidisciplinary rehabilitation,
- Clear protocols for management of stroke related problems
- Staff with a specialist interest in stroke or rehabilitation,
- Routine involvement of carers in the rehabilitation process
- Regular programmes of education and training.
- Not just about acute stroke care



Stroke unit outcomes - death or institutional care



Association of care with good outcomes

RCP stroke audit

Odds of death at 30 days

“Stroke unit” item

Early stroke consultant assessment

CT scan within 24 hours

Early nurse & therapist assessment

Early swallow assessment & nutrition management

Early *iv* fluids and aspirin

P value

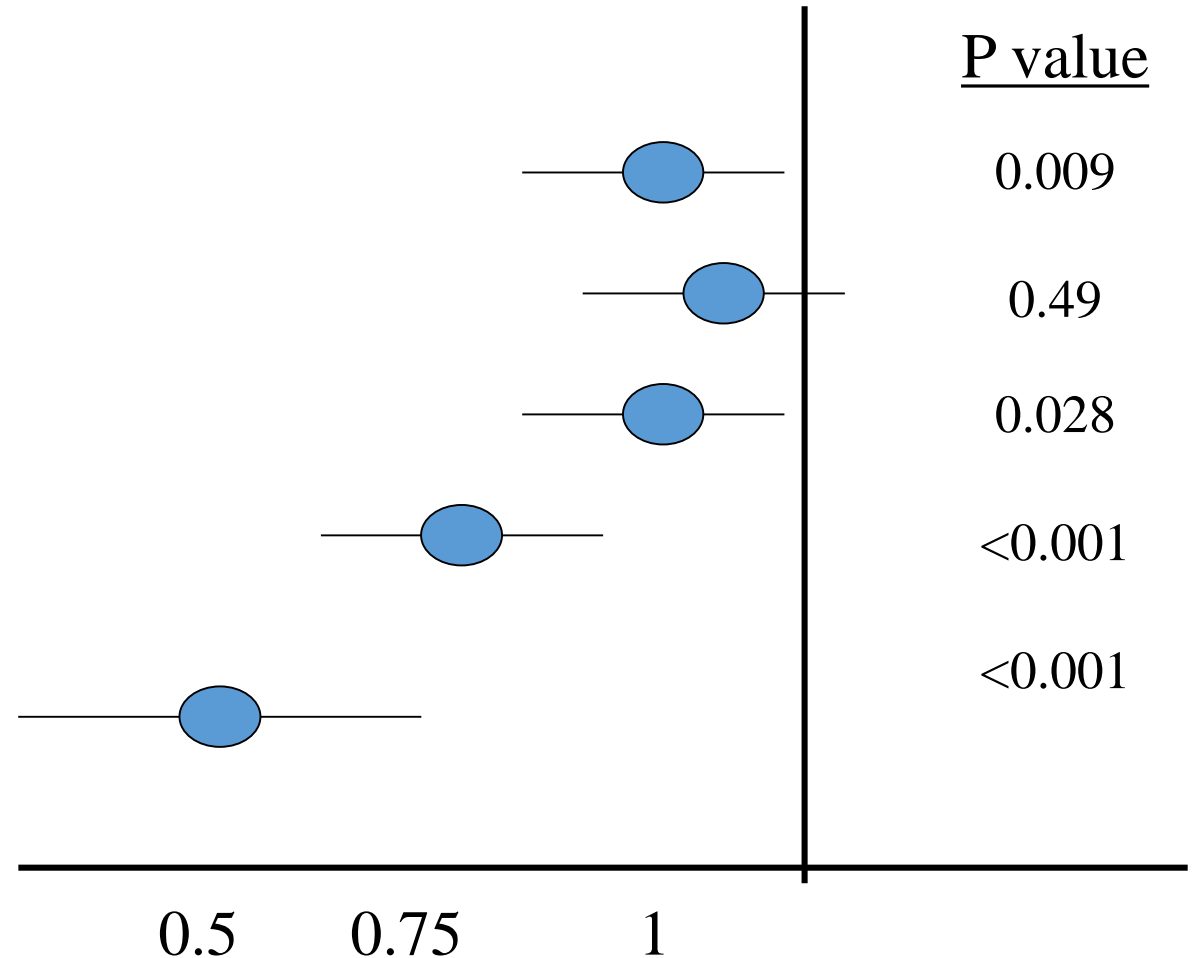
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0.028

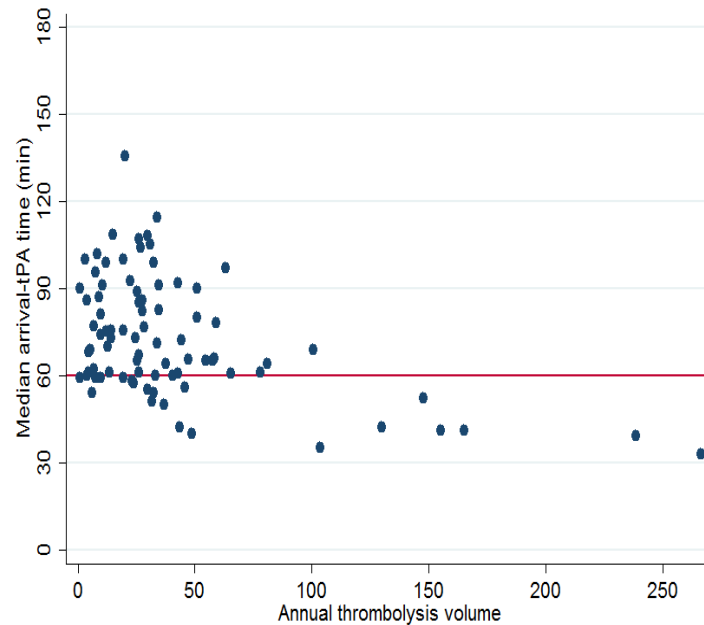
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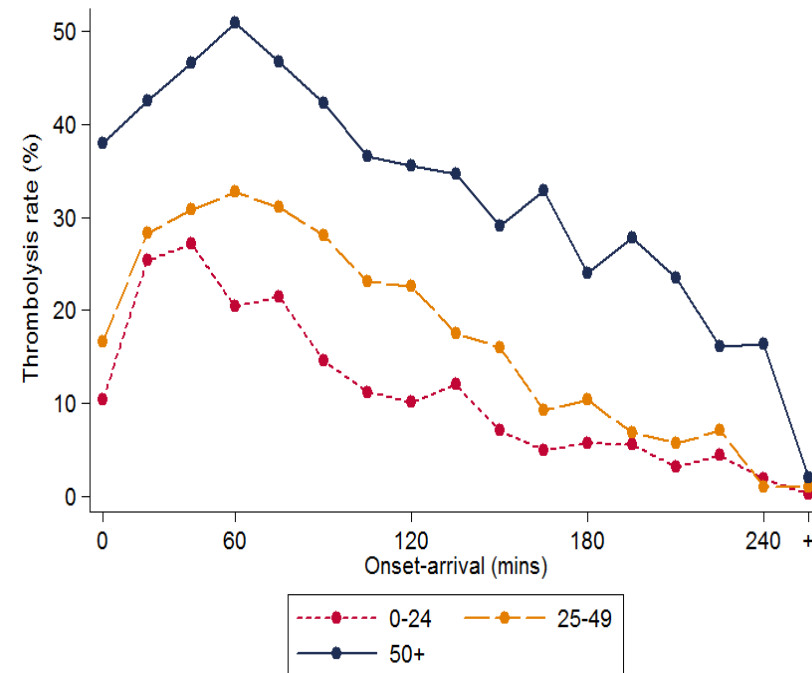


Does the size of unit matter?

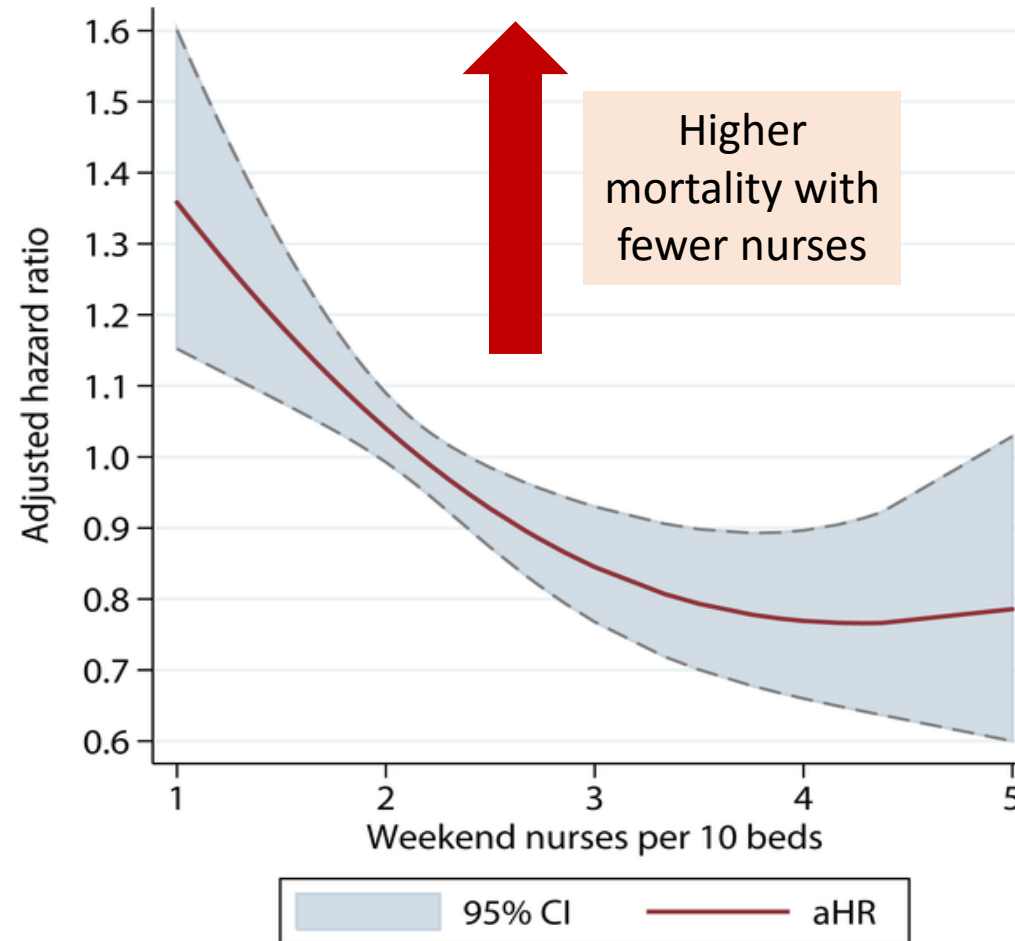
- Door to needle times



- Number of patients thrombolysed

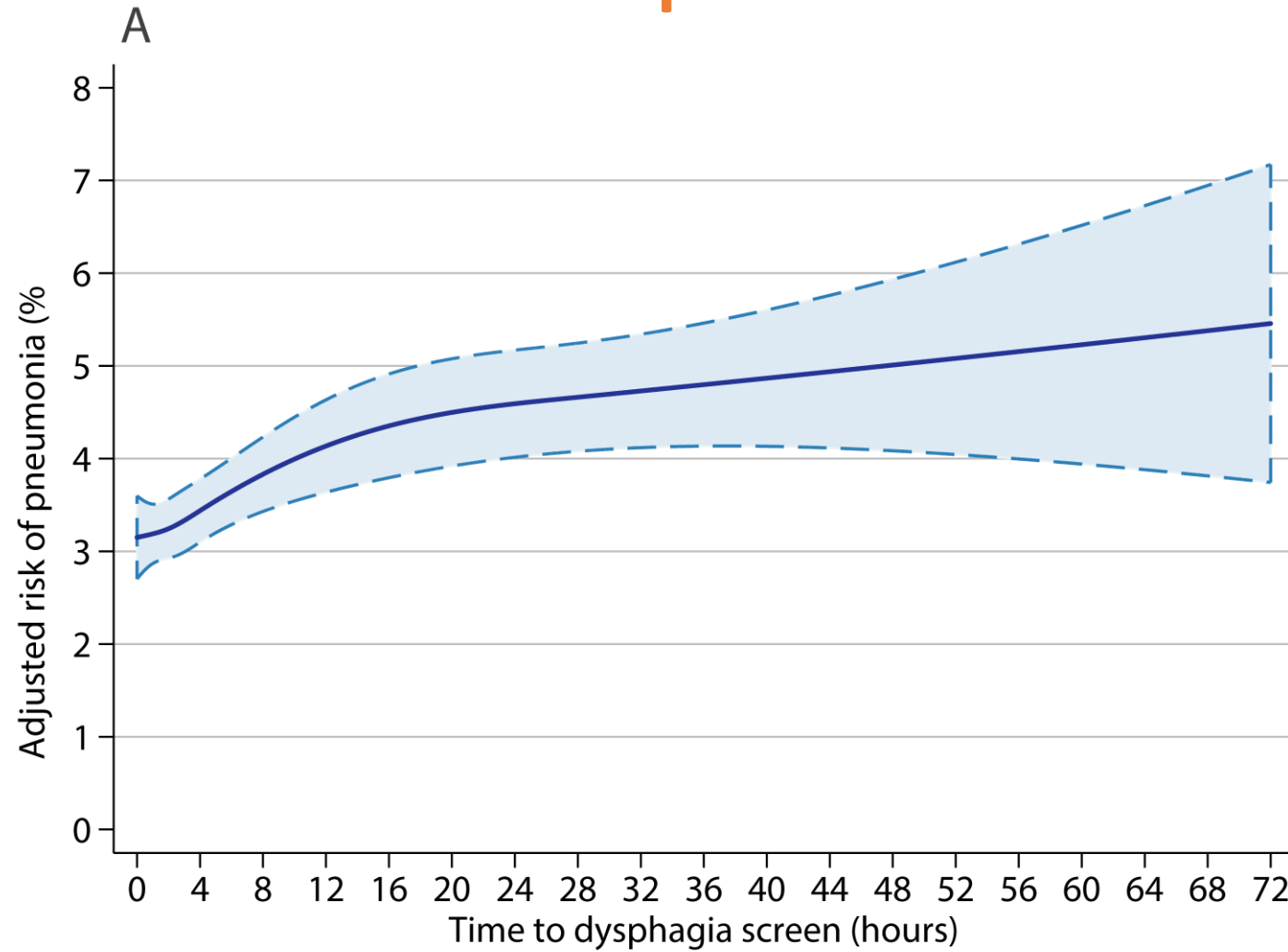


Adjusted Hazard Ratio of 30-day Mortality of Patients Admitted on Weekends, by Ratio of Registered Nurses Per Ten Beds on the Weekend



Bray BD, Ayis S, Campbell J, Cloud GC, et al. (2014) Associations between Stroke Mortality and Weekend Working by Stroke Specialist Physicians and Registered Nurses: Prospective Multicentre Cohort Study. PLoS Med 11(8): e1001705. doi:10.1371/journal.pmed.1001705
<http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1001705>

Time to dysphagia screen and risk of stroke-associated pneumonia



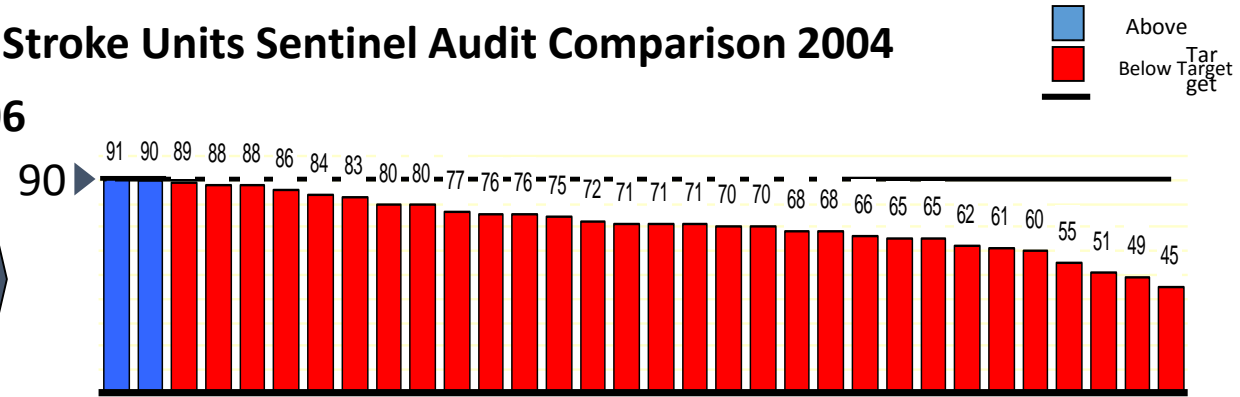
Modelled association adjusted for age, sex, stroke type (ischaemic, primary intracerebral haemorrhage, undetermined), pre-stroke functional level (modified Rankin Score), place of stroke (out of hospital or inpatient) and comorbidity, and NIHSS

Transforming Stroke care in London: Case for change

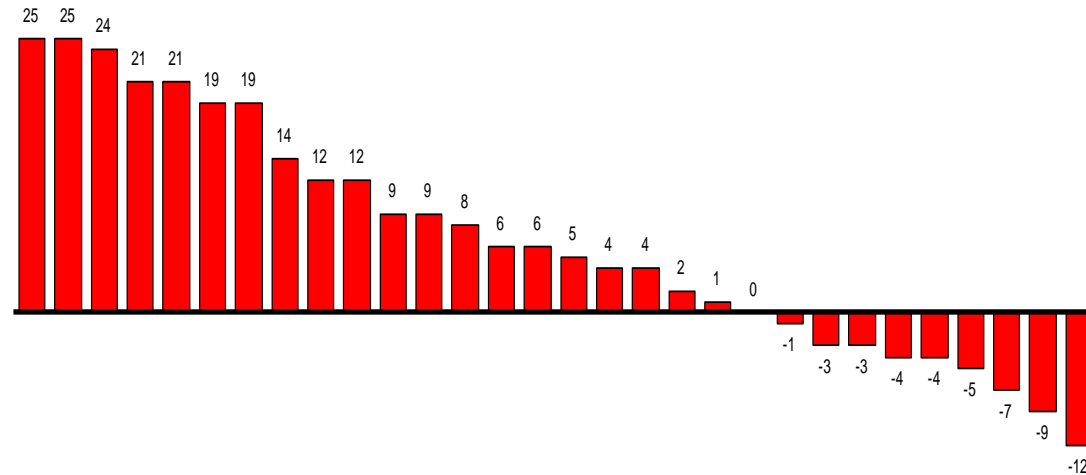


London Stroke Units Sentinel Audit Comparison 2004 and 2006

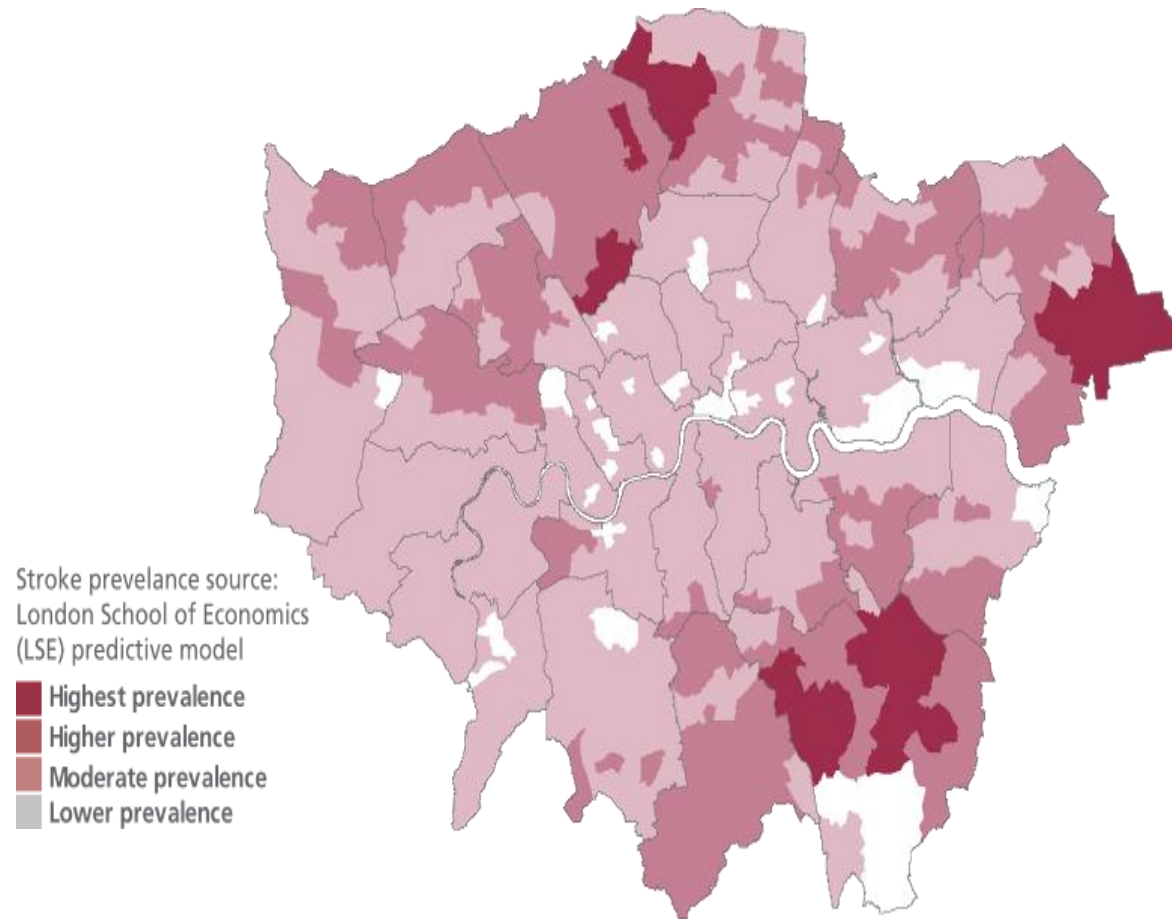
London Stroke Providers against Sentinel Audit 12 key indicators 2006



Change in London Stroke Providers against Sentinel Audit 12 key indicators 2006 vs 2004 scores



The scale of the problem of stroke in London



- Second biggest killer and most common cause of disability
- Population >8 million
- 8,000 strokes a year in London – 1200 deaths

Decision 'something needed to be done'

- Wide clinical support for change
- Strong evidence to show what a service should look like
- A health service structure that enabled structural change
- A strong leader of the London Strategic Health Authority - Dame Ruth Carnall

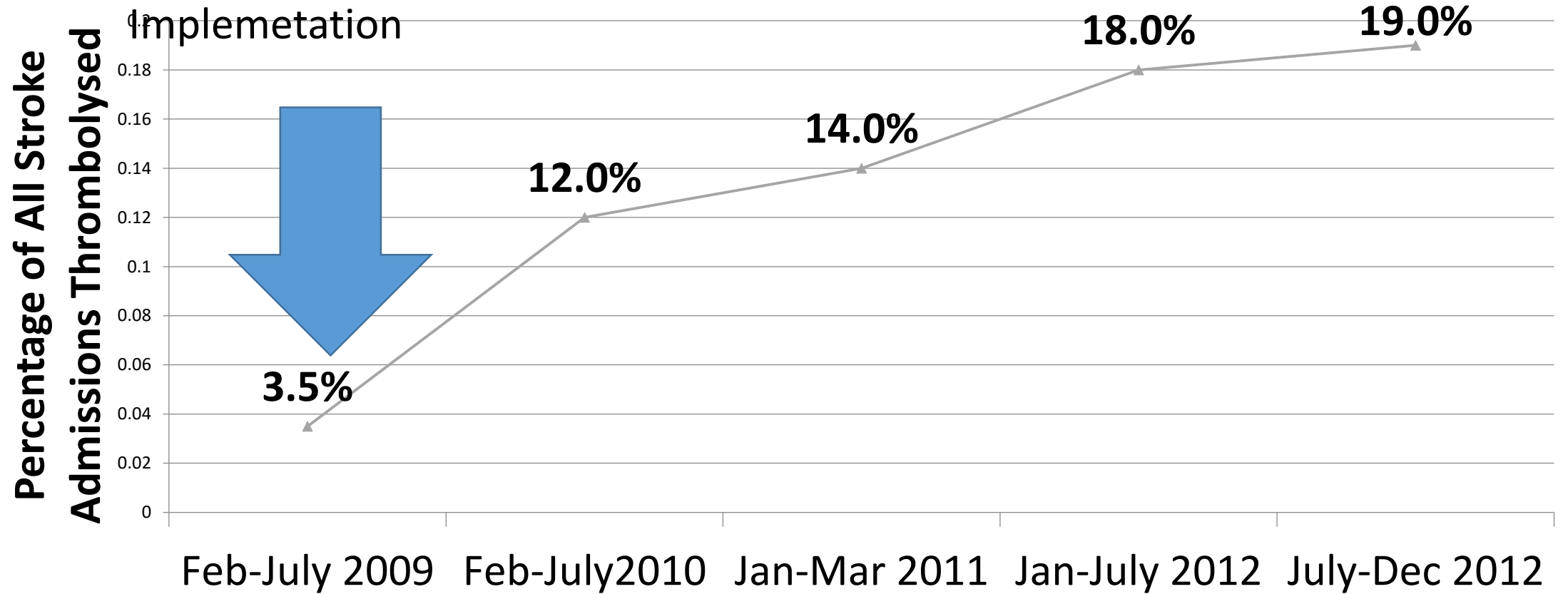
Standards for services

- Minimum staffing levels e.g.
 - 2.9 nurses/bed on HASU, 1.35 nurses per bed on ASU
 - 1.46 physiotherapists per 10 beds on HASU and 1.62 per 10 beds on ASU
- Standards for door to needle times
- Access to imaging (at least 2 CT scanners on site and access to MRI)
- 7 day consultant led ward rounds on the HASU and 5 day consultant rounds on ASU
- Transfer from HASU to ASU when required within 48 hours of request
- Standards for time from admission to being seen by PT, OT, SALT, Dietitian,
- Participation in research
- Patient involvement in running the service

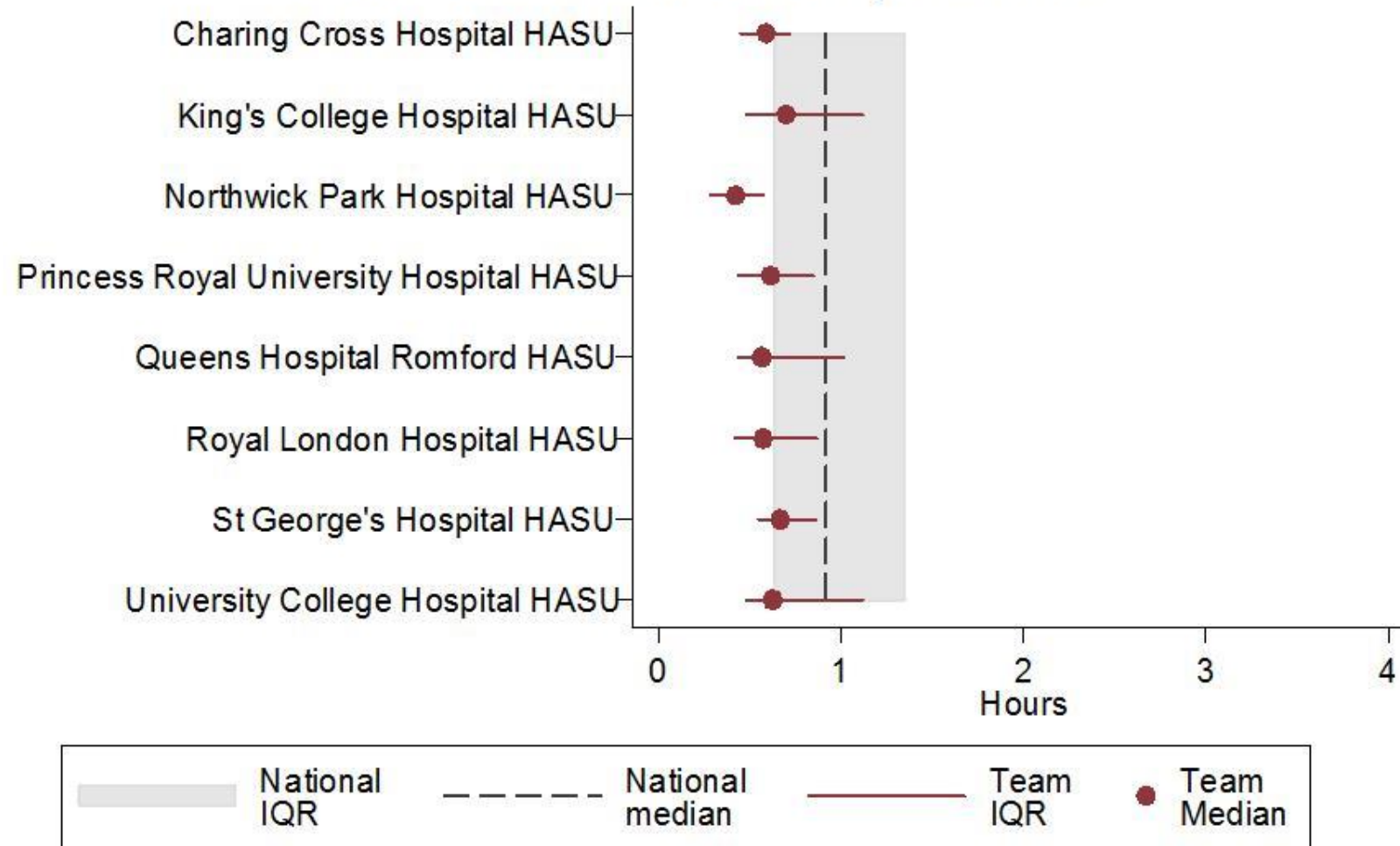
Final model

- 8 Hyperacute stroke units (HASU) (first 72 hours) each with their own Acute Stroke Units (ASU)
 - Situated within max 30 mins. travel time of all London population
- Further 16 ASUs
- Stopped all stroke care in 8 hospitals
- Repatriation where needed up to 72 hours (longer if too unstable to transfer).
- 400 additional nurses needed and about 100 therapists
- Improve community care and longer term rehabilitation
- 7 day services for the management of transient ischaemic attack

Thrombolysis Rates in London



Clock start to thrombolysis time

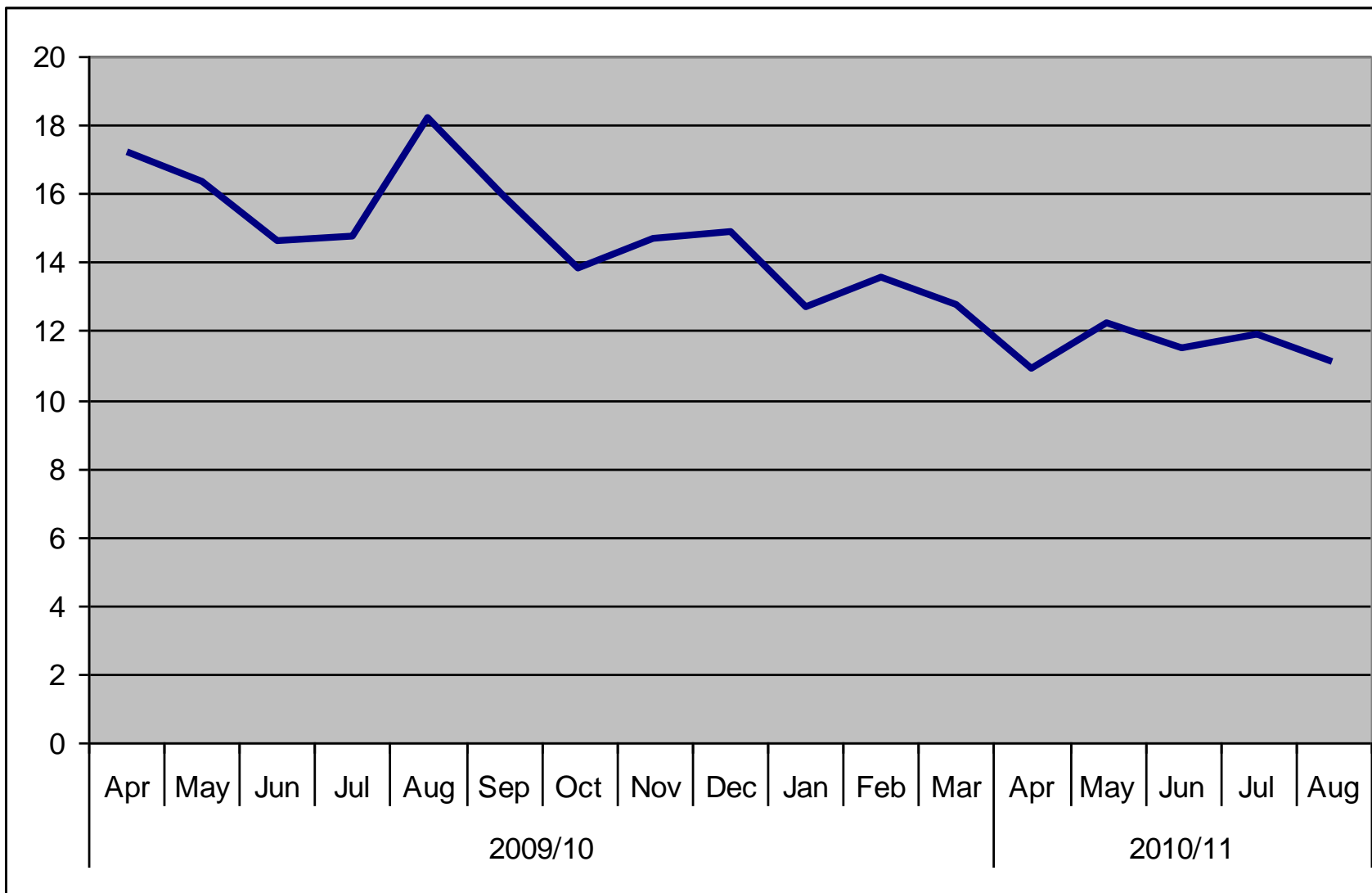


Source: SSNAP Oct-Dec 2014
Patient-centred results at team level for Key Indicator 3.5A

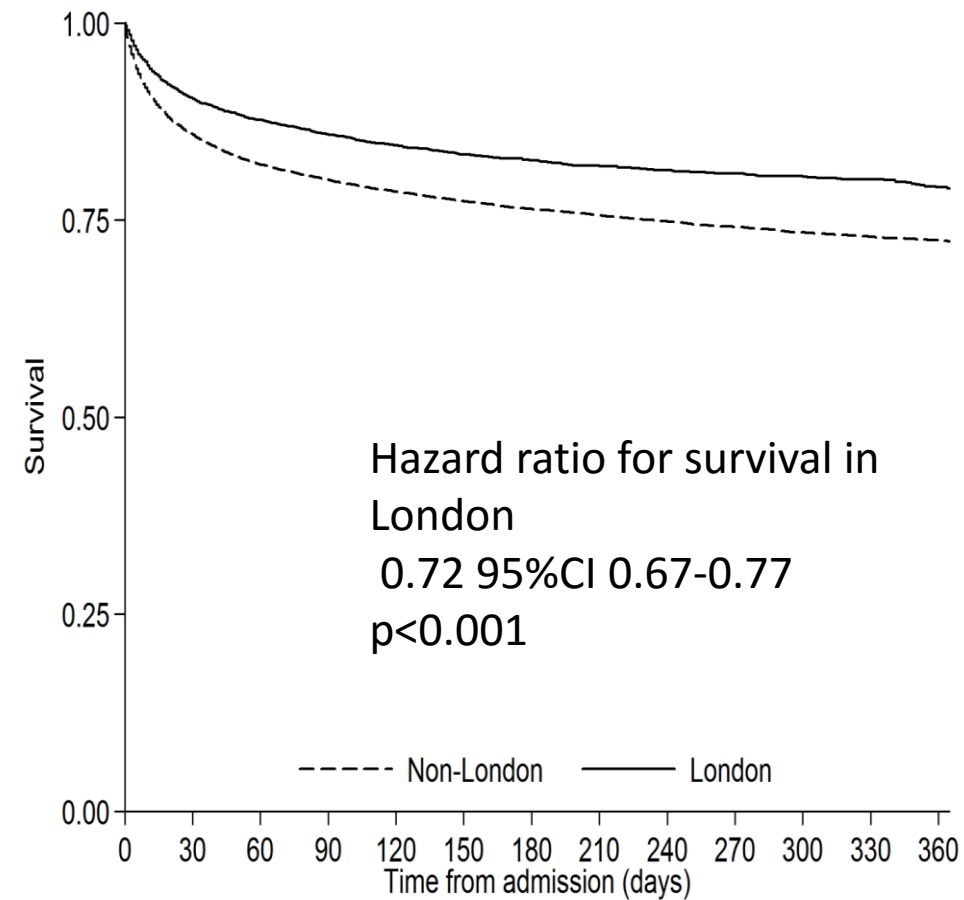
London SCN

Processes of Care

Average length of stay



London Stroke Survival vs Rest of England



SINAP Audit Data

Cost Effectiveness of London Reconfiguration at 90 days

	Before	After	Difference
Total costs	£96,585,248	£82,982,273	-£13,602,975
Mean cost per stroke	£15,002	£12,889	-£2,113
Total deaths	963	726	-237
Total QALYs	570	694	123
Mean QALYs per patient	0.089	0.108	0.019

National Impact of the London reconfiguration

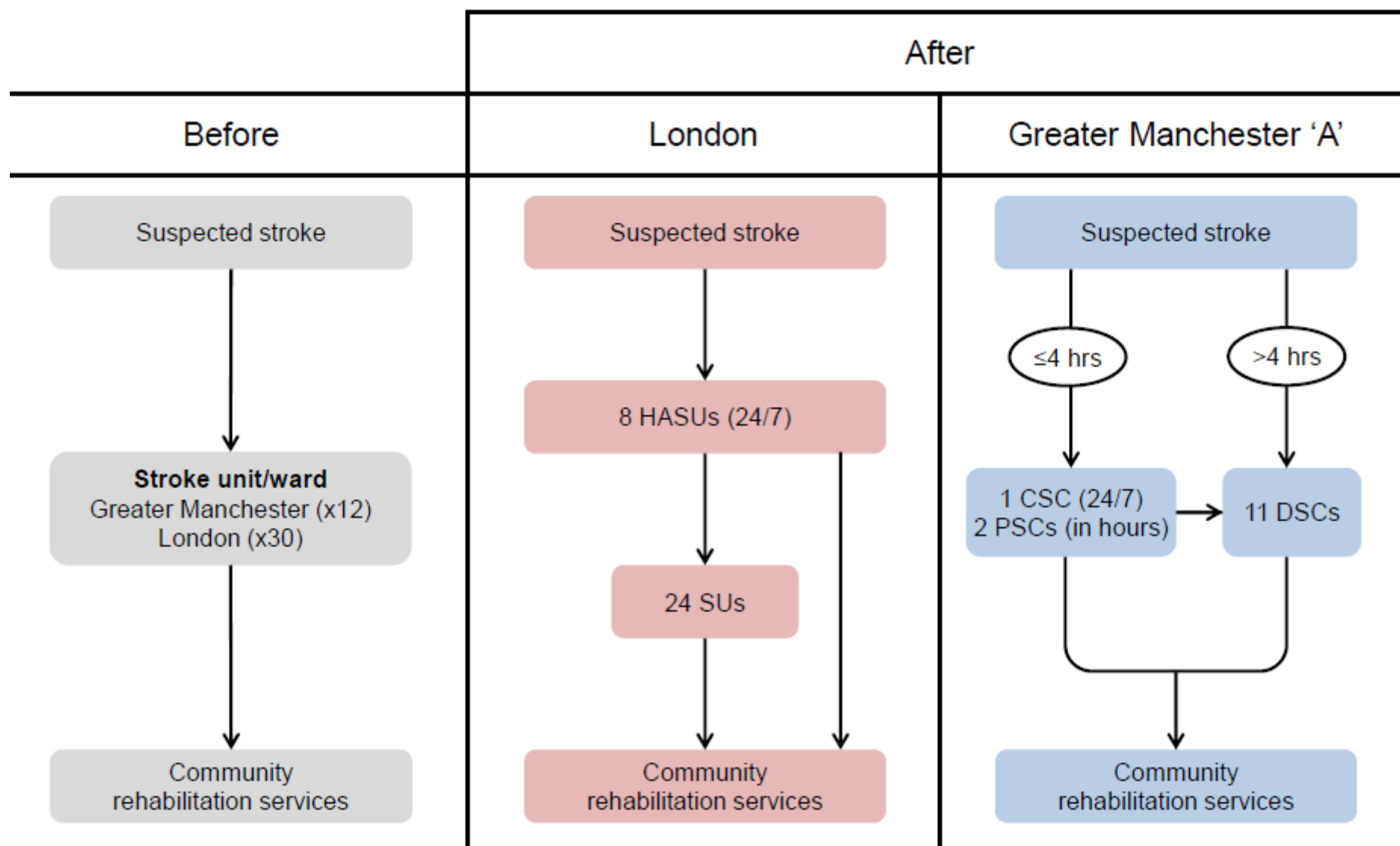
- Similar reconfigurations being developed for stroke in many other areas of England
- Stroke in London being used as the example to justify centralisation of specialist services in a smaller number of hospitals
 - Vascular surgery
 - Acute Kidney Injury
 - Major trauma etc....

Are there alternative models?

Manchester

- Manchester underwent a reconfiguration of stroke care at the same time as London
- Decision that main aim was to increase the proportion of patients receiving thrombolysis
- During normal working hours patients taken no usual hospital
- Outside normal hours only took patient to the comprehensive stroke centre if potentially thrombolysable

The changes



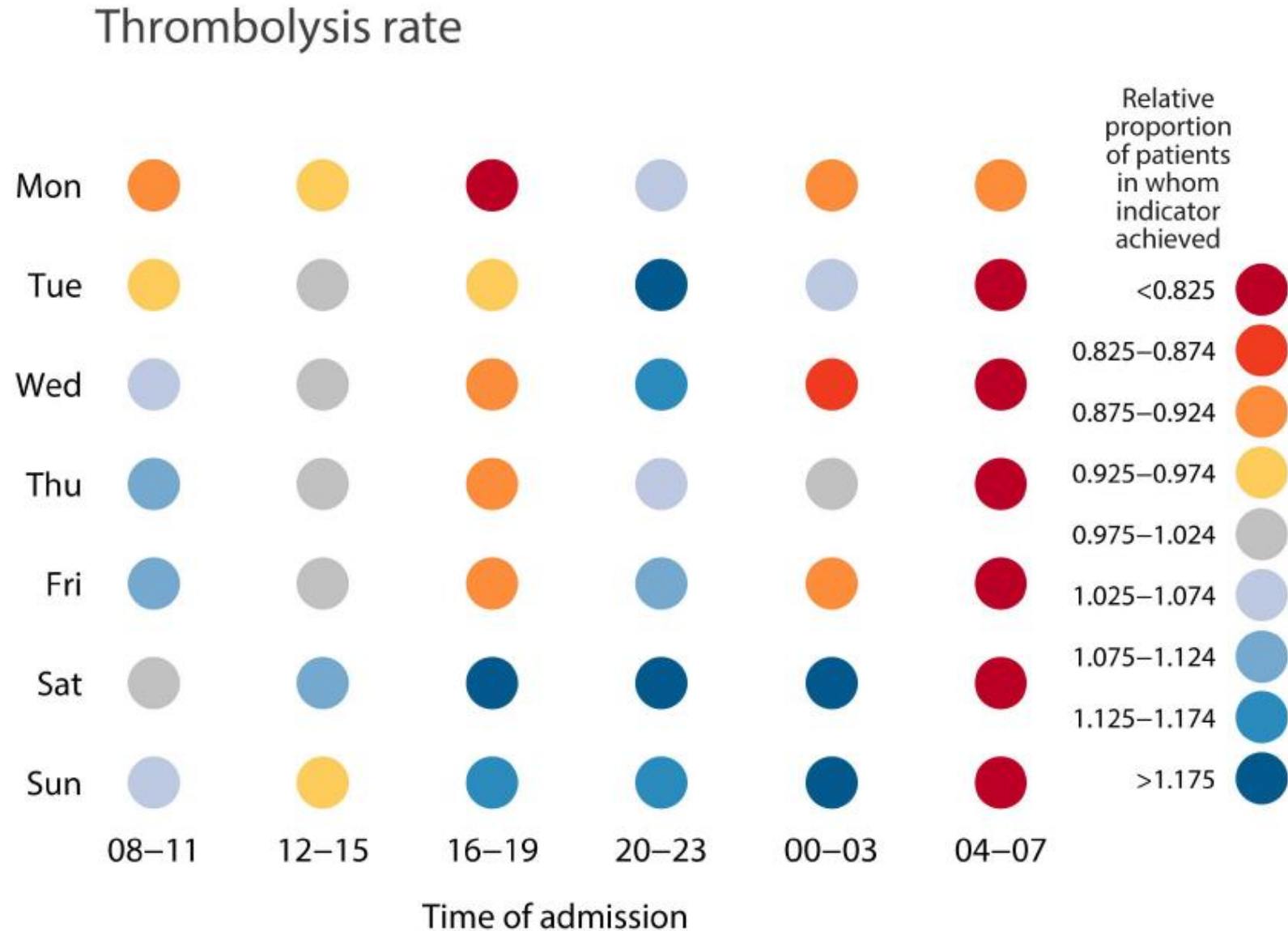
Impact of London and Manchester Reconfiguration

Outcome	Greater Manchester	London
Mortality (before and after)	No significant difference from rest of England	Significantly greater reduction than rest of England
Length of stay (before and after)	Significantly greater reduction than rest of England	Significantly greater reduction than rest of England
Provision of evidence-based care (after)	Overall, not significantly better than non-centralised comparator. Hyperacute services significantly better than comparator area	Overall, significantly better than comparator area. Hyperacute services significantly better than comparator area
Adherence to local stroke pathway (after)	67% suspected stroke patients presenting with 4h taken appropriately to hyperacute service	98% suspected stroke patients taken appropriately to hyperacute service

Lessons from London and Manchester

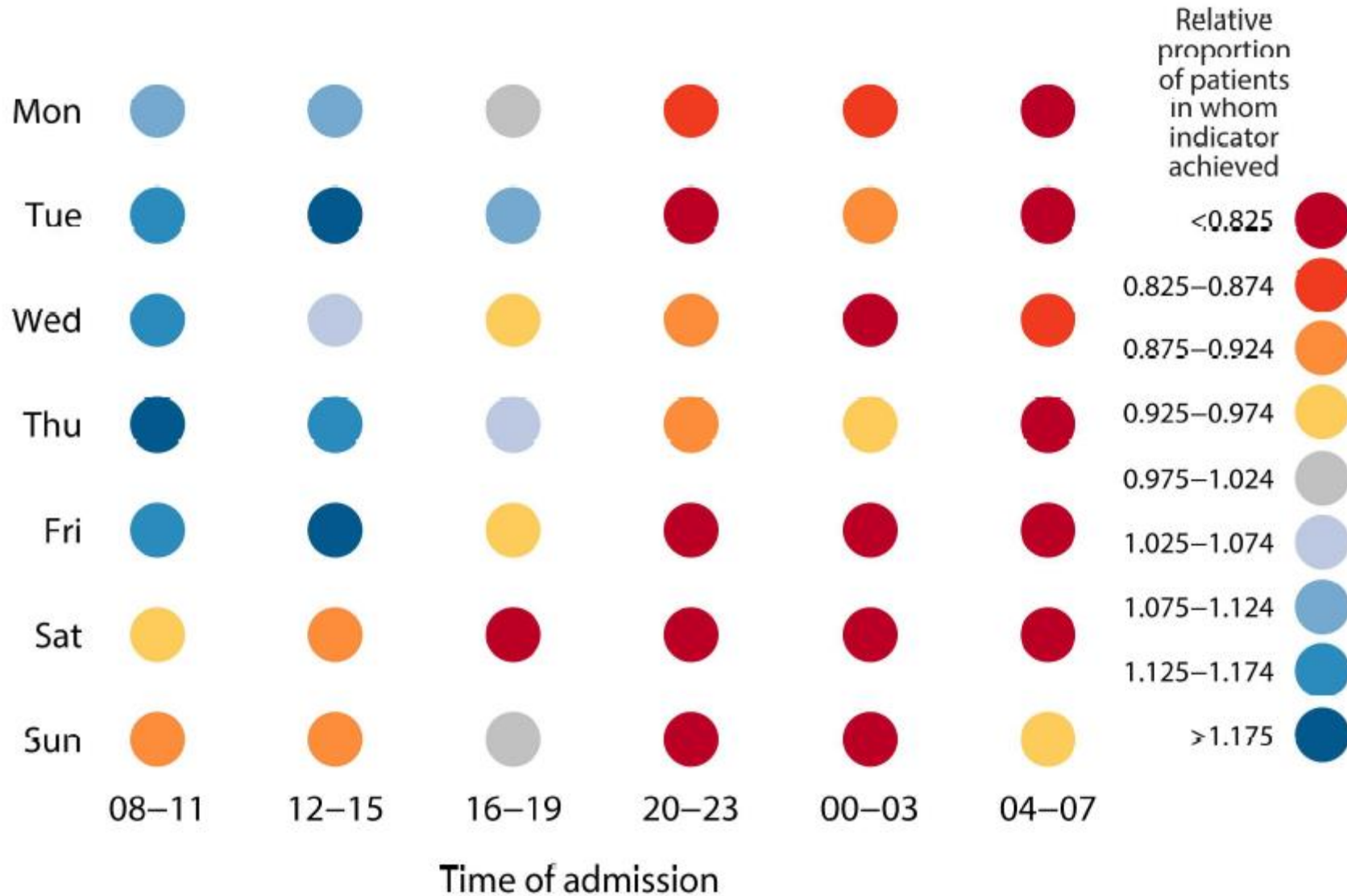
- Hub and spoke model can work in a large urban area
- The stroke services should be for the patients. Not the clinicians or the hospitals
- Patients will accept going to a hospital that is not their local hospital if the reasons explained
- The most important change needed is to admit ALL stroke patients to the hyperacute stroke unit
- Not just about acute care and not just about thrombolysis. The whole pathway must be reformed at the same time
- Need to invest to save
- Need strong leadership to make it happen with the support of strong politicians

Variation in care during the week



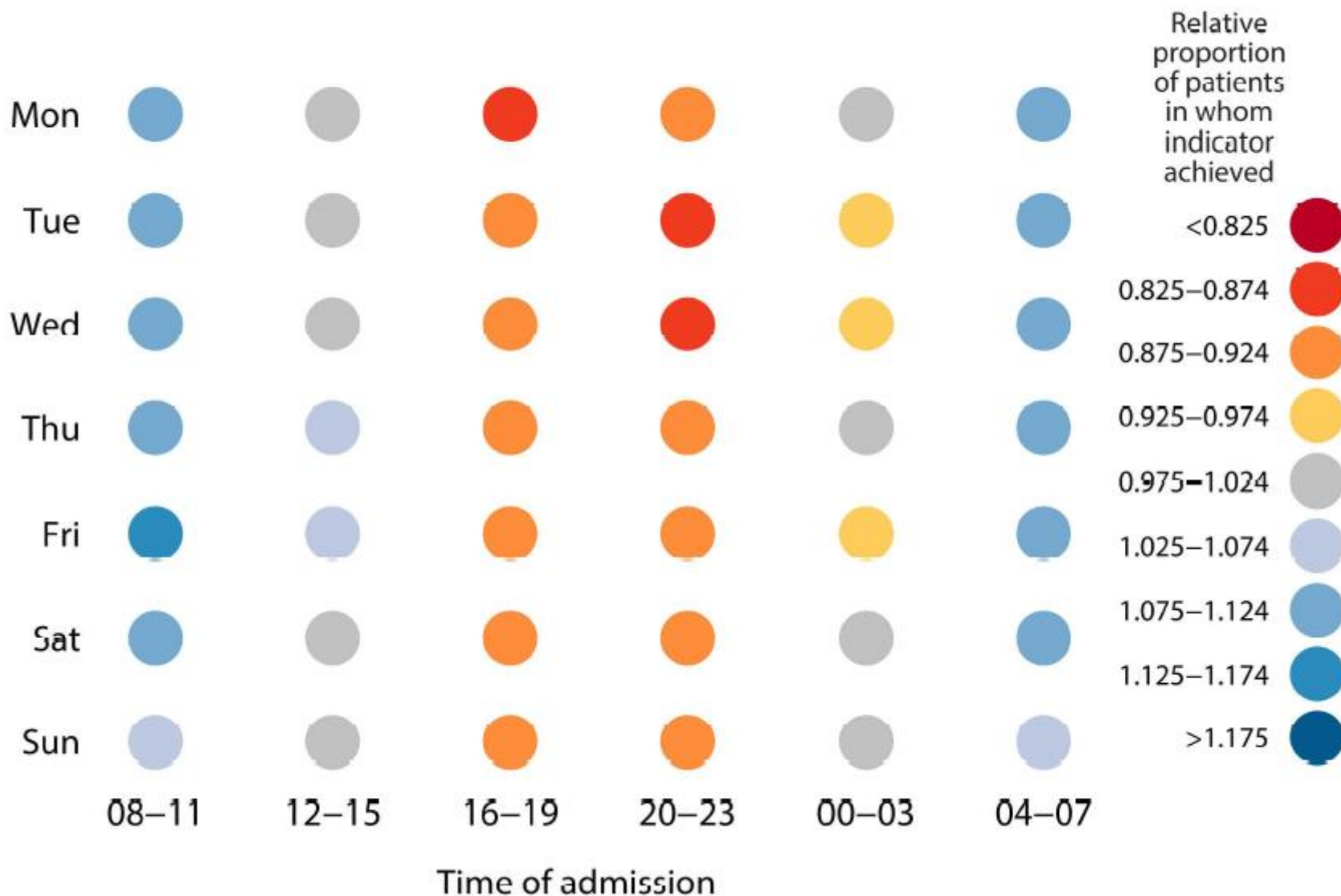
Variation in care during the week

Door to needle < 60 minutes

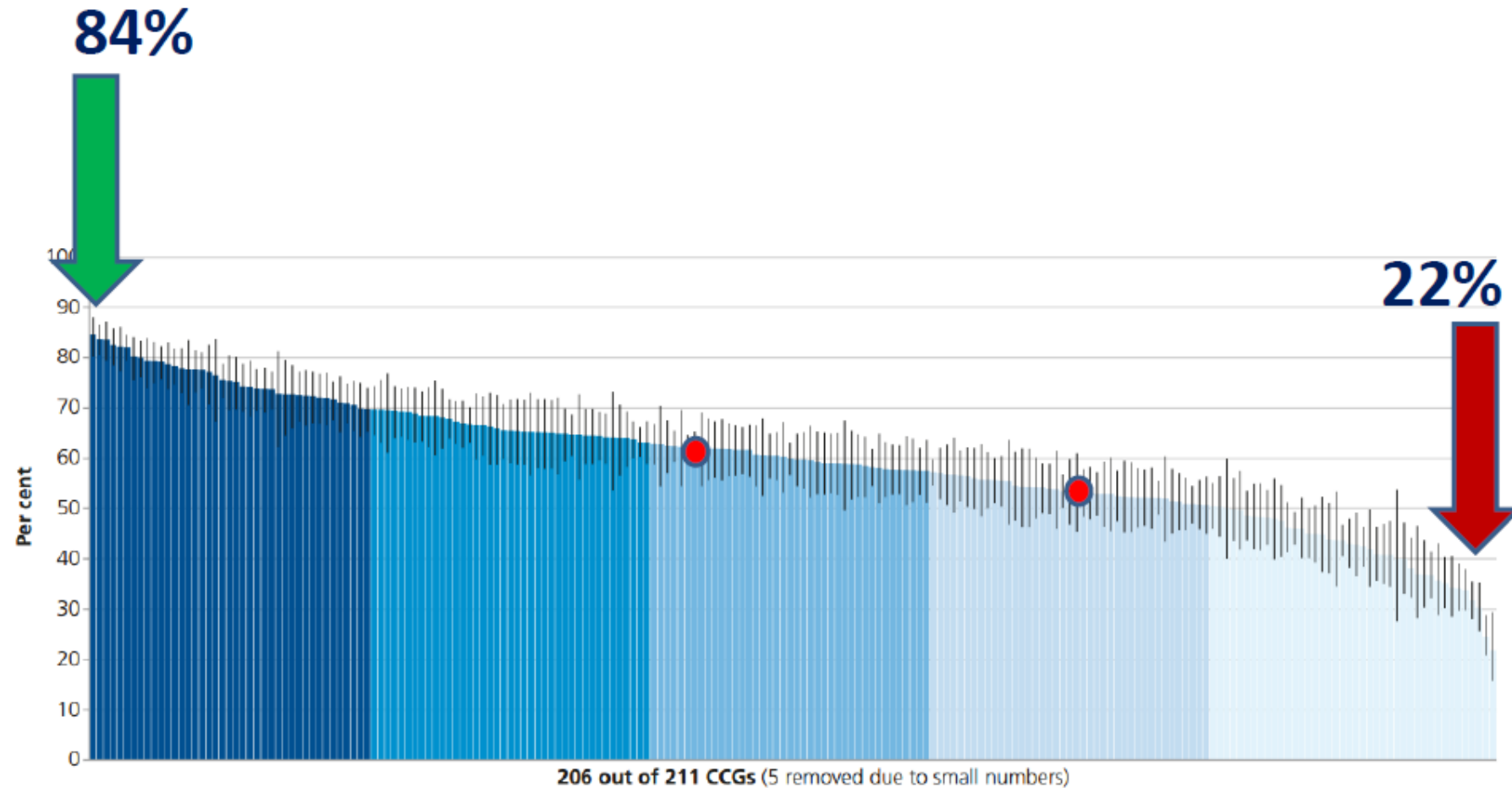


Variation in care during the week

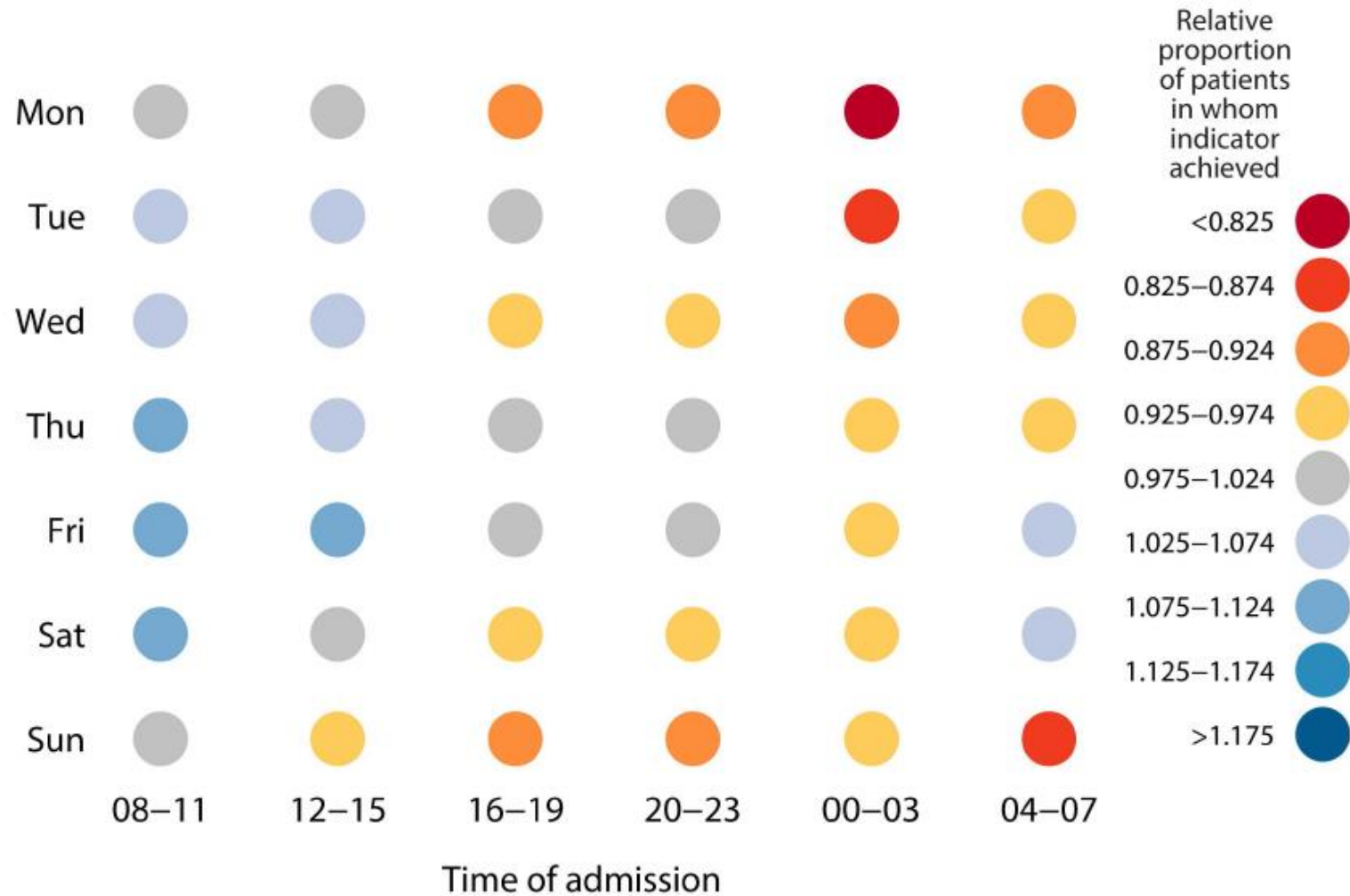
Brain scan within 12 hours



What are your chances of getting admitted to a stroke unit within 4 hours?



Admission to a Stroke Unit within 4 hours



Population impact of services

64 million inhabitants (80,000 strokes per year)

Impact in terms of extra independent survivors per year

Intervention	Maximum impact Extra independent survivors if all patients were eligible	Proportion eligible for treatment (%)	Actual impact Extra independent survivors per year
Rapid secondary prevention	160	All TIA; 15 stroke	800
Stroke unit (CSU) service	4000	80	3200
Rehabilitation (ESD) service	4000	30	1200
<i>Service total</i>	-	-	5200
Aspirin	800	80	640
rtPA within 0-3 hrs	8800	10	1280
rtPA within 3-4.5 hrs	4000	10	
Mechanical thrombectomy	8800	10	880
Hemicraniectomy	16000	0.5	80
<i>Acute medical total</i>	-	-	2280
<i>Total</i>	-	-	8080

Slide courtesy Prof Peter Langhorne