

Variations in practice patterns and outcomes after stroke across countries at different economic levels: the INTERSTROKE study

Peter Langhorne on behalf of the INTERSTROKE Investigators



INTERSTROKE Investigators Meeting
Beijing, 2009



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Project funding from Chest, Heart and Stroke Scotland

Main INTERSTROKE study had a range of funders

Population Health Research Institute, McMaster University, Hamilton, Canada



Faculty Disclosure

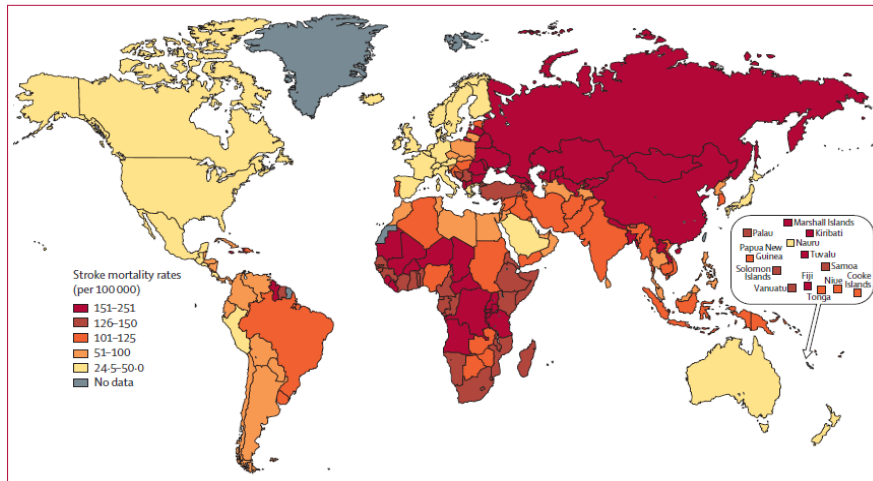
X	No, nothing to disclose
	Yes, please specify:

<i>Company Name</i>	<i>Honoraria/ Expenses</i>	<i>Consulting/ Advisory Board</i>	<i>Funded Research</i>	<i>Royalties/ Patent</i>	<i>Stock Options</i>	<i>Ownership/ Equity Position</i>	<i>Employee</i>	<i>Other (please specify)</i>
Example: company XYZ	x		x		x			

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Global variation in stroke mortality

Johnston et al. *Lancet Neurology* 2009

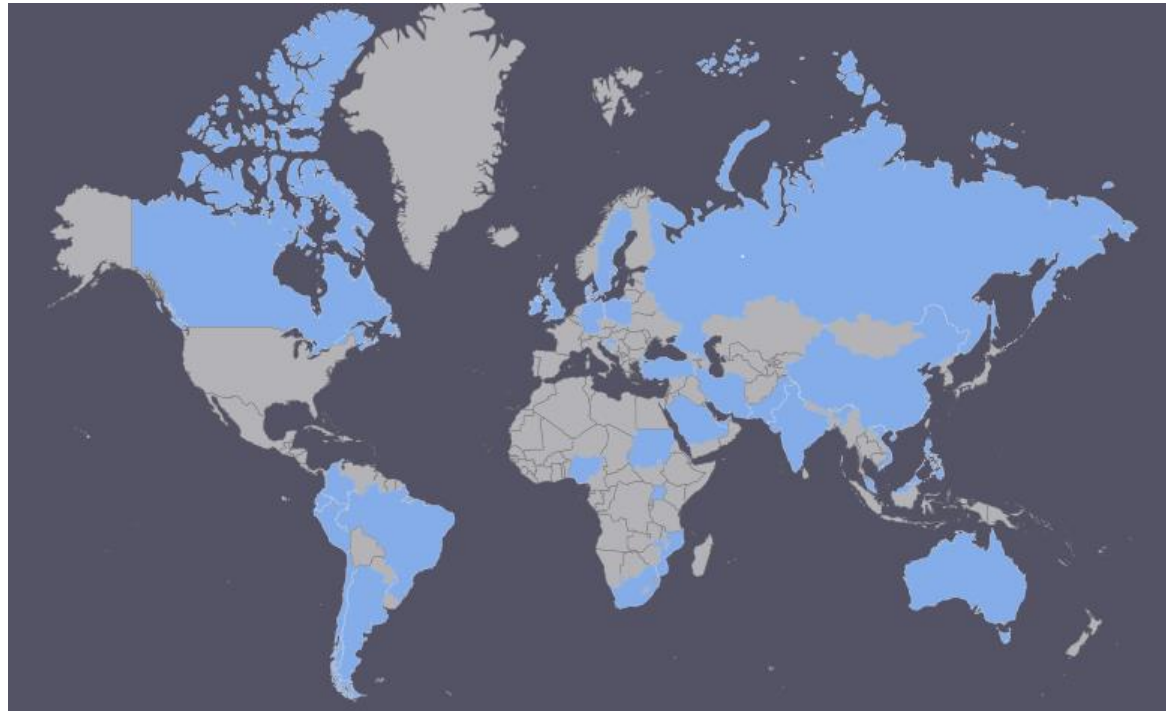
Most people experiencing stroke now live in low- or middle-income countries

Many stroke improvements have taken place in high income countries

Little is known about situation in low- and middle-income countries

International case control study of the strength of association
between risk factors and stroke across 32 different countries
(O'Donnell et al. Lancet 2016)

UK, Ireland, Sweden, Denmark, Germany, Poland, Croatia



Canada
Colombia
Ecuador
Peru
Brazil
Chile

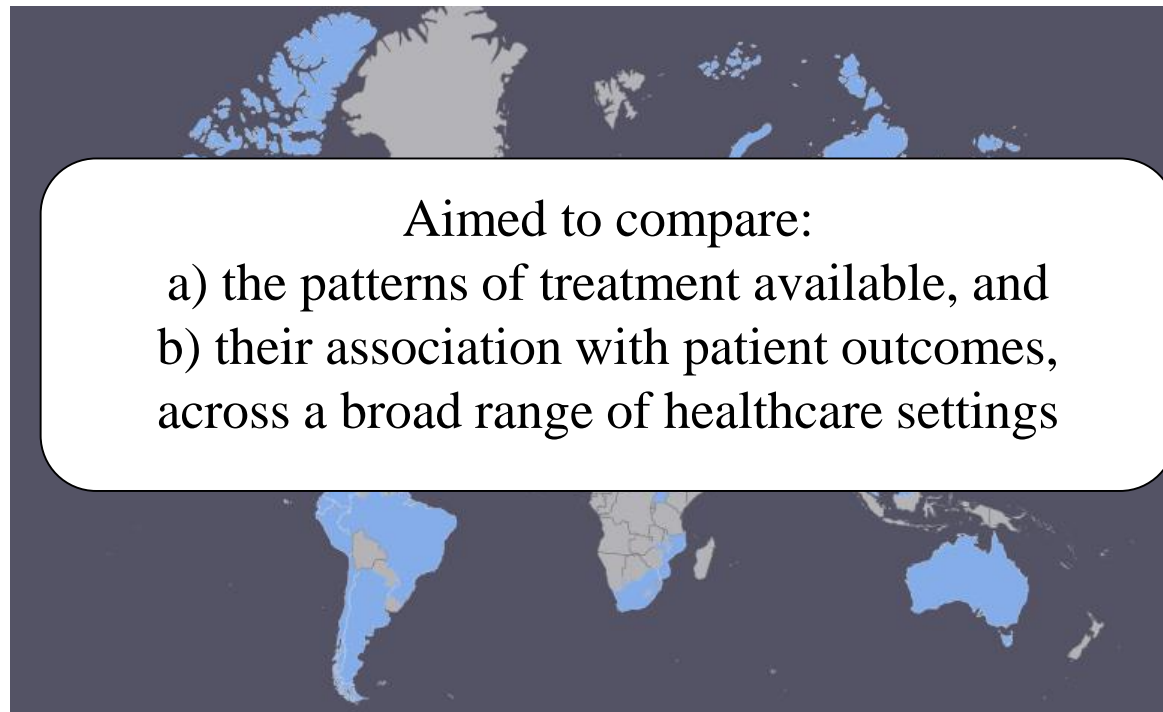
Turkey
Iran
Russia
China
Kuwait
Saudi A.
UAE
India
Pakistan
Philippines
Thailand
Malaysia
Australia

Nigeria, Sudan, Uganda, Mozambique, South Africa

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Patient level data (collected between 2007 and 2015) designed to assess risk factor associations across a range of countries and ethnicities

O'Donnell et al. Lancet 2016

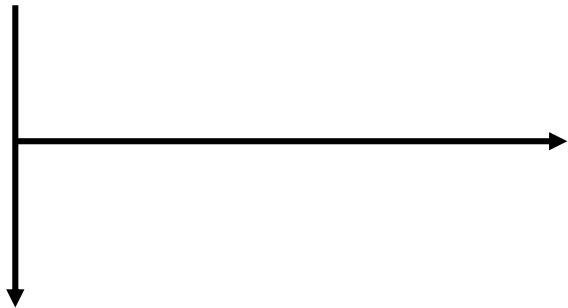
Patient level (INTERSTROKE)	Service level
Demographics	
Stroke type and severity	
Stroke risk factors	
Investigations	
Treatments in hospital	
Outcomes at one month	

We surveyed the characteristics of national and local healthcare systems, local hospitals, and stroke services

Circulated in 2011 (with a reminder sent in 2012)

Patient level (INTERSTROKE)	Service level
Demographics	National healthcare system
Stroke type and severity	Hospital characteristics
Stroke risk factors	Stroke service characteristics
Investigations	Stroke unit present?
Treatments in hospital	Characteristics of stroke unit?
Outcomes at one month	Rehabilitation after hospital

142 Hospitals (32 countries: 13447 patients) in INTERSTROKE

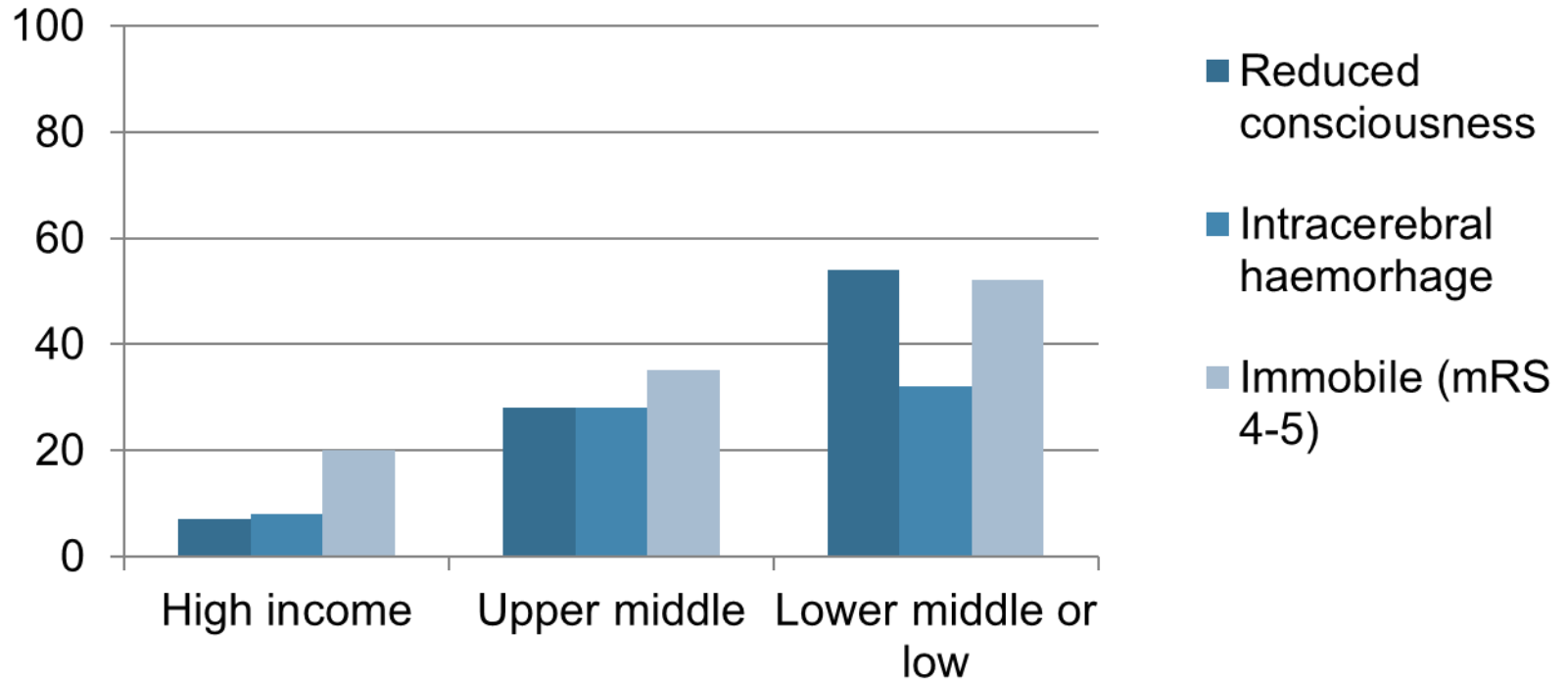


34 Hospitals (4 countries)
no survey information

108 Hospitals (28 countries: 12342 patients: 92%) in analysis

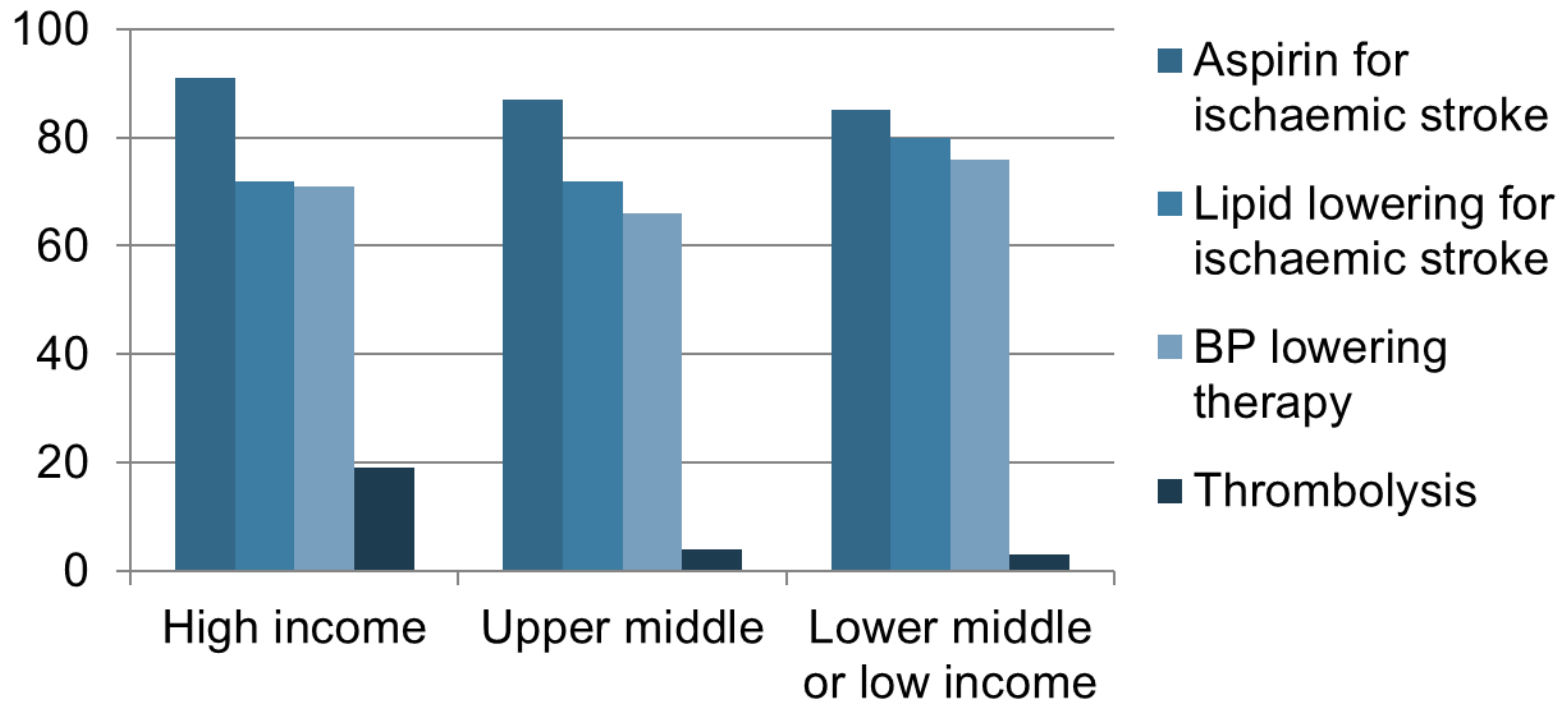
GDP categories	Countries	Hospitals	Patients
High-income	10	38	2579
Upper-middle	11	50	5856
Lower-middle or low income	7	20	3907

Baseline stroke characteristics (%)



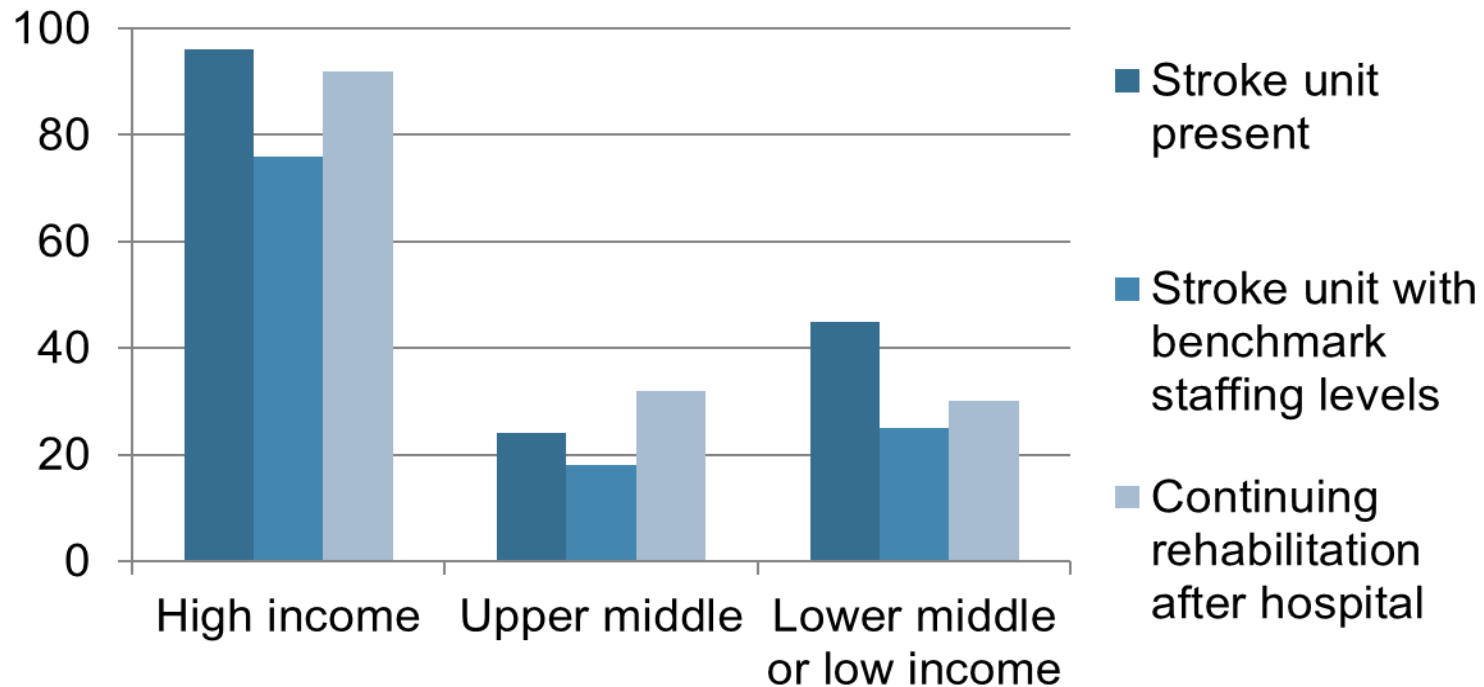
World Bank Country Income Category

Treatment given in hospital (%)



World Bank Country Income Category

Access to services (%)



World Bank Country Income Category

Multivariate regression analyses to account for patient casemix and service clustering

Estimated the association between services available, treatments given, and patient outcomes (death or dependency) at one month.

Casemix	Outcomes (1 month)
Age, sex, education level	Alive (mRS 0-5)
Country wealth (GDP)	Alive without major disability (mRS 0-3)
Pre-stroke disability	
Stroke type (haemorrhage or Oxfordshire Community Stroke Project category of infarct)	
Charleston comorbidity index	
Level of consciousness	
Modified Rankin score at baseline	

Multivariate analysis (Casemix variables, Country wealth) Odds Ratio (95% CI)

Treatment indicator	Alive (mRS 0-5)	Alive without severe dependency (mRS 0-3)
Antiplatelet for infarct		
Lipid lowering for infarct		
BP lowering for all stroke		
Medical stroke specialist available		
Stroke unit available		
Post-discharge rehabilitation available		

NB. Too few thrombolysis episodes for analysis

Multivariate analysis (Casemix variables, Country wealth) Odds Ratio (95% CI)

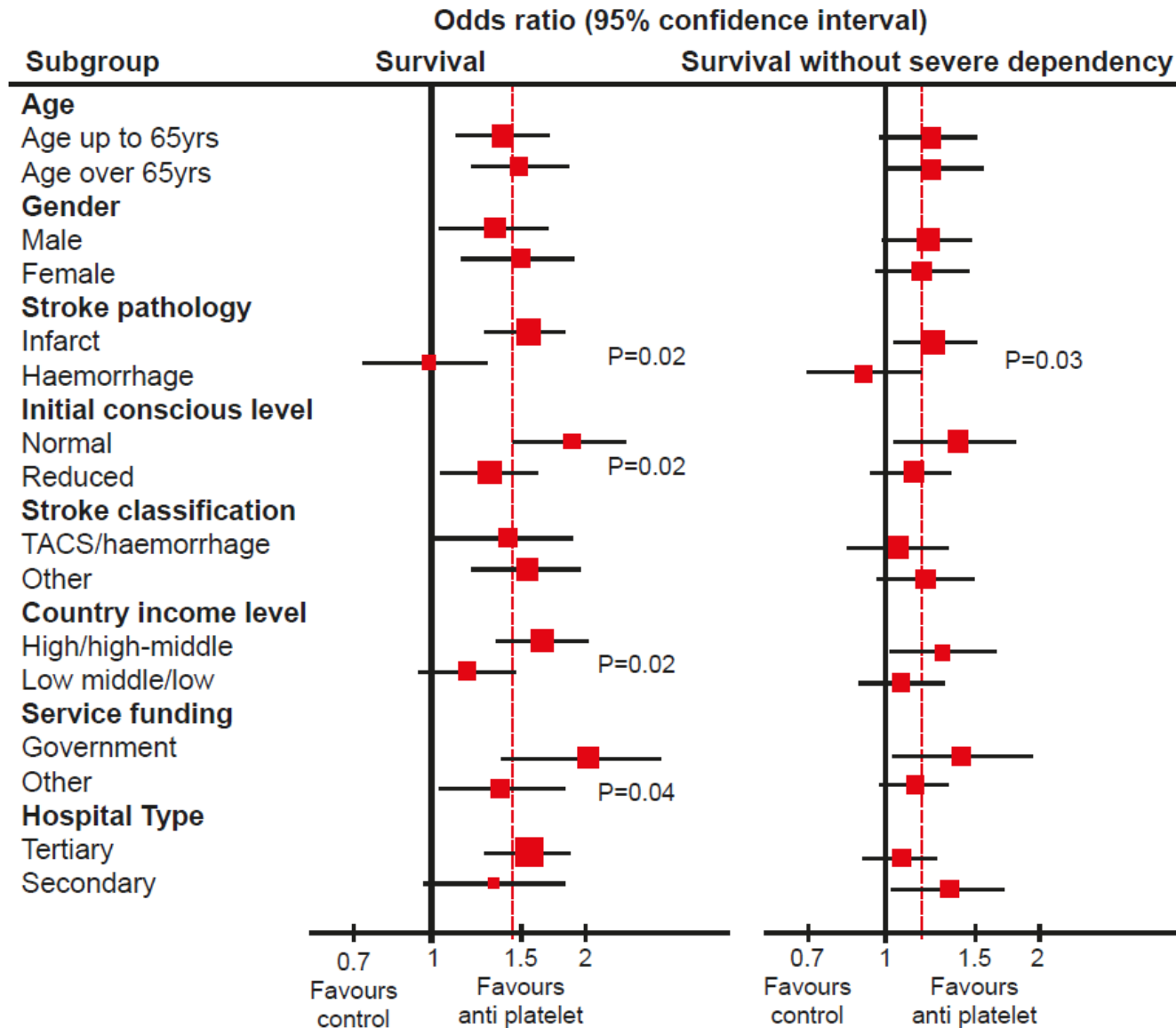
Treatment indicator	Alive (mRS 0-5)	Alive without severe dependency (mRS 0-3)
Antiplatelet for infarct	1.37 (1.14-1.65) P=0.001	1.18 (1.02-1.38) P=0.030
Lipid lowering for infarct	-	1.16 (1.01-1.34) P=0.037
BP lowering for all stroke	1.20 (1.03-1.41) P=0.021	-
Medical stroke specialist available	1.34 (1.14-1.57) P<0.0001	-
Stroke unit available	1.30 (1.12-1.43) P<0.0001	1.41 (1.26-1.58) P<0.0001
Post-discharge rehabilitation available	2.89 (2.35-3.56) P<0.0001	-

NB. Too few thrombolysis episodes for analysis

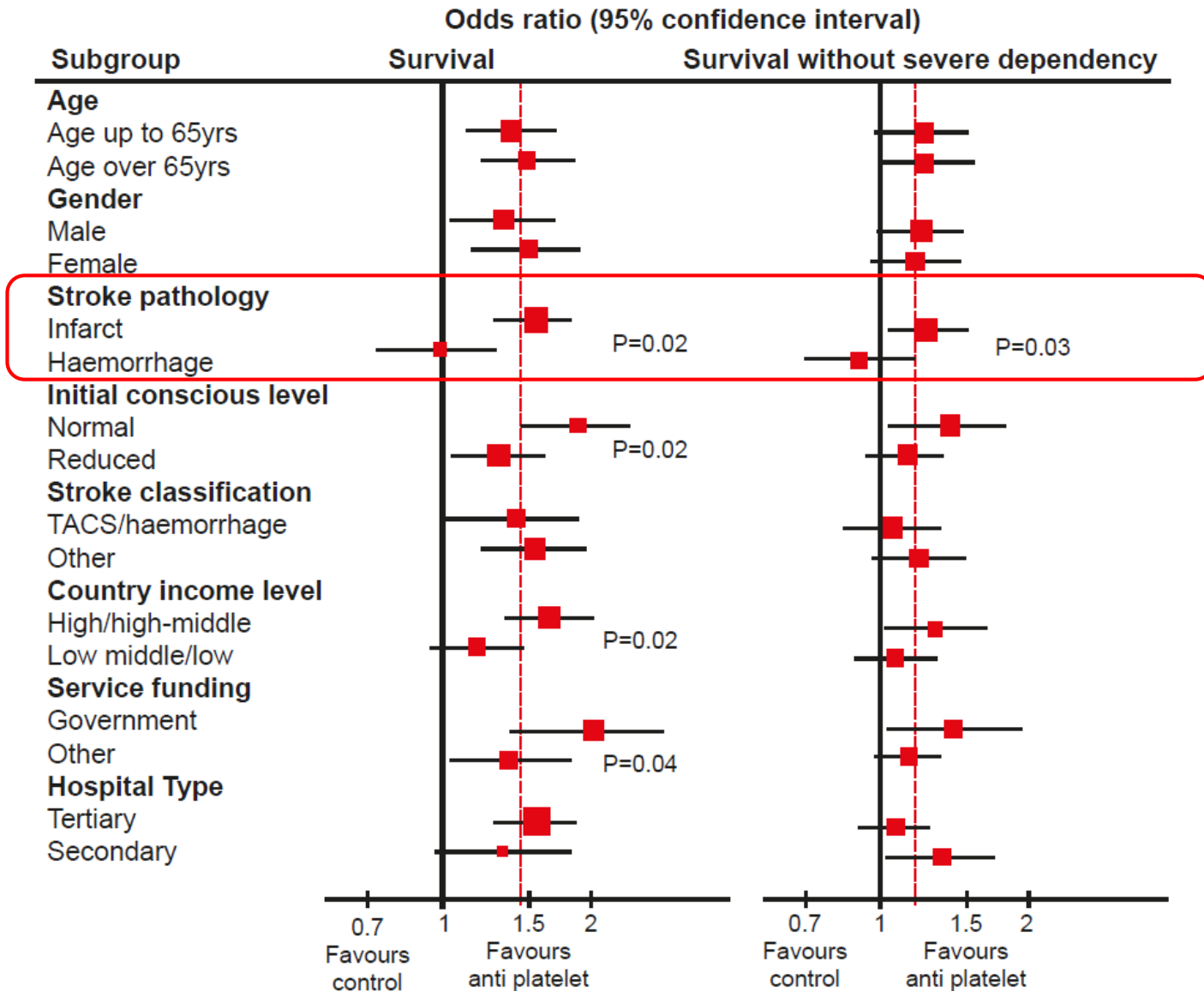
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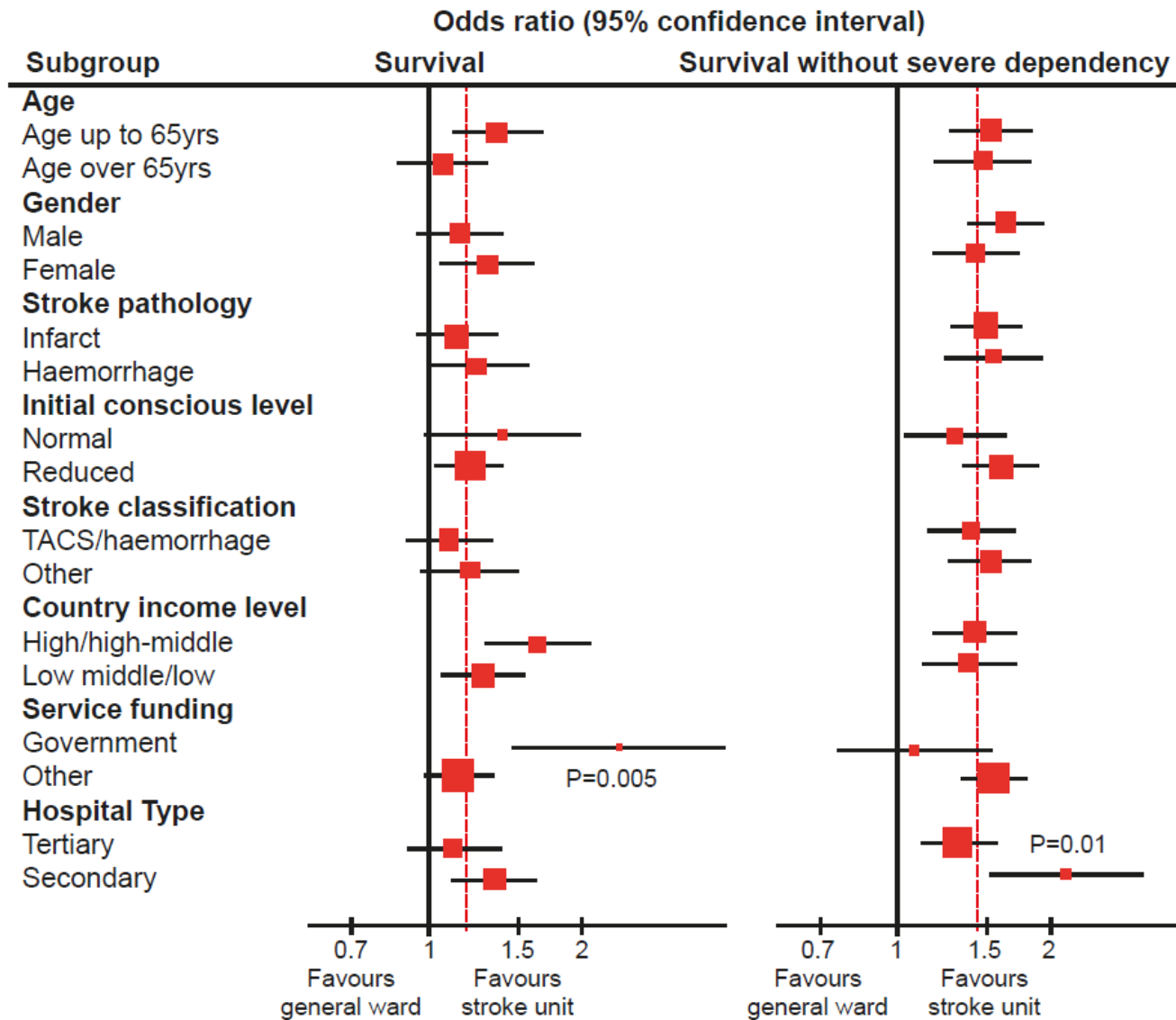
Association of antiplatelet therapy with a good outcome

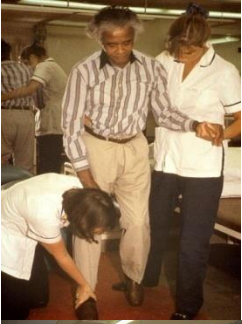
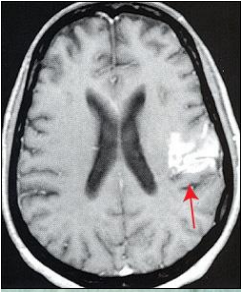


Association of antiplatelet therapy with a good outcome



Association of access to a stroke unit with a good outcome





- Variations in access to thrombolysis, stroke unit care and rehabilitation after hospital discharge related to national income
- After adjusting for patient casemix, improved patient outcomes were associated with:
 - antiplatelet therapy for ischaemic stroke, and
 - access to a stroke unit
- Future challenges are to develop ways of implementing affordable treatment options



University
of Glasgow



Thank you for
your attention

www.world-stroke-academy.org

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