

## SCIENTIFIC LETTER

### Changing from CHD to CVD risk-based guidelines for the management of mild uncomplicated hypertension in different ethnic groups: implications for primary care

*Journal of Human Hypertension*  
(2005) 19, 321–324.  
doi:10.1038/sj.jhh.1001829  
Published online 27 January 2005

The 1999 British Hypertension Society (BHS) guidelines equipped practitioners with an instrument to calculate the coronary heart disease (CHD) risk of a patient, based on the Framingham study.<sup>1,2</sup> The patient's CHD risk is correlated to the absolute cardiovascular disease (CVD) risk and allows the practitioner to make an informed decision about the patient's treatment.<sup>3</sup> The guidelines recommended that patients with mild uncomplicated hypertension (blood pressure (BP) 140–159/90–99 mmHg) be treated if at high CHD risk (10-year CHD risk  $\geq$  15% equivalent to a 10-year CVD risk  $\geq$  20%). However, in ethnic minorities in the UK, the estimated CHD risk is not an accurate representation of their total risk of cardiovascular disease.<sup>4,5</sup>

The incidence rate of first ever stroke (fatal or nonfatal) is twice as high in people of African origin living in the UK compared to white. CHD risk is, however, significantly lower.<sup>6,7</sup> Consequently, CHD risk equation underestimates the stroke and overall CVD risk of populations of African origin in the UK. With the 1999 guidelines, ethnic minority groups would therefore be undertreated and inequalities in management and prevention of cardiovascular disease widened.<sup>4</sup>

New hypertension guidelines based on CVD risk were published

in 2004.<sup>8</sup> Implementation in primary care may prove difficult initially, since the National Service Framework for CHD and the new General Medical Service contract currently use CHD risk-based assessment. However, the new CVD risk-based guidelines more directly address the potential inequalities of the provision of hypertension management across ethnic groups. Using data from the Wandsworth Heart and Stroke Study (WHSS),<sup>9</sup> we assessed the impact of switching from CHD to CVD risk-based management in multiethnic people with mild uncomplicated hypertension treated in general practice.

Men and women aged 40–59 years were recruited from general practices in South London in 1994–1996.<sup>9</sup> Details on methods, definition and calculations of risk and exclusion criteria are described elsewhere.<sup>4,9</sup>

To analyse the effect of risk thresholds for the treatment of mild uncomplicated hypertension, we also excluded patients with known diabetes<sup>10</sup> and other organ damage.<sup>4</sup> This left 1069 patients (404 white, 342 South Asian and 323 of African origin). Since patients with BP under 140/90 mmHg ( $n=755$ ) do not require antihypertensive treatment, and those with BP above 160/100 mmHg ( $n=234$ ) clearly do, the analysis focused on 234 patients with mild uncomplicated hypertension.

We calculated each patient's 10-year risk of a first event of fatal or nonfatal CHD, stroke and CVD using published equations from the Framingham study.<sup>2,4</sup> The patients were categorised as whether or not treatment would be recommended following two different analyses. For each ethnic group we looked at the num-

ber of patients who would be treated according to the 1999 BHS guidelines and the 2004 BHS guidelines.<sup>1,8</sup> We then extrapolated the number of patients who would be treated according to each guideline to different localities in London using the ethnic distribution data available from the Census 2001.<sup>11</sup>

The number of strokes that would be prevented following the new guidelines was calculated as follows. We estimated the incidence of stroke in the different ethnic groups by calculating the 10-year stroke risk in our sample of mild uncomplicated hypertensives eligible for treatment applying Framingham equations. Considering that the absolute risk is reduced if antihypertensive treatment is started, we estimated the relative risk reduction from a recent large-scale meta-analysis on the age-specific relationship between usual BP and vascular mortality.<sup>12</sup> We quantified the treatment effect or absolute risk reduction by using the relative risk reduction associated with an average reduction in systolic BP of 12 mmHg due to drug therapy. Subsequently, the number of strokes that would be prevented was calculated for a period of 10 years in different London boroughs assuming the treatment was effective from the beginning.

The estimated risks varied significantly by ethnic group.<sup>4</sup> South Asian participants had the highest risk of CHD and CVD. People of African origin had the lowest risk of CHD but the highest risk of stroke.

Switching from CHD to CVD risk-based assessment would result in the same number of white and South Asian patients eligible for antihypertensive treatment,

Correspondence: Professor FP Cappuccio, Department of Community Health Sciences, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE, UK. E-mail: f.cappuccio@sghms.ac.uk  
Published online 27 January 2005

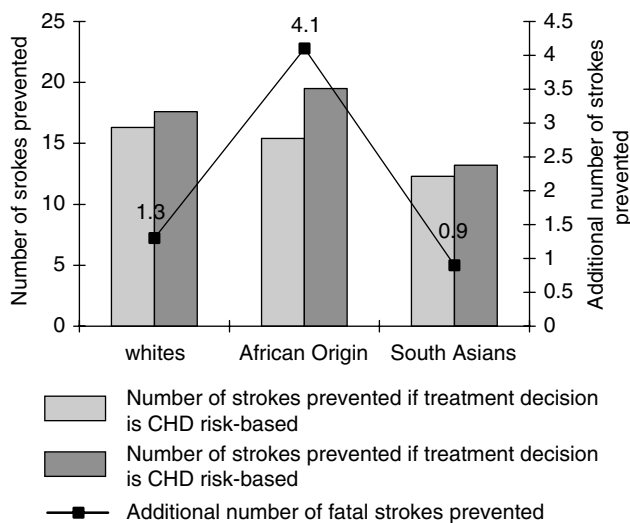
but a 20% increase (from 10 to 12) in the number of those of African origin needing treatment (difference 2.2%, 95% CI  $-2.1$  to 6.5%) (Figure 1). In addition to each ethnic group, the individuals selected for treatment using CVD rather than CHD risk-based assessment will tend to be at higher risk of stroke. Although the extra number of people of African origin requiring treatment on the basis of CVD risk is small, the benefit in terms of additional fatal strokes prevented per 1000 population over 10 years is three times greater (Figure 1). These benefits in preventing stroke will be particularly marked in practices in London boroughs with a high proportion ( $>20\%$ ) of people of African origin (Figure 2).

Switching from CHD to CVD risk-based guidelines for the management of mild uncomplicated hypertension will result in the same number of white and South Asian patients eligible for antihypertensive treatment, but will increase the number of Africans needing treatment by 20%. This will prevent about three times as many additional fatal strokes over 10 years in people aged 40–59 of African origin as in those of white or South Asian origin. More strokes will be prevented in London boroughs with a high proportion of patients of African origin.

Our results are directly relevant to general practice where most primary prevention and management of cardiovascular disease takes place. The study was based in an inner city population with a high representation of ethnic minorities compared to the rest of the UK. While our results may be easily generalised to areas of London and other major cities with similar ethnic mix, in areas with lesser ethnic minority representation, the absolute benefit would inevitably be smaller. On the other hand, the benefits are likely to be greater in an older population. In addition, the first stroke tends to occur 11 years earlier in people of African origin than in the white population.<sup>6</sup> We only used trial data on fatal strokes prevented. For each person with a fatal stroke, there is roughly one person with a stroke who recovers and one who remains disabled.<sup>13,14</sup> The study is small and lacks statistical power, particularly where estimates of risk are small as in stroke. We also considered BP irrespective of treatment. These factors are important limitations and will tend to underestimate our calculations of risk and benefit. We assumed all patients who qualified for treatment were effectively treated, complied with their treatment and achieved a reduction of

12 mmHg in systolic BP. In general practice, adequate BP reduction will not always be achieved and some patients may not comply with the treatment. This assumption may therefore overestimate the number of events prevented. Finally, the response rate of 64% is an underestimate of the true response rate due to the inaccuracy of the age and sex registers as by the analysis of the electoral register.<sup>15</sup> Our findings have external validity when the main prevalence data are compared to similar studies in the literature.

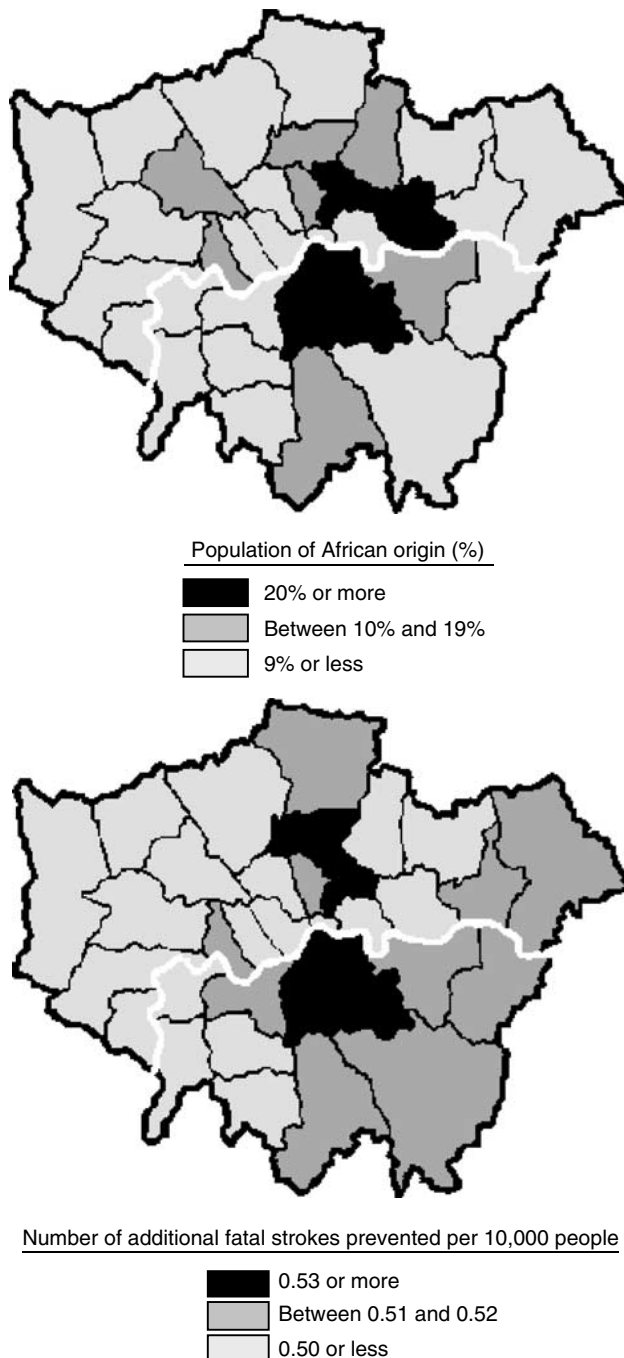
Strokes are estimated to account for an NHS expenditure of £2.3 billion per year, predominantly spent in the secondary care sector.<sup>13,16,17</sup> Therefore, the savings from the strokes averted could be extensive, the secondary care sector being the major beneficiary. However, because this change will have to be implemented in primary care, it will mean an extra cost for the primary care sector that will increase in relation to the size of the population of African origin covered by the local general practice. Primary Care Trusts in areas with a high proportion of their population of African origin may need additional resources to face the new challenge if inequalities in management and prevention of cardiovascular disease are to be effectively reduced.



**Figure 1** Number of fatal strokes prevented in a period of 10 years per 1000 people aged 40–59 years in each ethnic group using CHD or CVD risk-based guidelines.

## Acknowledgements

We thank the General Practitioners in Wandsworth for allowing us to approach people on their lists and the people of Wandsworth who took part in the study. A list of the Wandsworth Heart and Stroke Study Group is given elsewhere.<sup>9</sup> We thank Pasquale Strazzullo and Peter MacFarlane for their help with baseline measurements of risk factors. The study was supported by the former Wandsworth Health Authority, South Thames Regional Health Authority, NHS R&D Directorate, British Heart Founda-



**Figure 2** Distribution of the populations of African origin and additional number of fatal strokes prevented in 10 years per 10 000 population aged 40–59 years in each London Borough.

tion, British Diabetic Association and The Stroke Association and presented in part at the Annual Conference of the Society for Academic Primary Care held in Glasgow in July 2004. G Gomez is funded by StaRNet London. The Department of Health funds StaR-Net London.

GB Gomez, SM Kerry,  
P Oakeshott, G Rowlands  
and FP Cappuccio  
*Department of Community Health  
Sciences, St George's Hospital  
Medical School, Cranmer Terrace,  
London, UK*

## References

- 1 Ramsay L *et al.* Guidelines for management of hypertension: report of the third working party of the British Hypertension Society. *J Hum Hypertens* 1999; **13**: 569–592.
- 2 Anderson KM, Odell PM, Wilson PW, Kannel WB. Cardiovascular disease risk profiles. *Am Heart J* 1991; **121**: 293–298.
- 3 Jackson R. Guidelines on preventing cardiovascular disease in clinical practice. *BMJ* 2000; **320**: 659–661.
- 4 Cappuccio FP, Oakeshott P, Strazullo P, Kerry SM. Application of Framingham risk estimates to ethnic minorities in United Kingdom and implications for primary prevention of heart disease in general practice: cross sectional population based study. *BMJ* 2002; **325**: 1271–1276.
- 5 D'Agostino RB, Grundy S, Sullivan LM, Wilson P. Validation of the Framingham coronary heart disease prediction scores: results of a multiple ethnic groups investigation. *JAMA* 2001; **286**: 180–187.
- 6 Stewart JA *et al.* Ethnic differences in incidence of stroke: prospective study with stroke register. *BMJ* 1999; **318**: 967–971.
- 7 Wild S, McKeigue P. Cross sectional analysis of mortality by country of birth in England and Wales, 1970–92. *BMJ* 1997; **314**: 705–710.
- 8 Williams B *et al.* Guidelines for management of hypertension: report of the fourth working party of the British Hypertension Society, 2004—BHS IV. *J Hum Hypertens* 2004; **18**: 139–185.
- 9 Cappuccio FP, Cook DG, Atkinson RW, Wicks PD. The Wandsworth Heart and Stroke Study. A population-based survey of cardiovascular risk factors in different ethnic groups. Methods and baseline findings. *Nutr Metab Cardiovasc Dis* 1998; **8**: 371–385.
- 10 Harris TJ, Cook DG, Wicks PD, Cappuccio FP. Impact of the new American Diabetes Association and World Health Organisation diagnostic criteria for diabetes on subjects from three ethnic groups living in the UK. *Nutr Metab Cardiovasc Dis* 2000; **10**: 305–309.
- 11 ONS. Neighbourhood Statistics Census 2001. <http://www.neighbourhood.statistics.gov.uk>. 2001.

- 12 Prospective Studies Collaboration. Age-specific relevance of usual blood pressure to vascular mortality: a meta-analysis of individual data for one million adults in 61 prospective studies. *Lancet* 2002; **360**: 1903–1913.
- 13 Rothwell PM. The high cost of not funding stroke research: a comparison with heart disease and cancer. *Lancet* 2001; **357**: 1612–1616.
- 14 Wolfe CDA *et al.* Incidence and case fatality rates of strokes subtypes in a multiethnic population: The South London Stroke Register. *J Neurol Neurosurg Psychiatry* 2002; **72**: 211–216.
- 15 Cappuccio FP, Cook DG, Atkinson RW, Strazzullo P. Prevalence, detection and management of cardiovascular risk factors in different ethnic groups in south London. *Heart* 1997; **78**: 555–563.
- 16 Youman P, Wilson K, Harraf F, Kalra L. The economic burden of stroke in the United Kingdom. *Pharmacoeconomics* 2003; **21**: 43–50.
- 17 British Heart Foundation. *Coronary Heart Disease Statistics: British Heart Foundation Statistics Database 1998*. British Heart Foundation: London, 1998.