



University  
of Glasgow

Harding, S., Whitrow, M., Maynard, M. J., and Teyhan, A. (2007) Cohort profile: the DASH (determinants of adolescent social well-being and health) study, an ethnically diverse cohort. *International Journal of Epidemiology*, 36(3), pp. 512-517.

Copyright © 2007 Oxford University Press.  
This work is made available under the Creative Commons Attribution  
Non-Commerical 3.0 License (CC BY-NC 3.0)

Version: Published

<http://eprints.gla.ac.uk/16894/>

Deposited on: 06 May 2015

## COHORT PROFILE

# Cohort profile: The DASH (Determinants of Adolescent Social well-being and Health) Study, an ethnically diverse cohort

Seeromanie Harding,\* Melissa Whitrow, Maria J Maynard and Alison Teyhan

Accepted 3 April 2007

### How did the study come about?

*Ethnic differences* in chronic diseases in adulthood in the UK are well known but the causes and the stage of the lifecourse that these differences emerge are poorly understood. Every 10 years in the UK, death rates by social indicators are derived using data from death records and from censuses. In every decennial report since 1984, the highest death rates for coronary heart disease were reported for South Asians (people of Indian subcontinent origin) and the highest death rates for stroke for people of Caribbean or directly African origin.<sup>1–3</sup> The latter two groups, particularly in men, have had half the national coronary mortality rate, although recent evidence suggests a change particularly for Caribbeans. All of these groups have excess glucose intolerance and African-origin people more hypertension.<sup>4–6</sup> Other traditional risk factors, such as smoking or cholesterol levels (previously lower in Caribbeans) only partially account for differences in cardiovascular risk, although among Caribbeans excess stroke risk is directly related to rates of high blood pressure. Poorer mental health is also known for some ethnic minority groups.<sup>7,8</sup> For example, the prevalence of schizophrenia is higher in migrant and British-born Black Caribbeans.<sup>9,10</sup>

Ethnic minority groups account for 4.6 million or 7.9% of the total UK population. Apart from the Irish, the large ethnic minority groups originate from former British colonies, countries in the Caribbean, Africa and Indian subcontinent. The peak of migration for these groups was in the 1950s and 1960s, when right of entry to the UK was granted for a limited period after political independence from Britain. The population of UK-born ethnic minorities is growing. About half of Black Caribbeans and a third of Indians in the 1991 Census were born in the UK.<sup>11</sup> The conventional wisdom of migration studies is that a shift in disease patterns towards that of the host population is expected in subsequent generations as they adopt

local lifestyles. Few studies have been able to test this empirically in the UK and some report divergence<sup>12,13</sup> rather than convergence towards local rates. The scarcity of longitudinal data on ethnic minorities in the UK has, however, compromised research efforts to reliably investigate the transfer or changes in health risks across generations.

The DASH study started in 2003 with about 6500 11–13-year olds, 80% of whom were from ethnic minorities, in 51 secondary schools in London. They were followed up in 2005–06 and there are plans to track them in the future. Sampling frames for setting up cohort studies of ethnic minorities are virtually non-existent (door-to-door screening is usually undertaken to determine ethnic composition of households) in the UK and little is known about the success of tracking ethnic minorities over time. A school-based cohort of ethnic minorities was a pragmatic choice. Secondary rather than primary schools were targeted because of the uncertainty over the success of tracking children between primary and secondary schools. By tracking health and well being from age 11 years, the DASH study provides a basis for determining whether health and social conditions in early adolescence influence ethnic differences in chronic disease in later life.

The study is funded by the Medical Research Council.

### What does DASH cover?

The DASH study was designed to systematically examine the influence of social conditions (particularly aspects of family life, school life and neighbourhoods) on health and well-being of ethnic minority young people. The research themes are evolving but current focus is on understanding the development of cardiovascular health, respiratory health and psychological well-being. There is very little descriptive social-epidemiological data on children of ethnic minorities. The baseline data are being used to address research questions which cover simple descriptions of inter-relationships between social, economic and physiological measures and other health indices. The follow-up data are being used to cover more complex questions regarding stability and

Medical Research Council, Social and Public Health Sciences Unit, 4 Lilybank Gardens, Glasgow G12 8RZ, UK.

\* Corresponding author. E-mail: [seeromanie@sphsu.mrc.ac.uk](mailto:seeromanie@sphsu.mrc.ac.uk)

**Table 1** DASH sample by gender and ethnic group at baseline and follow-up

Ethnicity	Boys			Girls		
	Baseline (N)	Follow-up (N)	Follow-up (% of baseline)	Baseline (N)	Follow-up (N)	Follow-up (% of baseline)
White UK	647	487	75	589	385	65
Black Caribbean	490	357	72	456	358	79
Black African	512	389	76	595	453	76
Indian	275	225	81	218	172	79
Pakistani and Bangladeshi	409	317	77	222	143	64
Mixed	288	205	71	280	201	72
White Other <sup>a</sup>	406	280	69	319	195	61
Other <sup>b</sup>	515	354	69	413	258	62
Total	3542	2614	74	3092	2165	70

<sup>a</sup>White Other includes Eastern Europeans and Irish.

<sup>b</sup>Other includes Eastern Asians.

change in indices of social circumstances and the relevance to health.

### Who is in the sample?

A total of 6643 children from Years 7 (first year) and 8 (second year), aged 11–13 years, in 51 inner London secondary schools participated in 2003–04 (Table 1). Forty-nine of the 51 schools, 4779 children, participated in the follow-up in 2005–06.

The baseline sample was recruited from schools in the London boroughs of Brent, Croydon, Hackney, Hammersmith & Fulham, Haringey, Lambeth, Newham, Southwark, Waltham Forest and Wandsworth. These boroughs were selected as they have high proportions and numbers of people from ethnic minority groups. Schools with at least 5% of people of Black Caribbean descent were identified using school censuses provided by the Department of Education and Skills. Within each borough, schools were selected to enable representation at, above and below the national averages for academic performance based on reports from the Office for Standards in Education.<sup>14</sup> The classes were randomly selected and were all mixed ability classes. Eighty-three per cent of eligible students took part in the baseline study. Schools and pupils actively consented to take part in the study. Parents were provided with an information pack and given the opportunity to opt their child out of the study.

### What has been measured?

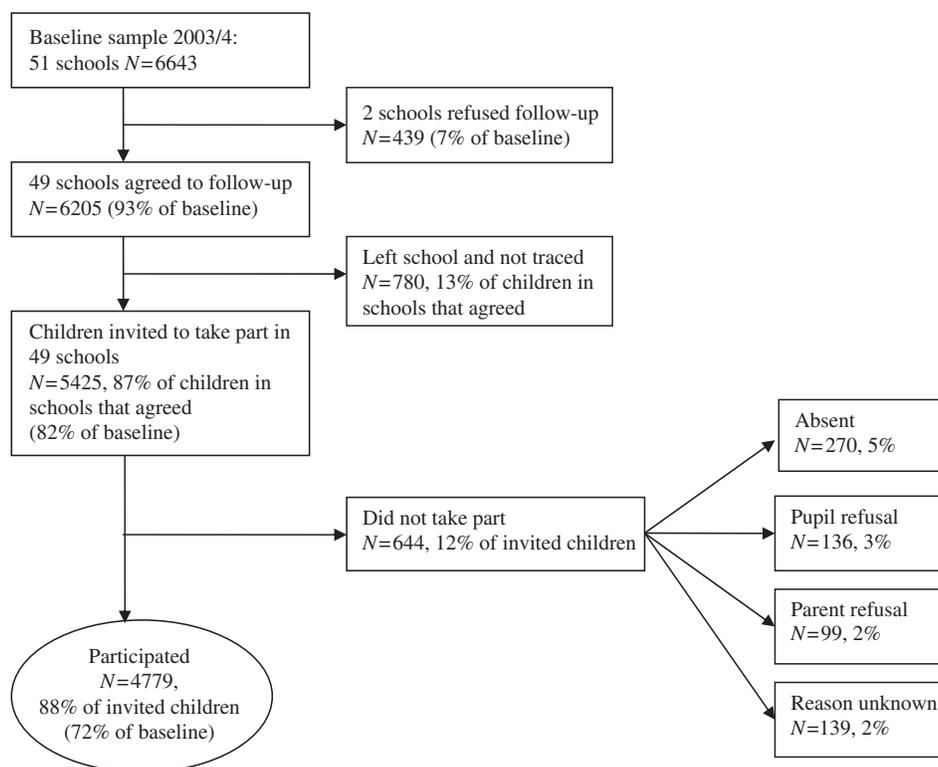
Socio-demographic, area, family life, social support, health (illness and health behaviour) and psychosocial data were collected from children at baseline and follow-up via a self-complete questionnaire. Physical measurements were taken by a trained survey assistant and included anthropometry, blood pressure, pubertal stage, lung function and salivary cotinine (the latter two at baseline only). School head teachers provided information about school facilities and ethos. Further detail of the data collected is available as a table on the journal website. Ethnicity was self-reported. Children were asked to choose from a grid containing 20 categories, based on those used in the 2001 Census, and if these were not appropriate to supply their own

description. They were also asked to report their parents' ethnicity, and their own birthplace and that of their parents and grandparents. Classification by ethnicity in Table 1 is based on consistent backgrounds of the child, parents and grandparents. The classification was based on having at least one parent with the same ethnicity as the child, and having at least three grandparents who were born in home countries. Children who reported 'Black British' or 'Asian British' or who did not report their own ethnicity were classified using parental ethnicity and parental and grandparental country of birth.

### What is attrition like?

Figure 1 shows the sources of attrition in the sample and the impact on sample size. Two schools did not participate in the follow-up study, one due to space restrictions during building renovations and another due to the pressures of examination timetables. In the remaining 49 schools, 4779 children took part in 2005–06 (72% of the baseline sample).

Figure 2 shows predictors, as measured at baseline, of the different sources of attrition (moved from school, absenteeism, parental and child refusal). The main cause of attrition was children leaving the school that they were in at baseline. For those who had left, little information was available on where they had moved. Ethnic minority children, however, were no more likely to have moved from the school they were in at baseline than White UK children. Generally, ethnic minorities were more likely to take part; they were less likely to be absent, to decline to take part or to have had their parents refuse for them to take part in the follow-up. In the entire sample, girls were less likely to have moved from the school they were in at baseline but were more likely to have parental refusal. Poor psychological well-being (based on Total Difficulties Score of  $\geq 17.5$  from Goodman's Strengths and Difficulties questionnaire)<sup>15</sup> was a predictor of having moved or being absent, and overweight or obesity (based on the International Obesity Task Force age-specific thresholds)<sup>16</sup> of parental refusal, but the number lost was very small (only 41 were classified as having potential psychological morbidity and 46 as overweight or obese).



**Figure 1** Attrition in the DASH cohort

The MRC has recently funded a project to evaluate practices to prevent attrition and to develop statistical methods for dealing with attrition in cohort studies.<sup>17</sup> The approach to handling missing data in DASH will be guided by the recommendations from this project.

## What has it found? Key findings and publications

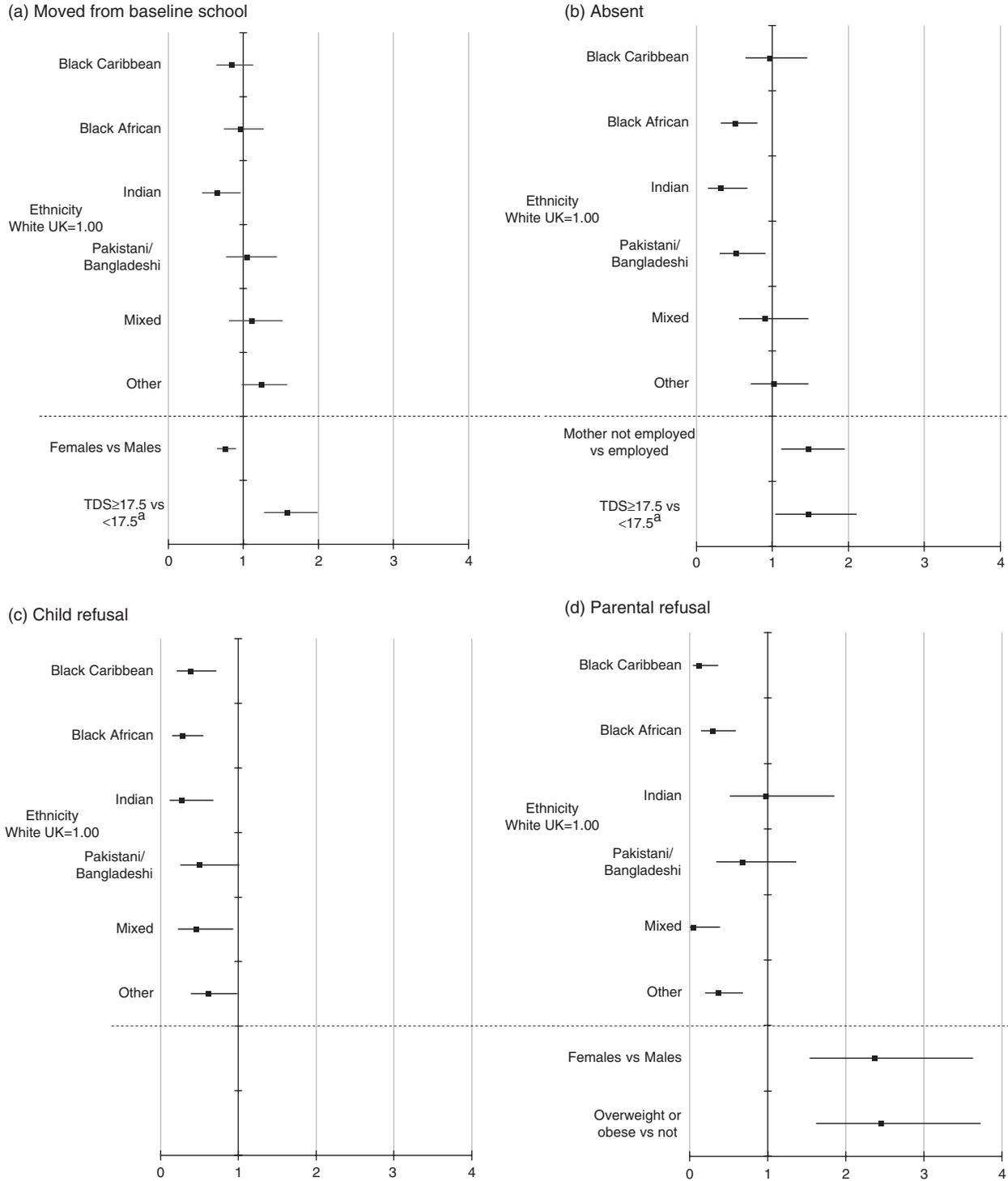
The DASH website gives updated references of accepted abstracts and publications (<http://www.sphsu.mrc.ac.uk/studies/dash>). The study is still at an early stage with analysis of the data now in progress. Ethnic differences in height, weight and blood pressure<sup>18</sup> and in various social descriptors of the population sub-groups have been reported. A striking finding from the baseline data has been that blood pressures in Black Caribbeans and Black Africans are not higher than British Whites in early adolescence as could be expected from patterns in adulthood, in spite of greater body size among the girls. The social descriptors reflect the changing face of Britain, with enormous diversity in terms of language spoken at home, religious affiliation, family composition and the increase of 'mixed' ethnicity groups. At least 50 languages were spoken at home with 8% speaking at least three languages with family members, about 70% of the Black Africans reported weekly attendance to a place of worship (compared with <10% for White UK), 13% Black Africans reported that they lived with an aunt or uncle (compared with 3% for White UK) and 53% of

those with a mixed ethnicity reported White UK and Black Caribbean ethnicity. Examples of other research includes ethnicity, obesity and high blood pressure; ethnic differences in lung function in relation to socio-economic disadvantage, psychosocial factors and ethnic differences in psychological well-being and quality of family life.

## What are DASH's main strengths and weaknesses?

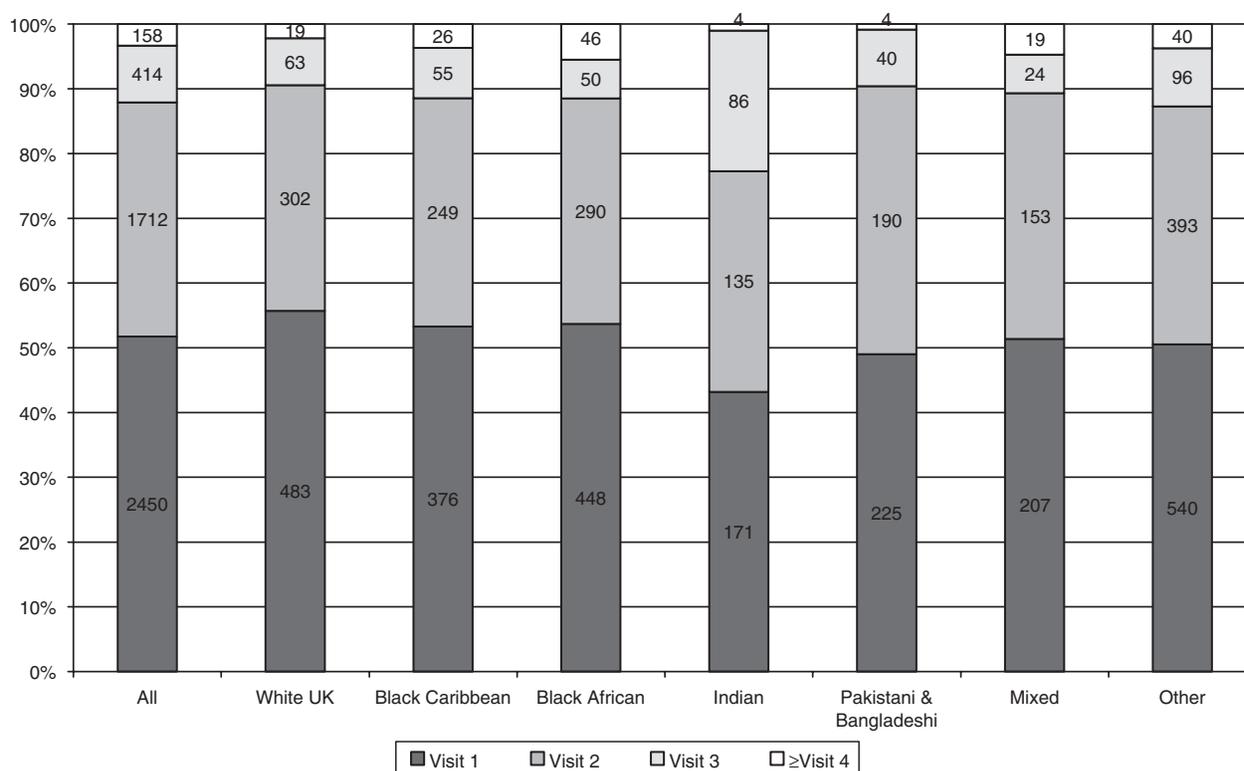
### Sample size

Large-scale longitudinal studies of ethnic minorities in the UK that include social, psychological, anthropometric and physiological measures are rare. Until recently, there has been a history of exploiting ethnic health data in studies that were not designed to examine ethnic differences in health and hence contain small samples of ethnic minorities which, though invaluable in their contributions to the topic to date, have not permitted systematic analysis for children. The investigation of effect of exposures within groups is often compromised by small sample sizes. DASH was powered to examine differences within ethnic group by key social variables, such as family type. The sample size also allows disaggregation of the African origin groups. Black Africans and Black Caribbeans are often aggregated in spite of historic and cultural heterogeneity. With over 1000 Black Africans, Black Ghanaians ( $n=262$ ) and Nigerians ( $n=369$ ), groups which largely arrived in the 1950s and 1960s, can also be examined separately from other



**Figure 2** Predictors of attrition: odds ratios and 95% confidence intervals. Mutually adjusted multinomial models, participated = baseline odds ratio; only statistically significant,  $p < 0.05$ , predictors shown.

<sup>a</sup>A total difficulties score (TDS - from Goodman's Strengths and Difficulties Questionnaire<sup>15</sup>) of  $\geq 17.5$  is an indication of potential psychological morbidity



**Figure 3** Percentage of children who took part at the first, second, third or subsequent visit to their school, by ethnic group. 100% = total number of participating children excluding movers who took part in their new school; numbers in each bar = N

African groups ( $n=487$ ) that arrived later, such as Somalis ( $n=175$ ).

### Multi-dimensional measures

The meaning and measurement of ethnicity in epidemiological studies are long debated issues in the literature.<sup>19</sup> We take the view that an ethnic group shares certain common socio-cultural practices, which have developed out of the particular traditions and experiences of the group but that these may change over time and generations. In DASH, temporal (e.g. length of residence in the UK) and cultural (e.g. language used at home, ethnicity of friends) dimensions of ethnicity can be examined. The extent to which socio-economic circumstances explain an ethnic effect in epidemiological studies is critical given that both ethnicity and health outcomes are associated with socio-economic position.<sup>20,21</sup> Conventional measures of socio-economic position, such as occupational class, however may not be appropriate. DASH contains information on 17 standard of living items as well as data on conventional measures on parental class and economic activity and area of residence.

### Special strategies to minimize non-response

DASH was set up with the support of civic leaders, teachers and parent governors which promoted participation but also provided the opportunity to keep in contact with schools and

communities. The ethnicity of the researchers, SH (of Indo Guyanese descent) and MJM (of Black Caribbean descent), played a key role as some teachers actively promoted ethnic minority researchers as role models for their pupils. Science workshops were offered partly as an incentive to schools to promote engagement with science and also as a means of promoting child participation. To aid the process of consent, information packs on the study were translated in 12 languages and help lines were set up to address parental queries. There were many instances where ethnic minority parents appeared to place more importance on oral communication with researchers than on the information packs.

Inner city schools can be challenging environments to conduct research with high absenteeism, truancy rates and residential mobility. Being adaptive and responsive to the school environment was crucial to promote participation at school level and to allow participation of children who were unable to take part on the first visit. Schools were allowed to choose how the study was conducted providing that the science was not compromised. For example, 13 short visits at one school enabled the study to be conducted during Physical Exercise and Personal, Social and Health Education lessons. A total of 163 visits were made to the 49 schools in the follow-up. Figure 3 reflects the impact of several visits on participation.

The main weakness of the study was the lack of an integrated qualitative component at the time of data collection. This would have provided valuable data on potential ethnic differences in

the meanings of exposures (e.g. perceptions of mixed ethnicity in relation to cultural, structural and temporal factors), social processes (e.g. perceptions of stability within different family types) and on the cross-cultural validity of questionnaire-based outcome measures (e.g. understanding of Goodman's multi-item psychological well-being measure). DASH would also have benefited from larger samples of selected mixed and other White ethnicities. Sampling decisions were pragmatic, based on funding and practical constraints, but DASH offers the potential for generating hypotheses that can be tested in new studies on these groups. Data that required the use of invasive measures (e.g. venepuncture) were not collected as the pilot study suggested that the response rates would have been severely compromised.

### Access to DASH data

DASH is a live study and access to the data is currently via collaborations. International comparisons are particularly welcome as they enhance the scientific contribution of the study. Potential collaborators can email the corresponding author directly. Other details can be found at <http://www.sphsu.mrc.ac.uk/studies/dash>. Collaborations based on the three research themes (cardiovascular health, respiratory health and psychological well-being) are welcome. New themes are also encouraged dependent on the scientific integrity of the proposal. Documentation of the meta-data is in progress which will make DASH more accessible in the future. We plan to continue the tracking of the cohort, including linkage of routinely collected data using the National Health Service Central Register.

### Supplementary material

Supplementary table is available at *IJE* Online (<http://ije.oxfordjournals.org>).

### Acknowledgements

The researchers would like to thank Dame Jocelyn Barrow, Mrs Janet Boateng, Professor Harry Goulbourne, school nurses and MPs for their support in recruitment of the schools. We are grateful to teachers, respondents and their parents, without whom the study would not have been possible. The support of the steering group (Professor Kennedy Cruickshank, Professor Kam Bhui, Dr Helen Minnis, Mr Devon Hanson, Dr Maria Jackson, Professor Sally Macintyre, Professor Patrick West, Mrs Catherine Ferrell, Mr Geoff Der) is also greatly appreciated. We are also grateful to Dr Rory Williams for his invaluable advice regarding the conceptual reasoning and design of the study.

### References

<sup>1</sup> Marmot MG, Adelstein AM, Bulusu L. *Immigrant Mortality in England and Wales 1970-78. OPCS Studies of Medical and Population Subjects. No. 47.* London: HMSO, 1984.

<sup>2</sup> Balarajan R, Bulusu L. *Mortality among Immigrants in England and Wales, 1979-83.* London: HMSO, 1990.

<sup>3</sup> Harding S, Maxwell R. *Differences in Mortality of Migrants.* London: The Stationary Office, 1997.

<sup>4</sup> Chaturvedi N. Ethnic differences in cardiovascular disease. *Heart* 2003;**89**:681-6.

<sup>5</sup> Mbanya J, Cruickshank J, Forrester T, Balkau B, Ngogang J, Riste L *et al.* Standardized comparison of glucose intolerance in west African-origin populations of rural and urban Cameroon, Jamaica, and Caribbean migrants to Britain. *Diabetes Care* 1999;**22**:434-40.

<sup>6</sup> Cruickshank JK, Mbanya JC, Wilks R, Balkau B, Forrester T, Anderson SG *et al.* Hypertension in four African-origin populations: current "Rule of Halves", quality of blood pressure control and attributable risk of cardiovascular disease. *J Hypertens* 2001;**19**:41-6.

<sup>7</sup> *Ethnic Minority Psychiatric Illness Rates in the Community (EMPIRIC).* London: Stationery Office, 2002.

<sup>8</sup> Nazroo J. *Ethnicity and Mental Health.* London: Policy Institute, 1997.

<sup>9</sup> McGovern D, Cope RV. First psychiatric admission rates of first and second generation Afro Caribbeans. *Soc Psychiatry Psychiatr Epid* 1987;**22**:139-49.

<sup>10</sup> Harrison G, Glazebrook C, Brewin J *et al.* Increased incidence of psychotic disorders in migrants from the Caribbean to the United Kingdom. *Psychol Med* 1997;**27**:799-806.

<sup>11</sup> 1991 Census. *Ethnic Group and Country of Birth. Great Britain. Volume 2 of 2.* London: HMSO, 1993.

<sup>12</sup> Harding S. Mortality of migrants from the Indian subcontinent to England and Wales: effect of duration of residence. *Epidemiology* 2003;**14**:287-92.

<sup>13</sup> Harding S, Balarajan R. Patterns of mortality in second generation Irish living in England and Wales: longitudinal study. *BMJ* 1996;**312**:1389-92.

<sup>14</sup> Inspection reports. Manchester: Ofsted - Office for Standards in Education. Available at: <http://www.ofsted.gov.uk>.

<sup>15</sup> Goodman R. The Strengths and Difficulties Questionnaire: a research note. *J Child Psychol Psychiatry* 1997;**38**:581-6.

<sup>16</sup> Cole T, Bellizzi M, Flegal K, Dietz W. Establishing a standard definition for child overweight and obesity worldwide: international survey. *Br Med J* 2000;**320**:1-6.

<sup>17</sup> Leyland A, White I, Harding S. Maximising the return from cohort studies. Available at: [http://www.populationhealthsciences.org/files/File/Cross%20unit%20appointments/Project%20summary\(1\).doc](http://www.populationhealthsciences.org/files/File/Cross%20unit%20appointments/Project%20summary(1).doc), 2006.

<sup>18</sup> Harding S, Maynard M, Cruickshank JK, Gray L. Anthropometry and differences in mean blood pressure among Black Caribbean, Black African, South Asian and White British adolescents: the MRC DASH study. *J Hypertens* 2006;**24**:1507-14.

<sup>19</sup> Bhopal R. Ethnicity as a variable in epidemiological research. *Br Med J* 1994;**309**:327-30.

<sup>20</sup> Kaufman JS, Cooper RS, McGee DL. Socioeconomic status and health in blacks and whites: the problem of residual confounding and the resiliency of race. *Epidemiology* 1997;**8**:621-8.

<sup>21</sup> Nazroo JY. The Structuring of Ethnic Inequalities in Health: Economic Position, Racial Discrimination, and Racism. *Am J Public Health* 2003;**93**:277-84.

<sup>22</sup> Zimet G, Dahlem N, Zimet S, Farley G. The Multidimensional Scale of Perceived Social Support. *J Pers Assess* 1988;**52**:30-41.

<sup>23</sup> Angold A, Weissman M, John K, Merikangas K, Prusoff B, Wickramaratne P *et al.* Parent and child reports of depressive symptoms in children at low and high risk of depression. *J Child Psychol Psychiatry* 1987;**28**:901-15.

<sup>24</sup> Rosenberg M. *Society and the Adolescent Self-Image.* Revised edn., (ed.) Middletown, CT: Wesleyan University Press, 1989.

<sup>25</sup> Tanner JM. *Growth and Adolescence.* Oxford: Blackwell, 1962.