

Towards an understanding of variations in infant mortality rates between different ethnic groups in England and Wales

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Key facts and messages

- Large inequalities in infant mortality rates exist between White and ethnic minority groups in England and Wales.
- Caribbean and Pakistani babies are more than twice as likely to die before the age of one as White British or Bangladeshi babies in part due to a higher prevalence of preterm birth and congenital anomalies, respectively, in these particular groups.
- There is considerable heterogeneity between different ethnic groups in both the causes and the risk factors for infant mortality.
- Explanations for variations in infant mortality between ethnic groups are complex, involving the interplay of deprivation, physiological, behavioural and cultural factors.
- More research is needed in order to identify the pathways that lead to higher risks of infant death among Black and other ethnic minority groups.

1 Background

In England and Wales, infant mortality rates in some ethnic minority groups are higher than the rate in the overall population. The government has set a target to reduce by at least 10% the gap in mortality between 'routine and manual' groups and the population as a whole by 2010, starting with children under one year. Whilst ethnic differences in infant mortality rates are not explicit in the government's infant mortality target they have nevertheless been highlighted as important.¹ This is the third in a series of four briefing papers from the Inequalities in Infant Mortality project.^{2,3} In this briefing paper we present the main facts on births within different

ethnic groups in England and Wales and what is known about the variation in infant mortality rates between the groups.

2 Classifying ethnicity in England and Wales

In the 1991 UK census, respondents were asked to record their ethnic group and were offered a series of choices (see Figure 1). For the 2001 census, the choices offered were more extensive and included the category "mixed".^{4,5} Respondents were explicitly asked to choose their ethnic group (White, Mixed, Asian/Asian British, Black/Black British, or Chinese or Other) and then to indicate their "cultural background" by choosing a specific sub-group within these broader categories (see Figure 1). Analyses of ONS Longitudinal Study (LS) data suggest that White, Indian, Pakistani, Bangladeshi and Chinese categories were stable across the 1991 and 2001 censuses. However, Black African and Black Caribbean categories were less stable, and the "Other" ethnic groups exhibited low stability over this period.^{4,5} This categorisation of ethnicity as a fixed characteristic on the basis of self-identification remains the basis of reporting for most national statistics. It is widely recognised that the census categories do not capture the multifaceted nature of people's cultural identities, which include religion, country of heritage and migration histories as well as ethnic group. However, they have the virtue of being brief for respondents, relatively straightforward to understand and useful in simple tabulations of health outcomes such as infant mortality.

Figure 1: The ethnic group classification used in UK National Censuses in 1991 and 2001 (adapted from Bosveld 2006⁴)

1991	2001
White	White
Black - Caribbean	- British
	- Irish
Black - African	- Other
Black - Other	Mixed
	- White and Black Caribbean
Indian	- White and Black African
Pakistani	- White and Asian
Bangladeshi	- Other
Chinese	Asian or Asian British
Other	- Indian
	- Pakistani
	- Bangladeshi
	- Other
	Black or Black British
	- Caribbean
	- African
	- Other
	Chinese or other ethnic group
	- Chinese
	- Other

3 Ethnicity and births in England and Wales

Ethnicity data are not currently collected at birth registration in England and Wales, as to do so would require a change in legislation. Birth registration data have been linked to the National Health Service (NHS) Numbers for Babies (NN4B) records, which include information on the ethnicity of the baby using categories that match those used in the 2001 census. The linked birth registration-NN4B dataset for all 2005 births found the following ethnic group composition:⁶

- 64.5% White British
- 5% White Irish or other White ethnicity
- 9% Asian or Asian British
- 5% Black or Black British
- 3.5% Mixed ethnicity
- 2% Other ethnic group
- 11% Unstated

In addition to data on births by ethnic grouping, it is also useful to consider births by mothers' country of birth – particularly since this has been recorded over a much longer period. However, analysis by mothers' country of birth does not provide information on women from ethnic minority groups who were themselves born in

England and Wales. In 1985 just over 12% of live births in England and Wales were to women born outside the UK; by 2005 this proportion had increased to 21%; and in 2007 was 23%.² In London, the proportion of live births to mothers born outside the United Kingdom was 47% in the period 2001-2003.⁷

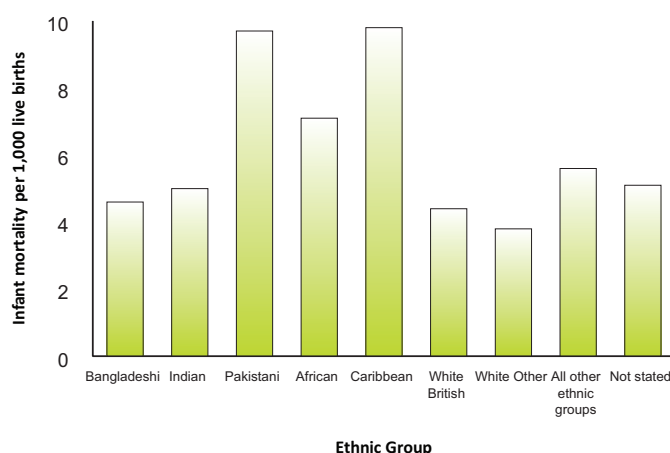
4 Variations in infant mortality by ethnic group

The linkage of birth registrations with NN4B data has enabled several analyses on ethnicity and infant mortality to be published over the last 3 years.^{6,8,9} We summarise the findings from this and other related research below.

4.1 Infant mortality based on babies' ethnicity

Figure 2 demonstrates the variations in infant mortality rates between the census-derived ethnic groups in England and Wales using the linked birth registration-NN4B data for babies born in 2005 and 2006.

Figure 2: Infant mortality rates by ethnic group, England and Wales, babies born in 2005 and 2006 (rates calculated by pooling published data for 2005 and 2006)^{8,10}



The key points are:

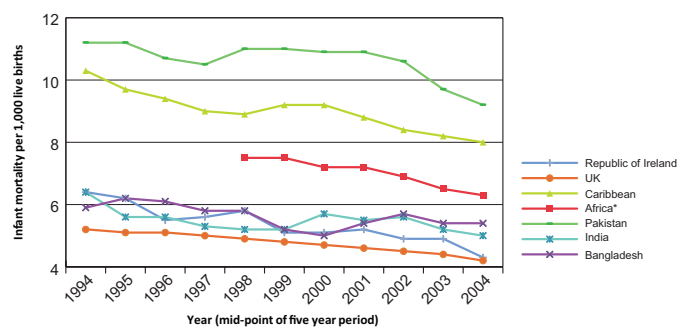
- The Bangladeshi and White groups had the lowest infant mortality rates.
- The greatest inequalities involved the Caribbean and Pakistani groups, whose babies were more than twice as likely as White British babies to die before the age of one.
- The Asian groupings showed marked variation: the Pakistani group had the second highest infant mortality rate of all ethnic groups, while the Bangladeshi group had the lowest of all non-White groups.

Also, a recent analysis of infant mortality by broad ethnic group (White, Asian, Black) and maternal country of birth (UK vs. non-UK born) found a consistent trend of lower infant mortality among babies born to non-UK born mothers relative to women in the same broad ethnic group born in the UK.⁹ Explanations for this trend include the possibility that some protective cultural practices may decline with increasing acculturation (for example, first and second generation mothers from ethnic minority groups are more likely to smoke and less likely to breastfeed than mothers from ethnic minority groups born outside the UK¹¹) and also that healthier people are more likely to migrate.¹² The complex nature of the association between infant mortality and ethnicity suggest that the inequalities observed are likely to be the result of the interplay of social, economic, cultural, and physiological factors.^{6,8,9}

4.2 Trends in infant mortality by mother's country of birth

Although the data on infant mortality rates between different ethnic groups are limited, infant mortality data grouped by mother's country of birth have been collected over a longer period and so analysis of time trends in these data has been possible (Figure 3). Despite a general trend of decreasing infant mortality rates over time in all groups, major inequalities between groups have persisted.

Figure 3: Infant mortality by mother's country of birth among singletons born 1992 -2006, shown as five year rolling averages (data from ONS series DH3, Nos. 27-40)



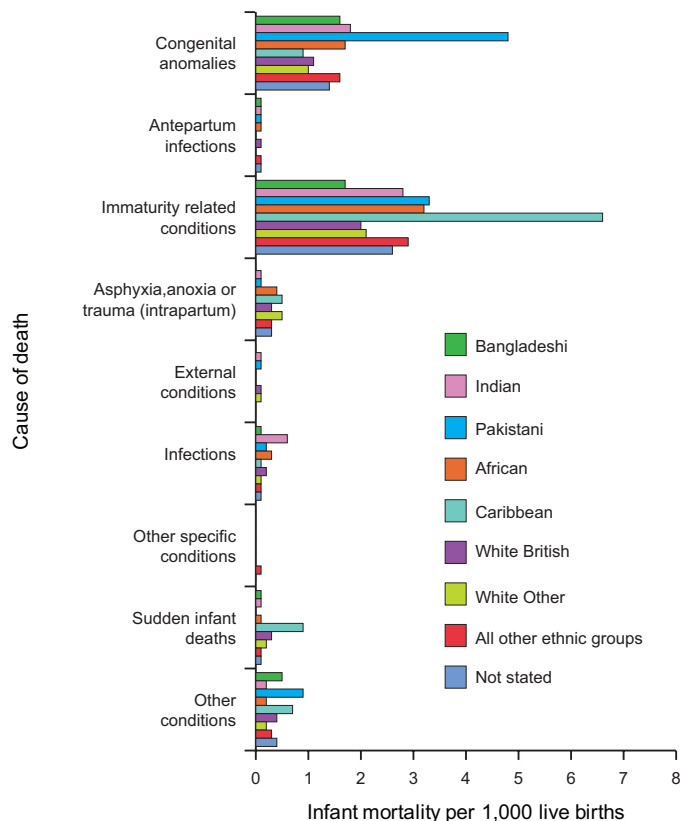
*Includes the following groups: East Africa, Southern Africa and Rest of Africa. Rates for the whole of Africa can only be derived from the published data from 1996 onwards.

4.3 Ethnic variations in causes of infant death

The distribution of causes of infant deaths in the UK varies by ethnic group (Figure 4). In 2005 the most common cause of infant mortality among all babies born in England and Wales was immaturity-related conditions, to which 46% of

all infant deaths could be attributed. This was followed by congenital anomalies, which were responsible for 27% of all infant deaths.¹⁰

Figure 4: Cause of infant death by ethnic group, England and Wales, 2005¹⁰



With respect to ethnic variations:

- in Caribbean babies, the proportion of infant deaths due to immaturity-related conditions was much higher than the other groups;
- Caribbean babies were also at higher risk of Sudden Infant Death Syndrome (SIDS), which accounts for 10% of all infant deaths in this group and only 5% of all deaths in the general population;
- congenital anomalies were the main cause of death among Pakistani babies.

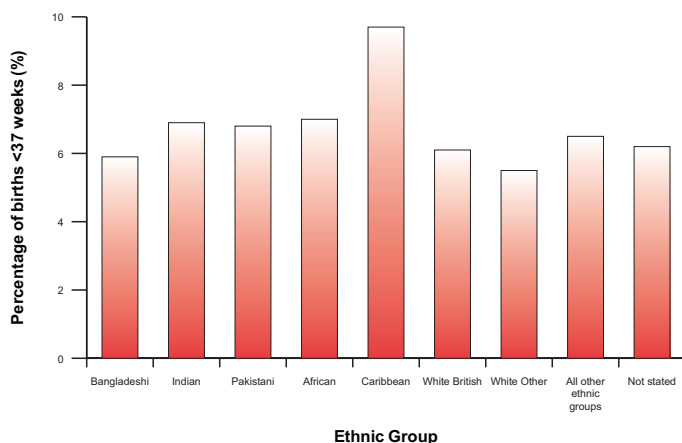
4.4 Possible factors contributing to ethnic variations in infant mortality

The following factors have been linked with infant mortality in the general population:

Gestational age at birth: In 2005, Caribbean ethnicity was associated with the highest risk of preterm birth among liveborn singletons in England and Wales (9.7%); significantly higher than all the other ethnic groups (see Figure 5). Among Indian, Pakistani and African births, 6.8-7.0% of babies were born preterm, while only 5.9% of all Bangladeshi and 6.1% of all White British babies were born preterm. This variation in the preterm birth rate is likely to be partly attributable to socioeconomic factors, with one UK study concluding that approximately half the

excess risk in Afro-Caribbeans was associated with differences in deprivation and marital status.¹³ However, other risk factors may also play a key role. For example, there is some evidence from the USA that lower genital tract infections, known to be a risk factor for preterm birth, are more common among Black women compared to White women.^{14,15}

Figure 5: Preterm birth (<37 weeks gestational age) by ethnic group: live singletons, England and Wales 2005⁶

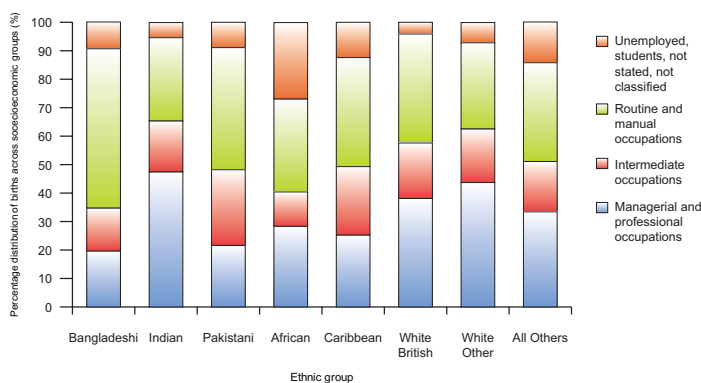


Congenital anomalies: There is some evidence that the birth prevalence of lethal congenital anomalies varies by ethnic group. In 2005 babies of Pakistani origin had more than a three and half fold excess rate of infant deaths from congenital anomalies compared with the population of England and Wales overall (Figure 4). Birth prevalence of congenital anomalies, and thus infant mortality due to congenital anomalies, is a complex reflection of both the underlying incidence of the anomalies and screening uptake and termination behaviour. This is discussed in detail in briefing paper 4 in this series.

Socioeconomic position: Socioeconomic position varies considerably by ethnic group.⁶ Births within the Indian group tend to be of higher socioeconomic position relative to other ethnic groups, and in particular relative to other Asian groups (Bangladeshi and Pakistani). However, when trying to understand the joint effects of ethnicity and socioeconomic position on births and infant deaths, several limitations of the routinely collected data in England and Wales (see Figure 6 below) should be noted. Specifically, data on socioeconomic position is available only for babies where the parents are married or the birth is jointly registered by both parents, with socioeconomic position (classified using the National Statistics Socioeconomic Classification (NS-SEC)) coded for only a random sample of 10% of these births, leading to small numbers in some groups. Furthermore, the proportion of births to 'sole registrants' varies considerably by ethnic group (this is discussed in further detail below). Consequently, the data

in Figure 6 do not fully capture ethnic variations in socioeconomic position at birth. The limited information available on the joint effects of ethnicity and socioeconomic position on infant mortality should be considered in the context of a much broader literature on the interplay between socioeconomic position and ethnicity, which we return to below.

Figure 6: Socioeconomic position of births (NS-SEC) by ethnic group, England and Wales, 2005⁶



Marital status and registration type: Marital status and registration type are associated with infant mortality^{2,16-18} and 'sole registration' is considered one of the five most important factors associated with infant deaths in London.⁷ As noted above, the proportions of live births registered by marital status and registration type also vary according to ethnic group. In 2005, 20.5% of babies in the Caribbean group and 13% in the African group were registered solely by an unmarried mother compared with less than 1.5% of births in the Asian groups.⁶

Maternal age: The risk of infant death is known to have a U-shaped relationship with maternal age—young maternal age is associated with higher risk, the risk falling until it reaches a minimum among women aged 30–34, and then increasing again with older maternal age.^{2,9,19} The proportion of births by maternal age group varies by ethnic group.^{6,20} In 2005, the Caribbean group had the highest proportion of births born to mothers under age 20 (9.5%) as well as to mothers over age 35 (25.6%). More than two-thirds of all births in Bangladeshi and Pakistani groups were to women under the age of 30⁶ but very few of these (i.e. between 3-4%) were to teenage mothers.⁶

Maternal smoking during pregnancy: In the Millennium Cohort Study, a nationally representative sample of births in the UK in 2000-2002, around a quarter of Black Caribbean women and White women had smoked during pregnancy in contrast to very few Black African and Asian mothers.²¹

Maternal weight: In the Millennium Cohort Study, 41% of Black mothers were obese or overweight just before pregnancy. In contrast, overweight in mothers classified as White, Asian or Other was significantly less common (26-28%). On the other hand, a greater proportion of Asian women (10%) were underweight before pregnancy than in any other group.²²

Access to and uptake of health care services during pregnancy: Although, in general, almost all pregnant women in the UK receive some antenatal care, the timing and extent of this has been observed to vary by ethnic group.^{23,24} In particular, Black and Asian women tend to access antenatal care later than White women.

Infant sleeping arrangements and other risk factors for SIDS: Some specific sleeping practices such as prone sleeping position and bedsharing (particularly with a parent who has consumed alcohol or drugs) are known risk factors for SIDS, while other practices such as breastfeeding and sharing the parental bedroom are protective.²⁵ There is some evidence that the prevalence of such practices differs by ethnic group.^{26,27} For example one small study, conducted prior to the 'Back to Sleep' campaign in the UK, found that Asian parents were more likely to place their child in the supine position (protective for SIDS) compared to Whites; however in the same study Asian babies were more than three times as likely as White babies to sleep in the same bed as their parents.²⁶ We are not aware of any more recent published data on the association between sleeping arrangements and ethnicity in the UK. Some protective factors, such as breastfeeding are more common in ethnic minority women,^{28,29} and while bedsharing appears to be more common in some ethnic minority groups, lower levels of alcohol consumption, illegal drug use and smoking may mitigate the some of the risks associated with this practice³⁰ in some groups. Little is known about the relative contribution of these risk factors to SIDS in different ethnic groups in the UK.

5 Towards understanding ethnic inequalities in infant mortality

5.1 A complex picture

The data presented above show three main patterns in ethnic inequalities in infant mortality:

- in general ethnic minority groups fare worse than Whites;
- there is considerable heterogeneity within most ethnic minority groups;

- the distribution of risk factors is sometimes seemingly paradoxical e.g. high deprivation in the Bangladeshi group is associated with relatively low infant mortality.

It is clear that the interplay of socioeconomic, behavioural (e.g. smoking), physiological (e.g. maternal age) and organisational factors (e.g. access to care) within and between ethnic groups is marked by complexity.

Many have considered that current theories based on the distribution of conventional risk factors between and within ethnic minority groups are inadequate as they fail to take into account such factors as culture and acculturation, experience/perception of racism, gender inequality, maternal stress, and putative biological (genetic) differences between ethnic groups. In general these theories also fail to adequately integrate these factors (along with more 'traditional' risk factors) into life-course models, which capture the cumulative, personal, trans-generational and historical disadvantage that impacts pregnancy and the first postnatal year in particular. However, there is evidence (albeit limited in quantity and scope) that suggests that any attempt to understand ethnic inequalities in infant mortality should include a consideration of these factors. Below we consider some of the attempts to do this.

5.2 Seeking explanations

The major causes of infant death in all ethnic groups are prematurity and lethal congenital anomalies. Ethnic groups with higher prevalences of these conditions (such as Caribbean and Pakistani groups) will have correspondingly higher rates of infant deaths, other things being equal. Therefore, it is important to elucidate the factors which predispose certain ethnic groups to higher rates of preterm birth or lethal congenital anomalies (or make them less likely to seek termination of a fetus with such an anomaly). Factors predisposing to preterm birth such as lower vaginal tract infections appear to be more common in certain ethnic groups; moreover genetic differences may predispose certain groups to preterm labour (and hence immaturity related conditions). However, the plausibility of genetics in accounting for a significant share of the disparities in infant mortality has been questioned.^{21,31-36} Additionally, contrary to beliefs that higher infant mortality in ethnic minority groups might reflect unhelpful maternal practices and behaviours associated with cultural differences, data from the Millennium Cohort Study suggest that behavioural factors tend to be mostly favourable among non-White groups. For example, these groups are more likely to have lower rates of cigarette smoking and higher rates of breastfeeding.¹¹ Thus, although cultural factors

may play a role in explaining differences in infant mortality rates in ethnic minority groups, little evidence exists to support this.²¹

Researchers in the USA have proposed several aetiological pathways between experiences of racial discrimination or racism and adverse health outcomes, including the role of such experiences in augmenting stress.^{37,38} Racism seems likely to be an important factor in explaining why subsequent generations of ethnic minority immigrants have poorer health and why even ethnic minorities with higher socioeconomic positions and educational attainment are still at heightened risk.³⁹ Empirical work on the impact of racism and racial discrimination on infant mortality among minority groups in England and Wales is lacking, however a number of US studies have reported a positive association between perceived racism and both preterm delivery and low birthweight.⁴⁰

Research on racial and ethnic inequalities in adverse birth outcomes in the USA also suggests that these inequalities start long before the baby is even conceived. This suggests that experiences in a mother's own early life (such as being born preterm, grand-maternal obesity or adverse environmental exposures during early childhood), along with the cumulative impact of socioeconomic deprivation or stress (including stress associated with racial discrimination) over the course of their lives, may be important factors in explaining higher infant mortality rates in ethnic minority groups.⁴¹⁻⁴⁴ One implication of the role of life course effects on poor birth outcomes is that health interventions aimed at reducing infant mortality rates in ethnic minority groups should not be limited to targeting women of childbearing age. Rather, interventions may be necessary at various points throughout the lives of these women. Again, there has been very little work done on understanding life course effects on infant mortality in the UK.

5.3 Socioeconomic influences across the life course

The effects of socioeconomic position on health and mortality (see briefing paper 2 in this series for an extended discussion of socioeconomic position and infant mortality³) are well documented, albeit not fully understood. In general people from ethnic minority groups in the UK are more socioeconomically disadvantaged and more likely to have poor health outcomes than the majority White British population.⁴⁵ This had led to an unfortunate tendency to view ethnicity as a proxy for socioeconomic disadvantage and to assume uniformly poor health outcomes.⁴⁵ The result has been attempts to generalise findings about the nature of the relationship between socioeconomic position

and health in the 'majority' population to understanding the inequalities observed in ethnic minority groups.⁴⁶ This overlooks differences within and between different ethnic minority groups and ignores the complexity of how socioeconomic factors and ethnicity interact to produce health outcomes.⁴⁷ A more sophisticated understanding of the relationship between ethnicity, socioeconomic position and poor health outcomes must see socioeconomic position as a multidimensional concept, and explore how its various components may have differential impacts on health in different ethnic groups.⁴⁵⁻⁴⁷

Furthermore, national statistics and surveys often fail to capture both the complex and dynamic nature of socioeconomic position. Current measures of socioeconomic position often provide only a 'snapshot' and do not capture the full impact of social deprivation experienced over a lifetime by some women. A study of ethnic variations in birthweight based on findings from the Millennium Cohort Study defined socioeconomic deprivation more broadly than the NS-SEC measure used in most official publications, making the case that wider constructs of socioeconomic position (encompassing educational attainment, housing tenure and single parenthood, along with more commonly used indicators such as income, employment and occupation) could have a powerful explanatory role.²¹ Using this multidimensional measure, socioeconomic factors were found to have strong explanatory power for low birthweight of Bangladeshi, Pakistani, Caribbean and African babies.

However, even with more encompassing measures of socioeconomic position, identifying causal pathways that lead from broadly defined socioeconomic variables to infant deaths is quite difficult and evidence of how these factors influence infant mortality in different ethnic groups is quite weak.⁴⁸ Further work which seeks to explain how particular forms of socioeconomic disparities lead to poor infant health outcomes, and takes into account the heterogeneity that exists between ethnic groups in the risk factors and causes of infant death, is critical to inform the development of effective public health interventions.

5.4 Uptake of and access to antenatal care

Timely, high quality antenatal care has been shown to be associated with better outcomes for the mother and infant.^{49,50} The few studies that have looked at access and uptake of antenatal care by ethnic minority women^{23,24,49,51,52} have revealed that women of black and ethnic minority groups generally have later and poorer access to these services during pregnancy.

The 2006 National Survey of Women's Experience of Maternity Care⁵³ noted that women from ethnic minority groups in England were more likely than White women to feel that they had not been treated with respect by midwives, doctors and other staff, and were less likely to have the contact details of a midwife during pregnancy. They were also more likely to feel rushed or that medical staff were rude, insensitive or unhelpful. The survey also found that these women were less likely to have seen a midwife initially, more likely not to have been offered screening for Down's syndrome or an anomaly scan, and less likely to have been offered antenatal classes. They also reported that ethnic minority women more often reported that staff, midwives and doctors often talked to them in ways that they could not understand.⁵³ Other factors affecting access to timely and appropriate antenatal care may affect ethnic minority women disproportionately, and explicit consideration of these barriers may help guide the development of services to address disparities in care.⁵⁴

6 What can be done to reduce inequalities in infant death rates between and within ethnic groups in England and Wales?

The Public Service Agreement (PSA) infant mortality target⁵⁵ has created a strong impetus for the NHS to implement strategies to reduce infant mortality, particularly in less advantaged groups of the population. The specific areas for action that have been identified as potentially having an impact on reducing the infant mortality 'gap' are as follows:^{1,56}

- reducing conceptions in under 18s in the 'Routine and Manual' (R&M) group;
- targeted interventions to prevent Sudden Unexpected Death in Infancy (SUDI) in the R&M group;
- reducing the prevalence of obesity in the R&M group;
- reducing overcrowding in the R&M group;
- reducing the rate of smoking in pregnancy;
- increasing early booking for antenatal care;
- reducing child poverty.

Although many of these actions might benefit ethnic minority groups, it is important to consider what additional measures are needed to tackle inequalities in infant mortality between ethnic groups, and also to ensure that interventions are appropriately tailored to meet the needs of specific ethnic groups. Furthermore, as the major determinants of health inequalities are socioeconomic, they are likely to require cross-

departmental action at a national government level. The impact of the NHS alone is likely to be relatively small and therefore it is important to be realistic about what can be achieved first through the action of local NHS organisations, such as service commissioners and providers, and second through NHS organisations acting collectively with other agencies (notably local authorities) to improve the public health in general and in ethnic minority groups in particular.

At the time of writing, Professor Sir Michael Marmot is undertaking a strategic review of health inequalities. A key role for the review is to identify new, and review existing, evidence in the key areas where action is likely to be most effective in reducing health inequalities.⁵⁷ The review is focusing on the impact of the social determinants of health and builds on his earlier report of the WHO Commission on the Social Determinants of Health.⁵⁸ Initial thinking from the review has identified possible areas for future action on ethnic inequalities in health which may more broadly impact on inequalities in infant mortality. These areas include:

- improving the position of black and minority ethnic groups by building a stronger evidence-base to inform policy development including on employment;
- education and health;
- improving the economic circumstances of disadvantaged groups, including black and minority ethnic groups;
- promoting equitable life chances through education, and addressing racism.

7 Sources of further detailed information

There are a number of internet resources containing specific information on health in ethnic minority groups including the website of the London Health Observatory⁵⁹ and a section on the NHS Evidence website on ethnicity and health.⁶⁰ For the technical aspects of data collection and analysis we would refer the interested reader to a toolkit produced by the London Health Observatory.⁶¹

The Millennium Cohort Study,⁶² which was funded by grants from the Economic and Social Research Council and a consortium of government departments led by the Office for National Statistics, has been a useful source of information on maternal and infant health in ethnic minority groups. Using over-sampling to boost the proportion of women included from ethnic minority groups, it contains very detailed information on social situation, health behaviours and medical problems, although the numbers in some groups are too small to make

useful comparisons. There are also a number of smaller cohort studies⁶³⁻⁶⁶ that provide relevant information.

The Race for Health Programme has produced a useful guide for those involved in commissioning services for ethnic minority groups.⁶⁷

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