# Obesity: JSNA

*May 2011*

## Section 1 – Identifying the Obesity Challenge

## Section 2 – The Local Obesity Challenge in Sandwell

## Section 3 – Addressing the Obesity Challenge in Sandwell

*Sandwell Child & Family Obesity Strategy - Strategic Implementation Plan (2009-2014)*

### *Introduction*

The refreshed Joint Strategic Needs Assessment for Sandwell (2010) identifies that the health of people in Sandwell is improving, but not as fast as the England average. Smoking, obesity, low fruit and vegetable consumption, lack of exercise, and alcohol use are all significant causes of ill health in the borough. This obesity needs assessment is intended to contribute to the over-arching aims currently being developed in the Lifestyle Services Specification by the Health & Well-Being Unit – Sandwell PCT. These aims seek to improve the health and well-being of local people through lifestyle change, reduce the prevalence of long-term conditions associated with unhealthy lifestyles, and contribute to a reduction in health inequalities. It is anticipated that this needs assessment will be subject to regular update in order to take account of the emerging evidence base and the ongoing development of the data and intelligence 'picture' for Sandwell in the areas identified.

*Compiled by:*
***Gordon Andrews***
***Dr. Rosemary Kyle***
***Ramila Patel***

Sandwell PCT
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# Section 1 – Identifying the Obesity Challenge

## *General Prevalence and Risk*

Obesity prevalence in England increased considerably between 1993 and 2008, from 13.6% to 24.0% among men and 16.9% to 24.4% among women[1]. With increase at the same rate, by 2025 it is estimated that levels will reach 47% for men and 36% for women (*See Appendix 1 – Definitions of Obesity in respect of BMI*)

Obesity contributes to the onset of many diseases and premature mortality[2]. It is the sixth most important risk factor contributing to the overall burden of disease worldwide. A recent combined analysis of 57 international prospective studies[3] found that Body Mass Index (BMI) is a strong predictor of mortality among adults. Overall, moderate obesity (BMI 30-35 kg/m2) was found to reduce life expectancy by an average of three years, while morbid obesity (BMI 40-50 kg/ kg/m2) reduces life expectancy by eight to ten years. This eight to ten year loss of life is equivalent to the effects of lifelong smoking.

The health problems associated with obesity are cardiovascular disease, hypertension, type II diabetes, sleep apnoea syndrome and some cancers. The Foresight obesity report (2007)[4] suggests that the risk of developing type 2 diabetes is some 20–80 times more likely for people who are obese compared with lean people. Coronary heart disease (which itself is slightly more common among obese people) is 2–3 times more common among diabetic men and five times more common among diabetic women. Stroke is also more common among obese people (and also among those with diabetes) than in the general population. Obesity is also a risk factor for some cancers, particularly endometrial and kidney cancer, and is also an important risk factor for osteoarthritis in most joints.

It is particularly important for South Asian populations in the UK to be aware of the health risks of increased BMI and waist circumference as they have a higher proportion of body fat in comparison to people of the same age, gender and BMI in the general UK population, and thus are at an even greater risk of developing cardiovascular diseases and type 2 diabetes[5] if they are obese.

As well as its physiological impact, obesity may contribute to psychosocial problems. Adults who are defined as severely obese may experience a decreased quality of life. There is a social stigma attached to obesity and those affected often face prejudice and discrimination. Severe obesity has a negative impact on mobility, productiveness, employment and psychosocial functioning. Many adults who are defined as being severely obese are left feeling depressed, defensive and unable to live life to the full.

[1] Health Survey for England 2008: Physical Activity and Fitness
[2] National Audit Office 2001
[3] Prospective Studies Collaboration. Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. Lancet 2009; 373: 1083–96
[4] Foresight Report 'Tackling Obesities: Future Choices' 2007
[5] WHO(2004) Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies accessed http://www.who.int/nutrition/publications/bmi_asia_strategies.pdf

# Section 2 – The Local Obesity Challenge in Sandwell

## Part One - Adults

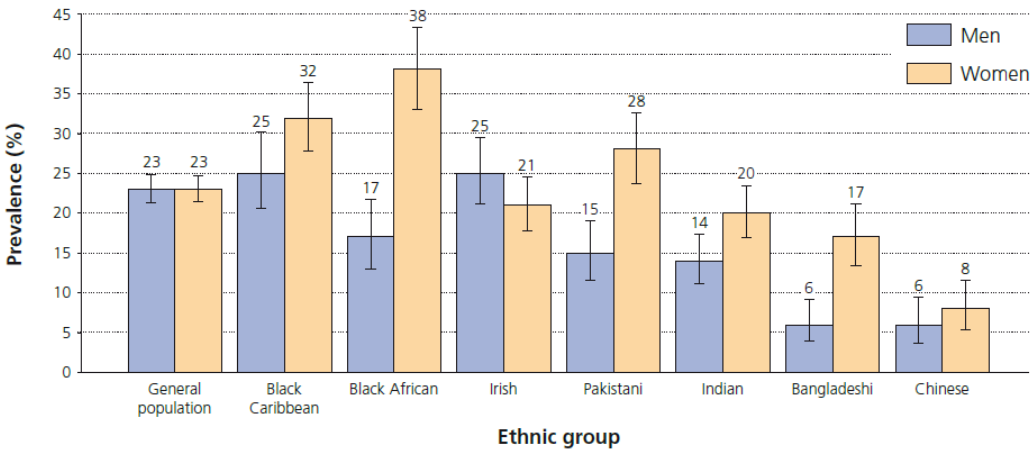
### *Local Prevalence*

We do not have hard data for adult obesity in Sandwell. However, the NHS Information Centre has published prevalence estimates for Primary Care Organisations in England using Health Survey for England data for 2003-2005. The model-based estimate of expected prevalence for Sandwell PCT based on its population characteristics is 27.7% (23.6% nationally), however this does not provide an estimate of the actual prevalence. There are 221,356 adults over 16 years old in Sandwell (Office of National Statistics Census 2001). Using the 27.7% estimate of prevalence approximately 61,316 adults in Sandwell could be defined as obese (BMI greater than 30 kg/m²). Of these, a model-based estimate suggests that 3,542 adults may be morbidly obese (BMI greater than 40 kg/m²). However, obesity prevalence is not uniform across the population. There are particular groups of people within the population where the risk of obesity is greater than in other groups. The following two sections consider those factors of relevance to Sandwell that may have an impact on obesity prevalence.

### *Ethnicity*

Nationally, there is little representative data on obesity prevalence in minority ethnic groups in the UK. In 2004, The Health Survey for England (HSE) included a 'boost sample' drawn from minority ethnic groups, enabling more detailed analysis of data by ethnicity. These data (Figure 1) show marked differences between obesity prevalence in different ethnic groups. The data were also analysed to determine the difference in prevalence between the sexes within each ethnic group. There is a considerable difference in prevalence between men and women in each ethnic group, whereas no such difference was found for the general population. In almost every minority group, women have a higher prevalence of obesity than men, and this difference is significant among the Pakistani, Bangladeshi and Black African populations. The lowest prevalence of obesity was found in the Chinese and Bangladeshi groups, in particular men within these groups. However it should be noted that these data have been analysed using current BMI thresholds, which are intended for White populations and may not necessarily be appropriate for other ethnic groups.

**Figure 1**: Prevalence of obesity in adults (aged 16 and over) by ethnic group and sex, 2004

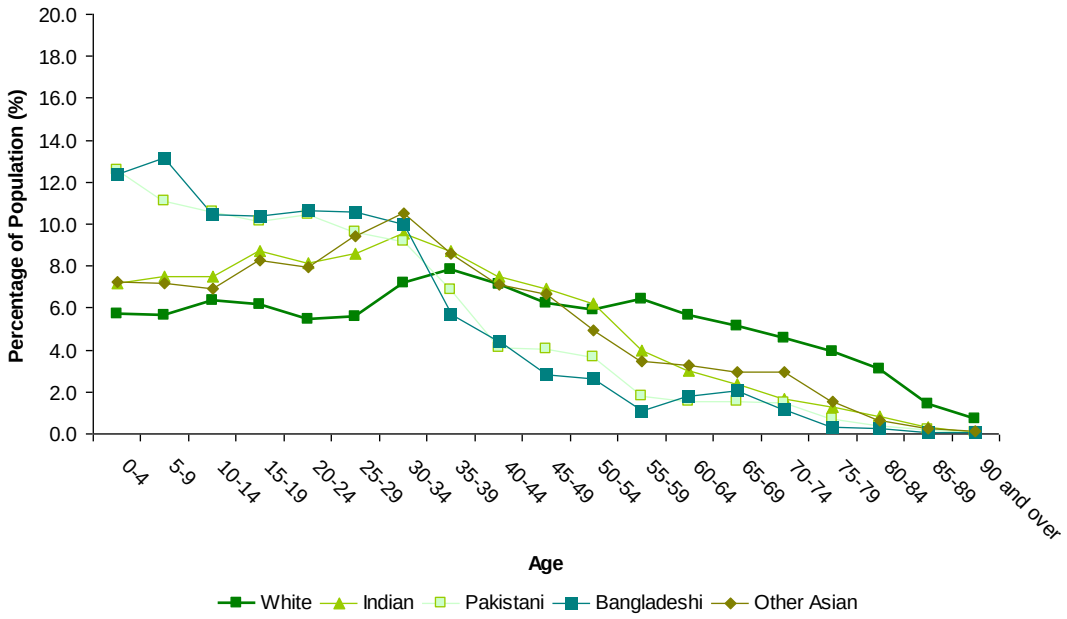



*Source: Health Survey for England*

*Error bars on chart are 95% confidence intervals. These indicate the level of uncertainty about each value on the chart. Wider intervals mean more uncertainty.*

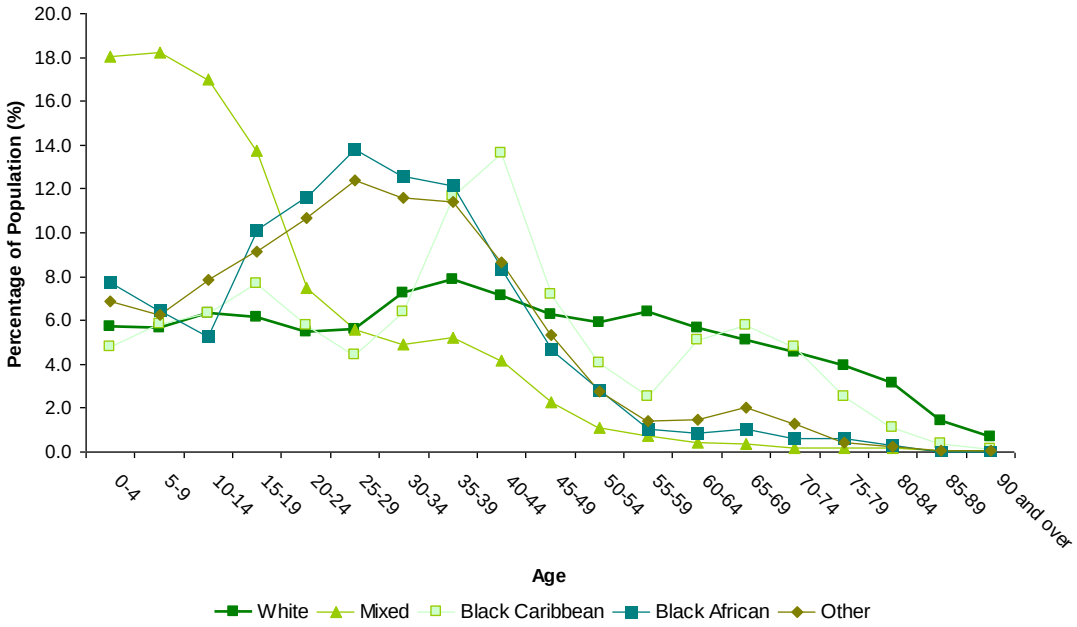
Knowledge of the differing rates of obesity prevalence in different ethnic groups can help to plan services to meet the needs of the population, so that these are both culturally and clinically relevant. The two figures that follow (Figs 2 and 3) show the proportion of different ethnic groups, by age profile within the Sandwell population. From these data it can be seen that the Mixed, Pakistani and Bangladeshi groups make up a higher proportion of the population under 20 years old than other ethnic group. The proportion of the population in these groups is also predicted to increase more rapidly than other ethnic group by 2029 (Fig 4), as these young people reach adulthood and have children themselves. Data presented in figure 4 predicts the ethnic mix of the Sandwell population in 2029 from baseline measurements in 2008. By 2029, Black and Minority Ethnic (BME) groups will have increased to 30 per cent of the Sandwell population. The largest projected increases are in the Bangladeshi and Pakistani populations, doubling in size due to a higher birth rate. Obesity prevalence is higher for Pakistani women than it is in the general population. Although specific prevalence figures are not provided for the Mixed ethnic group, we do know that rates of obesity in Black African and Black Caribbean women are very high compared with other ethnic groups and the general population. The risk factors associated with obesity, highlighted in Section 1, are potentially going to have a greater impact on those ethnic groups with higher rates of obesity prevalence. This impact will be exacerbated as the projected proportion of these groups in the Sandwell population increases. If these data are considered with what is known about obesity prevalence in different ethnic groups (Fig 1), predictions can be made about the potential need for appropriate and targeted obesity services in the population

**Figure 2: Age profile of the different ethnic groups, Asian and White, Sandwell**



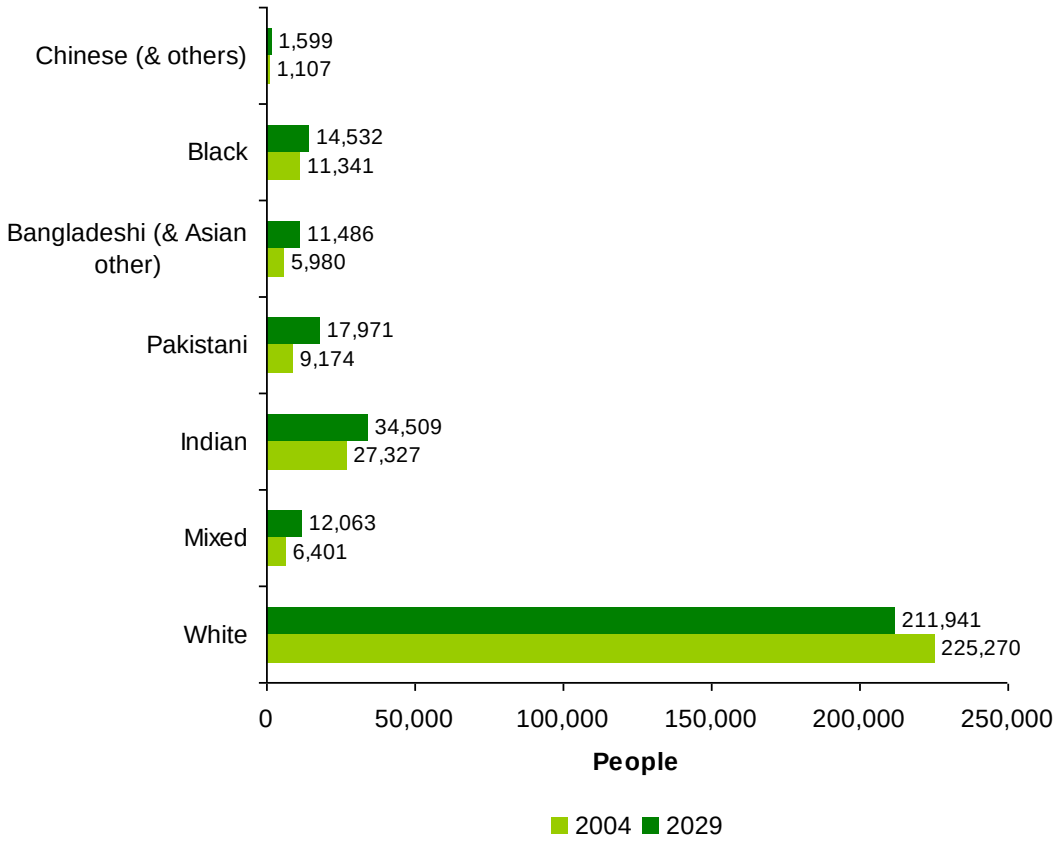

*Source: ECOTEC HDAM model Dec 2007*

**Figure 3: Age profile of the different ethnic groups, Black, Others and White, Sandwell**




*Source: ECOTEC HDAM model Dec 2007*

**Figure 4: Population of Sandwell by ethnic group, 2008 compared to 2029**




*Source: ECOTEC HDAM model Dec 2007*

### *Socio-Economic Grouping, Levels of Deprivation, Levels of Education*

There are also likely to be different rates of increase in obesity between different groups within populations. It has been estimated that by 2012, the national prevalence of obesity for adults in manual social classes will be higher (34%) than in adults from non-manual social classes (29%)[6]. The National Obesity Observatory (NOO)[7] has analysed data from the HSE, National Statistics Socio-economic Classification, England 2004-08 and Index of Multiple Deprivation IMD (2007) and found that among women, obesity prevalence increases with decreasing socioeconomic status. When considered alongside the increasing ethic population in Sandwell, and the higher rates of obesity found in women in these ethnic groups, these data suggest that treating and preventing obesity in women should be a key part of strategy in Sandwell. The link between socio-economic classification and obesity is less clear for men, although male manual workers do have higher rates of obesity than non-manual groups. However, obesity varies much less between men in different income groups, or living in areas of different levels of deprivation than it does between women, and a more detailed breakdown by occupational group also reveals little to understanding why this should be.

Obesity prevalence also rises with decreasing educational level among both men and women. Table 1 shows the educational levels of the Sandwell population compared with the West Midlands and Great Britain.

**Table 1: Sandwell population educational levels compared with the West Midlands and Great Britain**

| | Sandwell (numbers) | Sandwell (%) | West Midlands (%) | Great Britain (%) |
|---|---|---|---|---|
| NVQ4 and above | 28,000 | 15.4 | 24.8 | 29.9 |
| NVQ3 and above | 57,800 | 31.8 | 43.8 | 49.3 |
| NVQ2 and above | 90,400 | 49.7 | 60.9 | 65.4 |
| NVQ1 and above | 123,300 | 67.8 | 75.6 | 78.9 |
| Other qualifications | 23,200 | 12.8 | 8.2 | 8.8 |
| No qualifications | 35,200 | 19.4 | 16.2 | 12.3 |

The percentage of the population in Sandwell with no qualifications is greater than that in the West Midlands and Great Britain. There are also fewer people with higher level qualifications, the majority being categorised as NVQ1 and above (equivalent to GCSEs grades D-G).

A study of the quality of women's diets suggests that the most important influence on the prudent diet score used to assess diet was the educational attainment of the woman; lower scores were much more common among women with few educational qualifications. This influence was far more important than any other factor considered, including the woman's social class, the deprivation score of her neighbourhood, or whether she was in receipt of financial benefits. Although cost is a recognised barrier to eating healthily the less prudent diets observed in this study did not seem to be simply a result of lower income[8].

[6] Zaninotto, P. *et al*. (2009) Trends in obesity among adults in England from 1993 to 2004 by age and social class and projections of prevalence to 2012. Journal of Epidemiology and Community Health, 63:140-146

[7] http://www.noo.org.uk/NOO_pub

[8] Robinson S, Crozier SR, Borland SE et al (2004) Impact of educational attainment on the quality of young women's diets. European Journal of Clinical Nutrition 58: 1174-80.

# Section 2 – The Local Obesity Challenge in Sandwell

## Part Two - Pregnancy & Maternity

### *Prevalence*

The prevalence of obesity among women of childbearing age is increasing. Data collected as part of the Reducing Perinatal Mortality project shows that 27% of women living in the Sandwell PCT area, and giving birth in 2007, had a body mass index of 30+ (obese), and of these 7.9% had a BMI of 35+ (severely obese).

### *Risks associated with maternal obesity*

Women who are obese when they become pregnant face an increased risk of complications during pregnancy and childbirth. These include the risk of impaired glucose tolerance and gestational diabetes, miscarriage, preeclampsia, thromboembolism and maternal death[9]. Obese women giving birth were also likely to stay in hospital 4-6.5 days longer than those who are normal weight[10].

The risks associated with obesity for particular ethnic groups, already identified in Part One of this section are heightened during pregnancy. Asian and South Asian ethnicity are both independently associated with increased insulin resistance in late pregnancy. Pre-pregnancy BMI has a much greater effect on insulin resistance in pregnancy in Asian women than in Caucasians. Ethnicity thus emerges as a factor that alters the effect of obesity on insulin resistance in pregnancy[11]. Research undertaken at Heart of England foundation trust (HEFT) found that obesity and insulin resistance were independent risk factors. Data were analysed from one year's deliveries (2009) at HEFT. Of 2972 deliveries with accurately recorded ethnicity and BMI, 22% women were of South Asian origin. These women had a 6 fold increase risk of insulin resistance, which has a continuous association with obstetric complications. The percentage of stillbirths in the South Asian population, as a proportion of the obstetric population in that group, was much greater than in the white population. It is recommended that although treatment should continue for those diagnosed with gestational diabetes, much would be gained by preventing the obstetric complications and long term consequences of obesity. Prevention would benefit both the health of the mother and child and the financial costs associated with obesity related risks.

Maternal obesity also increases the adiposity of the foetus and newborn baby. This phenomenon is exacerbated further if maternal obesity is complicated by gestational diabetes Recent data suggest that maternal obesity alone, even in the absence of gestational diabetes, increase the risks of metabolic syndrome in the offspring[12]. Importantly, among those who fulfilled criteria for gestational diabetes, the relationship between maternal glycaemia and offspring obesity was lost if the mother received treatment[13].

Emerging evidence suggests that maternal obesity as well as having an impact on a mother's health also has long-term adverse influences on the health of their child.[14] Adiposity in early adulthood appears to be influenced by prenatal influences independently of current lifestyle factors. A baby born small or large for gestational age (either of the two extremes) is thought to have an increased risk of obesity in later life[15].[16]

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[9] Centre for Maternal and Child Enquiries and the Royal College of Obstetricians and Gynaecologists (2010).

[10] Galtier-Dereure, F., Boegner, C. and Bringer, J. (2000) "Obesity and pregnancy: complications and cost" American Journal of Clinical Nutrition, Vol. 71, No. 5, 1242S-1248

[11] Retnakaran,R. Hanley,AJG, Connelly, PW, Sermer,M and Zinman, B. (2005) "Ethnicity Modifies the Effect of Obesity on Insulin Resistance in Pregnancy: A Comparison of Asian, South Asian and Caucasian Women" Journal of Clinical Endocrinology and Metabolism doi:10.1210/jc

[12] Boney CM, Verma A, Tucker R et al (2005) "Metabolic syndrome in childhood: association with birth weight, maternal obesity, and gestational diabetes mellitus". Pediatrics 115:e290-6.

[13] Hillier TA, Mullen JA & Pedula KL (2007) Childhood obesity and metabolic imprinting.
The ongoing effects of maternal hyperglycemia. Diabetes Care 30: 2287-92

[14] Reynolds, RM; Osmond, C, Phillips, DI and Godfrey, KM (2010) Maternal BMI, Parity, and Pregnancy Weight Gain: Influences on Offspring Adiposity in Young Adulthood. J. Clin Endocriol Metab. (Epub ahead of print)

[15] Singhal A, Wells J, Cole TJ, Fewtrell M, Lucas A (1 March 2003). "Programming of lean body mass: a link between birth weight, obesity, and cardiovascular disease?". Am J Clin Nutr. 77 (3): 726–30.

The data in Table 2 show the numbers and percentages of babies born in Sandwell between June 2009 and October 2010. These are categorised according to birth weight and whether the mother had a BMI of below or above 30 kg/m². The percentage of babies with a birth weight between 3500 and 3999g born to mothers with a BMI of over 30 kg/m² is higher than that of babies in the same weight range born to mothers with a BMI of less than 30 kg/m². There were proportionately nearly twice as many babies weighing above 4000g born to obese mothers than to those born to mothers with a BMI of less than 30 kg/m².

| | Babies' birth weights | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mother BMI | under 2500g | | 2500-2999g | | 3000-3499g | | 3500-3999g | | 4000g and over | | unknown | | Grand Total |
| BMI < 30 | 521 | 9.04% | 1294 | 22.45% | 2207 | 38.30% | 1342 | 23.29% | 394 | 6.84% | 5 | 0.09% | 5763 |
| BMI > 30 | 76 | 5.54% | 216 | 15.73% | 482 | 35.11% | 414 | 30.15% | 185 | 13.47% | 0 | 0.00% | 1373 |

**Table 2: Birth weights of babies born to mothers with BMI less than and greater than 30**

*Source: Perinatal data 19/06/2009 to 12/10/2010*

The influence of maternal obesity continues to have an impact on offspring after birth. Data from the EarlyBird cohort study suggest that obesity in children is strongly linked with maternal obesity, particularly in girls[17]. The daughters of obese mothers appear to have a 10-fold greater risk of obesity and the sons of obese fathers a six-fold greater risk, but parental obesity does not influence the BMI of the opposite-sex child. This factor is thought to be more likely to be behavioural than genetic, and is well established by the time a child is 5 years old. This risk however appears to be unaffected by birth weight.

As with the differences in obesity prevalence between ethnic groups previously referred to earlier in this section and in part 1, research has also suggested that ethnic disparities in obesity prevalence are already present in the preschool years[18]. Key findings from the National Child Measurement Programme: England 2009/10 school year show that obesity prevalence is significantly higher than the national average for children in both Reception and Year 6 in the ethnic groups 'Asian or Asian British', 'Any Other Ethnic Group', 'Black or Black British' and 'Mixed'. Data collected from children in Sandwell for the National Child Measurement Programme (NCMP) are considered in the next section of this document.

[16] Parsons TJ, Power C, Manor O (December 2001). "Fetal and early life growth and body mass index from birth to early adulthood in 1958 British cohort: longitudinal study". BMJ 323 (7325): 1331–5. doi:10.1136/bmj.323.7325.1331. PMID 11739217. PMC 60670

[17] Perez-Pastor EM, Metcalf BS, Hosking J, Jeffery AN, Voss LD, Wilkin TJ. Assortative weight gain in mother-daughter and father-son pairs: an emerging source of childhood obesity. Longitudinal study of trios (EarlyBird 43). Int J Obes (Lond). 2009;33:727-35

[18] Taveras, E. M. Gillman, M.W., Kleinman, K., Rich-Edwards, J.W. and Rifas-Shiman S. L.(2010) "Racial/Ethnic Differences in Early-Life Risk Factors for Childhood Obesity". Pediatrics Vol. 125:4 pp. 686-695 (doi:10.1542/peds.2009-2100)

## Section 2 – The Local Obesity Challenge in Sandwell

# Part Three - Children

Defining obesity in children is more complex than it is for adults. Different countries use different growth references and cut off points and none of these are adapted for ethnicity. Current trends suggest that around 8% of obese 1–2-year-old children will be obese when they become adults and that around 80% of children who are obese at age 10–14 will become obese adults, particularly if one of their parents is also obese[19]. Significantly, the EarlyBird Study highlights that the 'average', pre-pubertal child is no heavier than 20-25 years ago and that a sub-group of obese children (living within obese families) has skewed the distribution. As previously stated, there is a strong same-sex gender relationship with regard to obesity risk among the offspring of obese parents. A 'feed backwards' effect is observable for childhood obesity i.e. the effect of the obese parent (and re-cycled behaviours such as over-nutrition within families) in the early life stages being identified as a key determinant as opposed to the 'feed forwards' effect of the obesogenic environment in future life. 90% of excess weight gained by girls before puberty (and more than 70% in boys) occurred before the age of 5 years.

In the UK, the National Child Measurement Programme (NCMP) uses the UK90 to determine BMI status according to a child's age and sex. The NCMP measures over one million children annually at Reception (4-5 years) and Year 6 (10-11 years). Data initially collected at schools for the NCMP include pupil names, sex, dates of birth, ethnicity codes, home postcodes and home addresses. Before being uploaded to the main NCMP database pupil names are removed, dates of birth are changed to months of birth and postcodes are converted to lower-layer super output areas so that individual children cannot be identified from the results at a national level. These data are analysed centrally by the NHS Information Centre, who then publish a report and statistical information on the NCMP in December. The most recent data for the academic year 2009/2010 are compared to the previous data for 2008/2009 in Table 3 below.

### *Findings from the National Child Measurement Programme (2009/10)*

**Table 3: Sandwell NCMP results 2008/9 & 2009/10 compared with West Midlands and England**

| Academic Year | Class | Target % Measured | Actual % Measured | Target % Obese | Actual % Obese |
|---|---|---|---|---|---|
| 2008/09 | Reception | 86 | 97.7 | 11.2 | **12.9**<br>10.1 W Mids.<br>9.6 National |
| | Year 6 | 86 | 94.4 | 20.0 | **24.6**<br>19.4 W Mids.<br>18.3 National |
| 2009/10 | Reception | 87 | 99.6 | 10.8 | **11.9**<br>10.2 W Mids.<br>9.7 National |
| | Year 6 | 87 | 93.9 | 20.0 | **23.5**<br>20.2 W Mids.<br>18.6 National |

[19] Whitaker et al. Predicting obesity in young adulthood from childhood and parental obesity. NEJM 1997;, 337: 926-7

### *Distribution of BMI*

The following charts (Figs 5 and 6) show the distribution of children in Reception and Year 6 across the BMI centiles. For the purpose of the NCMP, children's BMI is classified using the 'population monitoring' thresholds of the 85th and 95th centiles of the British 1990 growth reference population (UK90). The 85$^{th}$ centile shows the cut off point between 'healthy weight' and 'overweight' children and those above the 95$^{th}$ centile are classified as 'obese'. In clinical settings the 91st and 98th centiles tend to be used. Letters sent to parents are generated using the NHS IC's tool. It is worth noting that this tool uses the UK 1990 clinical thresholds to define overweight and obesity (different from the population-monitoring thresholds used in the NHS IC's national report),

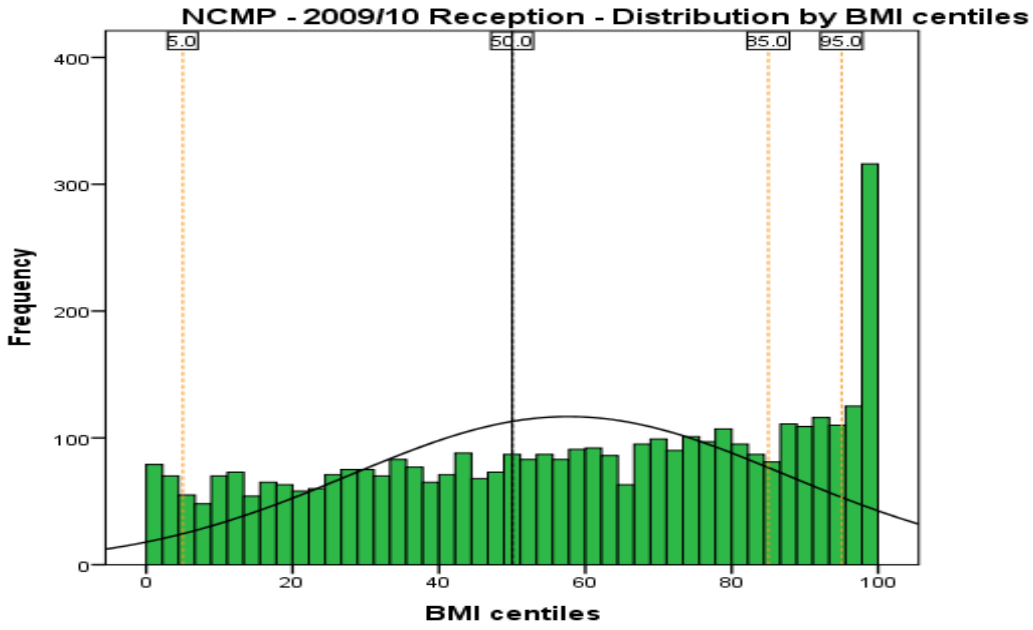


**Figure 5:** *Source - Sandwell PCT 2010*

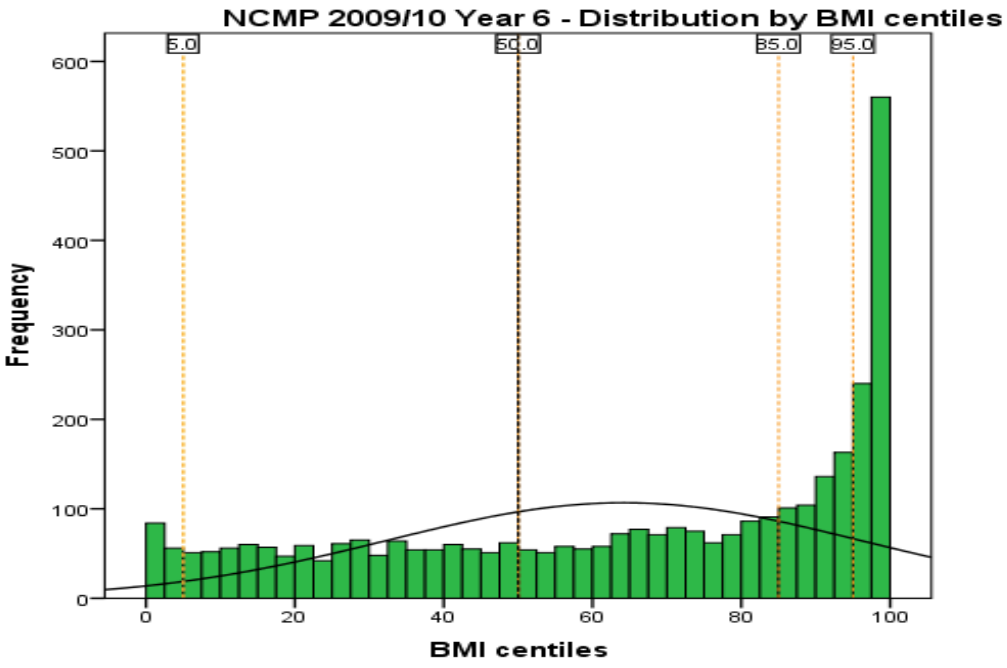

**Figure 6:** *Source - Sandwell PCT 2010*

The median and mean BMI have been calculated for both Reception and Year 6. This gives a baseline for comparing subsequent data, but not previous data as the numbers of children measured in previous years were not sufficient to give accurate values for the primary school population.

## *Ethnicity*

Ethnicity data are collected as part of the NCMP. As the numbers in some ethnic groups are small, where possible they have been combined in accordance with established conventions. It was decided to keep children with mixed ethnicity in their separate groups. This is because the number of children with mixed ethnicity is increasing in the Sandwell population. Table 4 shows the numbers of children measured in each school year by ethnic group.

| Ethnic groups | Number of children measured for NCMP (2009/10) | |
|---|---|---|
| | Reception | Year 6 |
| Other ethnic groups | 358 | 183 |
| White group | 2106 | 2066 |
| White and Black Caribbean | 109 | 119 |
| White and Black African | 13 | 13 |
| White and Asian | 74 | 42 |
| Indian | 456 | 385 |
| Pakistani | 397 | 271 |
| Bangladeshi | 152 | 125 |
| Black Caribbean | 162 | 133 |
| Black African | 95 | 65 |

**Table 4: Numbers of children measured in each school year by ethnic group.**

For ease of analysis all the data for white groups were analysed together[20]. Because of their relatively small numbers, some groups were put together and analysed as 'other'[21].

## *Reception Age*

Simple analysis comparing underweight, healthy weight, overweight and obese categories in the white and total BME cohorts[22] of Reception children (2106 and 1687 children respectively) shows little apparent difference between the percentages of healthy weight and obese children (Fig 7). There does however appear to be a higher percentage of overweight children in the white group than in the BME group and a higher percentage of underweight children in the BME group than in the white group.

[20] White British, White Irish, Any Other White Background
[21] Any Other Asian Background, Any Other Black Background, Any Other Ethnic Group, Any Other Mixed Background, Not Stated/Invalid
[22] Ethnicity codes not recorded for some children

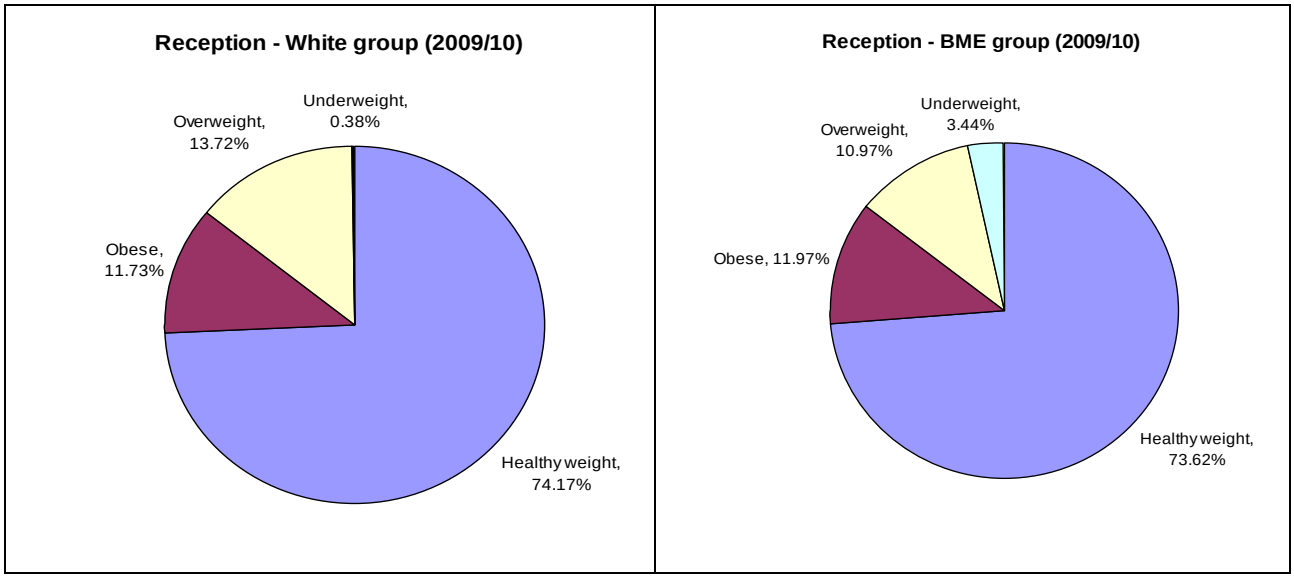


**Figure 7: Reception BMI classification total White and combined BME groups**

### *Year 6*

When data for underweight, healthy weight, overweight and obese classification between the white and total BME groups in year 6 are compared (2066 and 1266 children respectively), overweight and obesity both appear to be similar for the white and BME group. The percentage of children who are underweight appears to be higher in the BME group.(Fig 8)

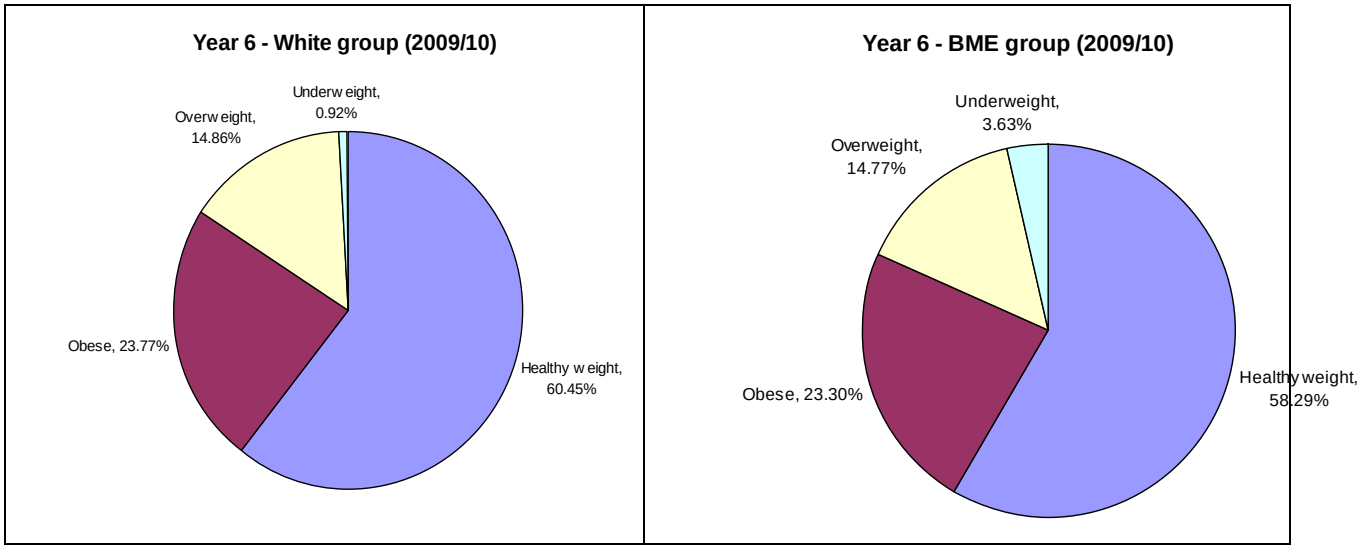


**Figure 8: Year 6 BMI classification total White and combined BME groups**

The data were then analysed in more detail by ethnicity code to see if there were any demonstrable differences in the distribution of BMI classification between the different ethnic groups. Although the relatively small numbers of children in each ethnic group meant that these differences were not statistically significant, the data suggest that obesity prevalence could be greater in some ethnic groups than in others. Nationally, there has been a significant increase in obesity prevalence in those of Bangladeshi ethnicity[23]. Data collected from Bangladeshi children in both reception and year 6 in Sandwell do concur with these findings, but importantly this group also appears to have a higher than average prevalence of underweight. Appendix 5 provides an analysis of BMI classification for all ethnic groups, but is important to reiterate that in some groups the numbers are small and so may not be representative of the child population as a whole.

[23] National Obesity Observatory (January 2011) Obesity and Ethnicity

### *Gender*

The data were then analysed to investigate the differences in overweight and obesity between boys and girls in each of the ethnic groups. The results of this are shown in Fig 9 and 10. These bar charts show obese and overweight children in each ethnic group as a percentage of the total number of children in that ethnic group. The data are separated into values for boys and girls in each ethnic group.

It must be remembered when looking at these charts that they can only give a snapshot of how overweight/obesity might be distributed as the numbers in some groups are too small to be statistically significant. However, they may give an indication of how the distribution of overweight and obesity could change between Reception and Year 6. For example it would appear that in Reception the proportion of White and Black Caribbean boys who are obese and overweight is greater than for girls; by Year 6 this appears to have reversed with a greater percentage of girls being overweight or obese. Mixed ethnic groups are predicted to increase in Sandwell (see Fig 4) which may have implications for future obesity prevalence.

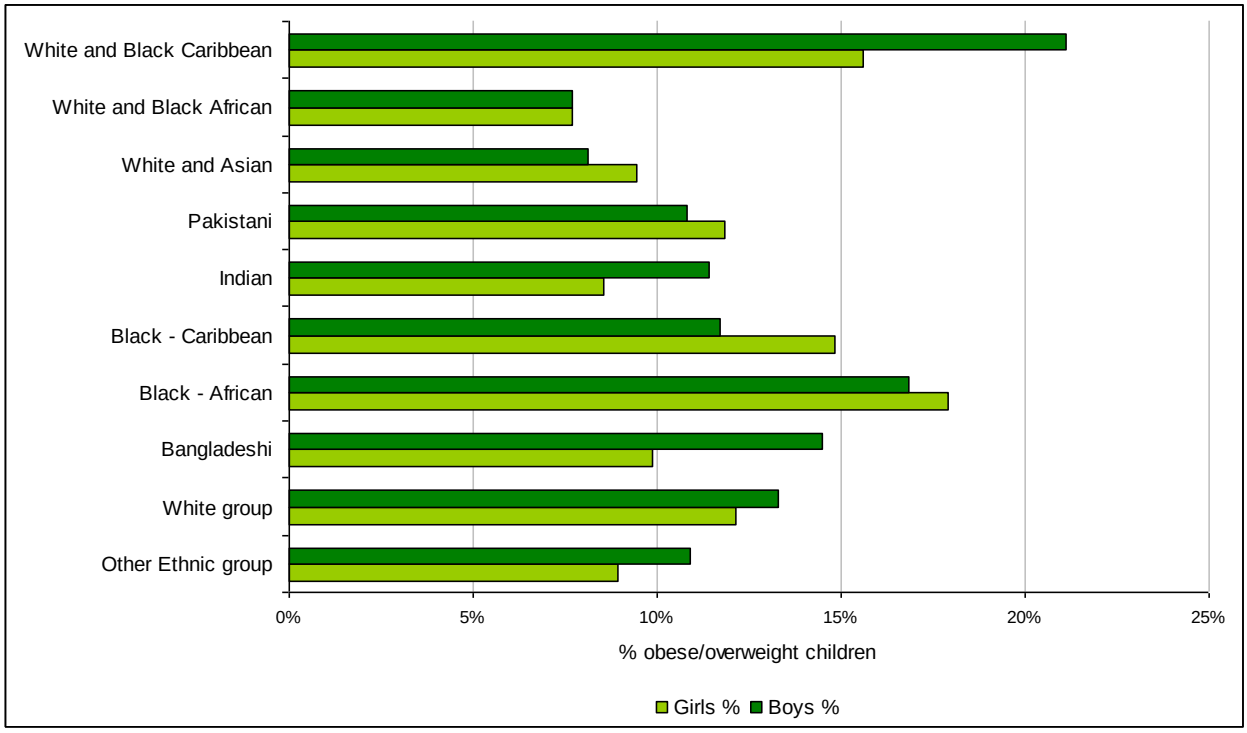


**Figure 9: Percentage of overweight and obese children in Reception by gender and as a proportion of each ethnic group (2009/10).**

| | obese/overweight | | | | | | |
|---|---|---|---|---|---|---|---|
| **ethnic group** | **total in group** | **girls** | **total girls** | **Girls %** | **boys** | **total boys** | **Boys %** |
| White and Black Caribbean | 109 | 17 | 45 | 16% | 23 | 64 | 21% |
| White and Black African | 13 | 1 | 6 | 8% | 1 | 7 | 8% |
| White and Asian | 74 | 7 | 37 | 9% | 6 | 37 | 8% |
| Pakistani | 397 | 47 | 184 | 12% | 43 | 213 | 11% |
| Indian | 456 | 39 | 217 | 9% | 52 | 239 | 11% |
| Black - Caribbean | 162 | 24 | 80 | 15% | 19 | 82 | 12% |
| Black - African | 95 | 17 | 45 | 18% | 16 | 50 | 17% |
| Bangladeshi | 152 | 15 | 77 | 10% | 22 | 75 | 14% |
| White group | 2106 | 256 | 1056 | 12% | 280 | 1050 | 13% |
| Other Ethnic group | 358 | 32 | 173 | 9% | 39 | 185 | 11% |

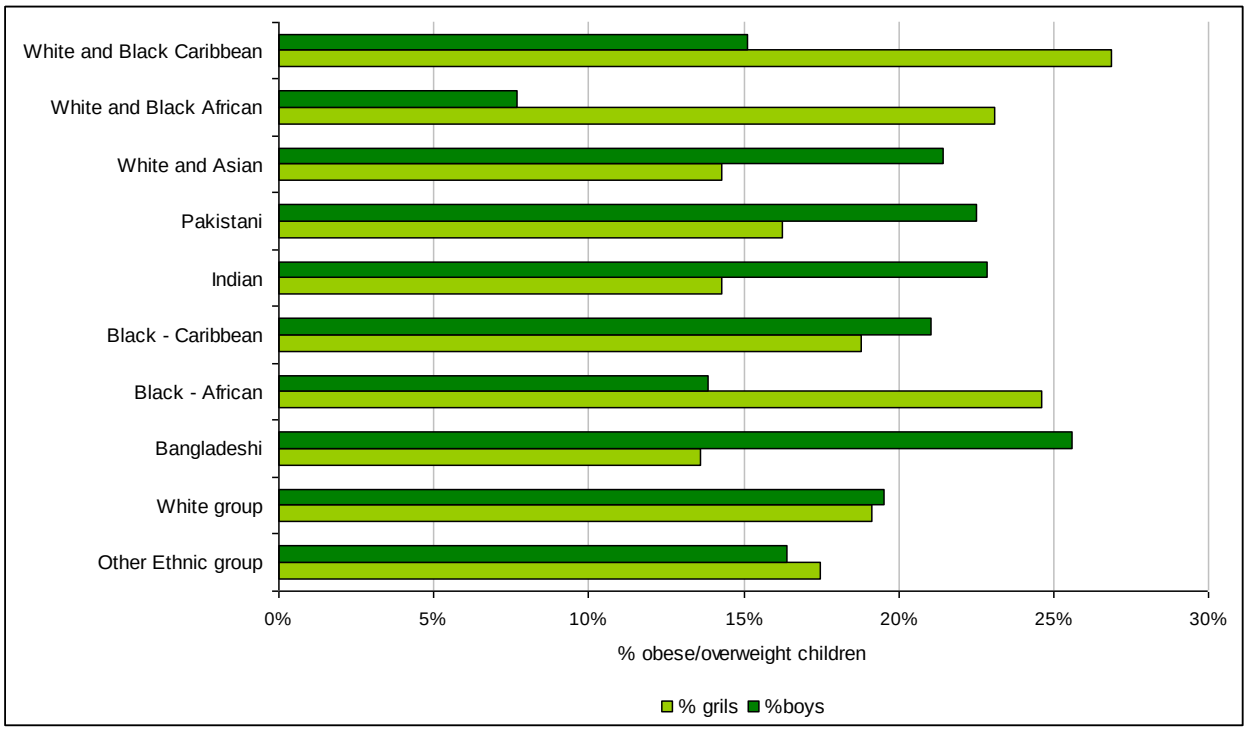


**Figure 10:** **Percentage of overweight and obese children in Year 6 by gender and as a proportion of each ethnic group (2009/10)**

| | obese/overweight | | | | | | |
|---|---|---|---|---|---|---|---|
| ethnic group | total in group | girls | total girls | Girls % | boys | total boys | Boys % |
| White and Black Caribbean | 119 | 32 | 68 | 27% | 18 | 51 | 15% |
| White and Black African | 13 | 3 | 5 | 23% | 1 | 8 | 8% |
| White and Asian | 42 | 6 | 19 | 14% | 9 | 23 | 21% |
| Pakistani | 271 | 44 | 127 | 16% | 61 | 144 | 23% |
| Indian | 385 | 55 | 173 | 14% | 88 | 212 | 23% |
| Black - Caribbean | 133 | 25 | 59 | 19% | 28 | 74 | 21% |
| Black - African | 65 | 16 | 34 | 25% | 9 | 31 | 14% |
| Bangladeshi | 125 | 17 | 51 | 14% | 32 | 74 | 26% |
| White group | 2066 | 395 | 993 | 19% | 403 | 1073 | 20% |
| Other Ethnic group | 183 | 32 | 90 | 17% | 30 | 93 | 16% |

### *Socio-Economic Grouping, Levels of Deprivation, Levels of Education*

The NOO has analysed data from HSE, NCMP, IMD and FSM (children entitled to free school meals) and found that there is an almost linear relationship between obesity prevalence in children and the Index of Multiple Deprivation (IMD) 2007 score for the area in which they live. Child obesity prevalence in the most deprived tenth of local areas is almost double that in the least deprived tenth. There is greater inequality between the most and the least deprived in terms of obesity prevalence among children in Year 6 (aged 10–11) than there is in Reception (aged 4–5). Child obesity prevalence in areas with the highest level of income deprivation is almost double that of areas with the lowest level. Obesity prevalence is also related to eligibility for free school meals (FSM). In areas where there are higher rates of eligibility for FSM there is a significantly higher rate of obesity than in those areas with low eligibility rates. Child obesity prevalence rises as household income falls, and is significantly higher in the lowest income group than in the highest. Child obesity prevalence also varies by occupation-based social class, with children living in households where the main income-earner works in a manual occupation more likely to be obese than those living in households where the main income-earner is in a professional occupation.

# Section 3 – Addressing the Obesity Challenge in Sandwell

This document attempts to identify some local, over-arching priorities for action and future commissioning activity on the basis of the current national directives and emerging structures (under development), evidence based-guidance, local partnership review and local strategic needs assessment. It will also complement the work that has recently been completed to develop the over-arching Lifestyle Services Specification for universal and targeted services by the commissioner / provider team currently within Sandwell Primary Care Trust.

## Current National Directives

The 2010 coalition government White Paper '*Healthy Lives, Healthy People*' identifies that Britain has amongst the worst levels of obesity the world. Within the public sector action is required across health, social care, education, transport and environment. Locally, this work will be driven through a strategic health and well-being board and championed by directors of public health. There must be clear links with the new approach to reducing health inequalities through closer working with local communities (supporting the notion of 'big society' whereby people come together to address issues and improve lives for themselves and their communities) to address economic status, education opportunity, employment, housing and environment (*'Fair Society, Healthy Lives'* Marmot. 2010). Progress in narrowing health inequalities needs to be measured against specified public health outcomes.

National government is calling for a strategic approach to behaviour change (see Cabinet Office 2010 discussion paper '*Applying Behavioural Insight to Health*'); drawing on the Nuffield Council of Bioethics 'intervention ladder' which identifies the least intrusive actions e.g. providing information, through to the most intrusive e.g. eliminating choice through legislation with 'nudging' as a key feature in influencing individual health decisions. In forthcoming national guidance on obesity there will be a focus on finding ways to support people to change their behaviour. Work needs to involve all sections of society with emphasis on developing partnerships between private public and voluntary sector as well as local communities. Specifically, there will be ongoing commitment to the **National Child Measurement Programme (NCMP)**, **Healthy Start**, and promotion of the national '**Change4Life**' campaign which advertises healthier food/lifestyle choices.

*'Healthy Lives Healthy People: A Consultation on the Funding and Commissioning Routes for Public Health'* proposes local programmes to prevent and address obesity e.g. **delivering the National Child Measurement Programme** (NCMP) and **commissioning of weight management services** by the local authority in association with the NHS treatment of overweight and obese patients e.g. a provision pathway from **brief advice** during primary care consultation, through dietary / **specialist advice & services** in a health care setting, to **bariatric surgery**.
(N.B. For further details on the recommendations for action identified at Tier 3 & Tier 4 below, please refer to *'Review of Sandwell's Bariatric Policy'* Bal Kaur – Sandwell PCT July 2010)

## Sandwell Child & Family Obesity Strategy - Strategic Implementation Plan (2009-2014)

The Sandwell Child & Family Obesity: Strategic Implementation Plan (2009-2014) seeks to incorporate a **'whole system'** approach to combating obesity within Sandwell, highlighting roles and relationships between key agencies and work streams across the prevention, management and treatment agenda within a tiered pathway. With emphasis upon strengthening community / third sector involvement with 'universal' obesity service delivery, priorities are identified within four outcome areas: Service, Performance, Pathway and Partnership Development. Key actions needed are identified in bold below:

## 1. Service Development:

Focussing on prevention, management & treatment via adoption of a whole system approach (NICE Guidance due in March 2012), the aim is to tackle child and family obesity concurrently; identifying family-focused, key intervention points in order to break the intergenerational cycle in a family setting: e.g. Early Years prevention programmes should target future/ young parents with the education and prevention agenda. *Preventing Childhood Obesity through Lifestyle Change Interventions – A Briefing Paper for Commissioners* by National Obesity Observatory (Nov 2009) highlights multi-component interventions, ideally addressing diet and physical activity together, with an emphasis upon encouraging positive changes in behaviour. There should be an emphasis upon peer and family support, age appropriateness and acknowledgement of the views of child / adolescent populations

In addition to the various physical activity, food and behaviour change programmes currently available via multi-agency services, specific obesity services at Tier 1 and Tier 2 (which are now established and currently in post-pilot phase) need to be supported and sustained beyond expiry of short term funding (e.g. WNF to March 2010). These services are a critical part of a 'whole system' obesity care pathway. Based on current evidence, local knowledge, community engagement and partnership working, they have been developed to prevent and reduce obesity at all ages and stages of the life course and are currently being delivered across Sandwell (See – 'Sandwell Obesity Services' (p6) of Sandwell Child & Family Obesity: Strategic Implementation Plan (2009-2014):

### Tier 1 & Tier 2 Services: April 2011-2012

ACTION: Pregnancy & Maternity:

**FAB Tots Programme – Continue development of the early years, obesity prevention and healthy lifestyles promotion programme for delivery in children's centres which aims to work with future parents and young families to break the inter-generational cycle of unhealthy lifestyle behaviour. It is anticipated that 21 programmes will be in operation 2011-12. The core programme is currently being enhanced with the addition of weight management, stop smoking and maternity services as part of 'FAB Tots Plus'.**

*Additional supporting evidence-base:*
NICE has recently published guidance for weight management before, during and after pregnancy[24]. Data presented during a study day at the Perinatal Institute in Birmingham (June 2010) suggests that a small reduction in weight of large numbers of women could reduce the number of days on HDU (£2000/day) and reduce preterm birth care (£2000/day). This weight loss would also reduce the costs associated with caesarian sections and postoperative infections. But this weight loss would not only improve maternal health and birth outcomes; it would also improve the intrauterine environment, with considerable effect on the risk of obesity in the future for the unborn child.

ACTION: Management of Overweight and Obesity in Adults and Children

**WellFIT – Continue provision of the child and family weight management programme offering lifestyle support including nutrition and behaviour change advice alongside physical activity sessions. 12 programmes are planned to continue in 2011-12, targeting delivery to children (6-9 yrs) and young people (10-13 yrs) alongside family members.**

[24] http://guidance.nice.org.uk/PH27

**Slimwell – Continue delivery of the community-based adult weight management programme (inc. adolescents from 13 yrs) offering lifestyle support including nutrition and behaviour change advice alongside physical activity sessions. It is anticipated that 30 programmes will be in operation 2011-12 operating in a variety of community venues.**

*Additional supporting evidence-base:*
NICE guidance on the prevention, identification, assessment and management of overweight and obesity in adults and children[25] considers both public health and clinical interventions. Notwithstanding the limited evidence in an already obese population, NICE suggested that public health community interventions appear to be a cost-effective use of resources. Dietary interventions seem particularly cost effective due to the low levels of staff contact needed. These results seem to agree with the analysis undertaken in the prevention component of the guidance, which are similarly considered to be cost effective. Guidelines for a whole-systems approach to preventing obesity are being developed by NICE and are due to be published in March 2012[26].

An analysis by health economists at York University considered the range of cost effectiveness of obesity reduction/prevention interventions. The cost per quality adjusted life year (QALY) ranged from £6289 to £8527 for surgery; £6349 to £24,431 for pharmacotherapy and £265 to £3,018 for public health interventions. Public health interventions generate lower cost effectiveness thresholds than surgery and pharmacotherapy. However, there is a higher degree of uncertainty concerning cost effectiveness of these interventions, as displayed by the range of values. Trueman and Flack[27] (2006) draw attention to the fact that comparisons of the groups of interventions are complicated as pharmacological and surgical interventions typically result in higher QALYs gained but at substantially higher costs than non pharmacological or public health interventions, partly because it is much easier to collect data about the outcomes of surgery or drugs.

## Tier 3 Services: April 2011-2012

Currently the availability of optimum non-surgical support through a weight management clinic has been on an ad-hoc basis. Some GPs have provided their own weight management clinics or general advice; some have referred to the Sandwell 'community lifestyle services / dietetic service' and to specialist Consultants.

ACTION: Development of a more robust Community-Based Tier 3 Programme

**Reflecting regional guidance (West Midlands Specialised Commissioning Services – WMSCG), agree the development of Tier 3 services (specialist weight management service) in the obesity care pathway as a priority, and ensure this service reflects the cultural and social needs of Sandwell's diverse community:**

- Sandwell to have a specialist community based weight management service in place by April 2012.
- All patients being referred for surgery will have first explored all non surgical options for weight management and will have been under the care of a specialised weight management service either in secondary or community care for at least 12 months.
- Patients who are referred to specialised surgical weight management services will have previously accessed services for people who are overweight / obese at a local level.

[25] http://www.nice.org.uk/CG043fullguideline
[26] http://guidance.nice.org.uk/PHG/Wave20/53
[27] Trueman P and Flack S (2006) Economic evaluation of Weight Watchers in the prevention and management of obesity. Poster presentation at the conference of the National Institute of Health and Clinical Excellence, December 2006.

These services would generally include: dietetic advice, lifestyle and exercise advice, psychological support, medical assessment of co morbidities and psychological assessment

**Commission the provision of tier 3 services from neighbouring PCT providers until Sandwell has developed its own service.**

West Midlands Specialised Commissioning Services (WMSCG) also advise that the key role of the community based weight management services is to act as the triage and referral point for surgical interventions and to provide follow up and support to patients in terms of diet and lifestyle advice post surgery. A specialist community weight management service can act as a gate-keeper for bariatric surgery referral and help manage the demand for Bariatric surgery. A specialist community weight management clinic will allow Sandwell to provide this service more efficiently and also meet the NICE guidance criteria.

(N.B. For further details on the recommendations for action identified at Tier 3, please refer to *'Review of Sandwell's Bariatric Policy'* Bal Kaur – Sandwell PCT July 2010)

## Tier 4 Services: April 2011-2012

The current service is provided by Walsall Manor Hospital Trust and Heart of England NHS foundation Trust. West Midlands Specialised Commissioning Services (WMSCG) has issued regional guidance on the commissioning of Bariatric services which has recently been adopted in Sandwell. The threshold criteria of BMI 45 – 49.9 with diabetes and BMI>50 (with any of the following co-morbidities diabetes, hypertension, obstructive sleep apnoea, dyslipidaemia) has been influenced by the projected levels of obesity in the West Midlands and to manage increasing demand for the service.

There are no robust arrangements in place to ensure patients eligible for Bariatric surgery have tried 'non-surgical measures but have failed to attain or maintain adequate clinically beneficial weight loss for at least 12 months' or the 'person has received intensive management in a specialist obesity service'. This is flagged up as a gap in the management of obese patients in Sandwell and also in terms of having a comprehensive care pathway to support the commissioning of Bariatric services.

ACTION: Co-ordination and Development of Local Bariatric Policy (WMSCG) – (Link with 3. Pathway)

**Make certain that bariatric services are being commissioned within the context of the wider Obesity Care Pathway which ensures the following are accessible to Sandwell residents:**
**- Universal prevention**
**- Brief intervention for those overweight**
**- Specialist medical/MDT obesity service (including psychological assessment and assessment of co-morbidities**
**- Bariatric surgery**
**- Post operative follow-up**

*Additional supporting evidence-base:*
There is good evidence to support the use of bariatric surgery within an overall adult obesity pathway and this is recommended in the NICE 2006 clinical guidelines. For further details regarding evidence-base at Tier 4 refer to *Appendix 3 - Evidence Base - Clinical effectiveness of Bariatric Surgery* and *Appendix 4 - Cost Effectiveness of Bariatric Surgery*

SERVICE DEVELOPMENT: SUCCESS CRITERIA

- Participant outcome data with reference to behaviour change, diet, participation in physical activity and weight loss supports cost effectiveness of obesity prevention and management interventions such as FABTots, WellFIT and Slimwell, in addition to specialist services (bariatric surgery), against the standard evaluation framework.

- The potential benefits of robustly commissioning an effective bariatric surgical service for the treatment of people with severe obesity include:

- achieving long-term weight loss in people with severe obesity and decreasing overall mortality after surgery[28]
- reducing the development of new comorbid conditions and reducing healthcare use after surgery[29]
- improving performance and patient-centred clinical care through implementing the recommendations for bariatric surgery and specialist follow-up as outlined in NICE clinical guideline CG43 on obesity
- assessing service demand for people requiring bariatric surgery
- reducing inequalities by ensuring that all people who are severely obese have access to, and an assessment by, a multidisciplinary team
- ensuring the service is integrated and appropriate, and that clear referral pathways are in place so that bariatric surgery is provided alongside other clinical or public health weight management services and population health programmes
- increasing informed patient choice through the provision of information on a variety of procedures, thereby allowing the patient and clinician to jointly decide on the best intervention based on the best available evidence.

*Refer also to NICE – Obesity-related Guidance and Compliance Documents: Examples*
**Obesity (2006), Behaviour Change at Population, Community & Individual levels (2007), Community Engagement (2008), Weight Management before, during and after pregnancy (2010)**

## 2. Performance Measurement:

ACTION: Development of Community Consultation – Families / Focus Groups

**Work needs to be undertaken within different ethnic communities to gain an insight into the cultural practices, beliefs and attitudes about obesity. This knowledge would then be used to inform the family approach already identified in the obesity strategy. Data analysis and an understanding of beliefs and attitudes should be used in conjunction with the evidence base to inform developments in the prevention and treatment of childhood and adult obesity in Sandwell.**

[28] Nicholas V, Christou MD, Sampalis J et al. (2004) Surgery decreases long-term mortality, morbidity and health care use in morbidly obese patients. Annals of Surgery 240: 416–24.

[29] Sjöström L, Narbro k, Sjöström CD et al. (2007) Effects of bariatric surgery on mortality in Swedish obese subjects. The New England Journal of Medicine 357: 741–52.

ACTION: Further co-ordination and development of Data & Intelligence / Understanding Needs

Work is currently being undertaken by West Midlands Public Health Office (WMPHO) using Mosaic segmentation and GIS mapping. Existing 'Healthy Weight Healthy Lives' data is being aligned with Sport England market segments through a regional training programme. WMPHO is currently developing prevalence mapping which will, for example, link the proportion of families with children aged under ten in key population 'cluster groups' – e.g. 'young parents who lack knowledge' - with Sport England – Market Segmentation data. The borough level mapping of Sandwell will show distribution at super output area level. This will perhaps be a useful step forward in taking a more targeted approach to families but there are two key issues to note – (1) It is still important to cross-reference percentages identified in the mapping against actual numbers, (2) The data sets are of limited value when interrogated against 'ethnicity' due to lack of robust data / sufficient numbers. WMPHO has been alerted to this.

PERFORMANCE DEVELOPMENT: SUCCESS CRITERIA
- NCMP performance data enables trend analysis year on year from baseline.
- Triple-S: Fitness Testing data enables trend analysis.
- Obesity JSNA enables greater targeting of families within population groups and geographically.
- Sandwell Physical Activity Data & Intelligence Group provides detailed information and intelligence to support planning, delivery and evaluation.

## 3. Pathway Development:

Further formalisation of the local 'obesity services framework' is integral to preventing obesity and cardiovascular disease. Services at Tier 1 and Tier 2 are now established in the borough, are all currently in post-pilot phase and are a critical part of a 'whole system' obesity care pathway (See also 1. Service Development Actions – Tier 3 & Tier 4 Services). Future funding for the management and delivery of the programmes identified above needs to be fully integrated into current financial planning and the overarching service framework.

**Service Development at Tier 3 and Tier 4 needs to be supported and integrated within the obesity services model in Sandwell Child & Family Obesity: Strategic Implementation Plan (2009-2014). This will support appropriate and timely care for the public and patients.**

ACTION: Referral to appropriate Services / Programmes within the emerging Obesity Services Framework

**GPs and health professionals at key points of contact (e.g. Midwives during early pregnancy) should raise awareness and refer to the range of services / programmes available within the obesity services framework (e.g. FABTots Plus)**

PATHWAY DEVELOMENT: SUCCESS CRITERIA
- Audit of referral pathway evidences significant throughput and appropriate referral to an increasing range of services available across the obesity services framework.
- Integrated pathway: Increasingly primary activity can be delivered by any healthcare professional from primary or secondary care or for example through the pharmacy, Council, leisure services, or private sector
- Community-based weight management is delivered by appropriately trained staff – The standard evaluation framework is fully employed for evaluating weight management interventions
- The third tier is developed for more specialist intervention / specialist weight management service. This tier is able to provide the triage and assessment for all patients being considered to move on to tier 4 (bariatric surgery)

## 4. Partnership Development:

In order to address the growing problem of both child and adult obesity Sandwell PCT in partnership with a range of partner organisations have developed the Sandwell Family and Child Obesity: Strategic Implementation Plan (2009-2014). The Strategic Change Goals identified for action planning were generated through the prior consultations on Child and Adult obesity completed in 2009. This Strategic Implementation Plan has been updated on a quarterly basis since January 2010 in order to capture key actions and developments across multi-agency working within Sandwell in four, key thematic areas: Partnership, Pathway, Service Development & Performance.

The sub-themes identified within the left-hand column of the Action Planning - Activity Map (Who Actions?) *(page 4)* and included within Priority Areas (What Actions?) *(page 5)* are taken from *Healthy Weight, Healthy Lives: A toolkit for developing local strategies* and are incorporated as guidelines to indicate the context for more detailed action planning to be undertaken by the agencies within the work streams identified.

ACTION: Promotion of the strategic implementation plan for Sandwell and communication of progress within partnership, service development, performance, pathway development areas

**Actively promote the development of an integrated care pathway from prevention and early intervention through to Specialist Weight Management Services. Continue to adopt a proactive, 'whole system' approach, focusing on early identification and intervention throughout the life course to both prevent and treat obesity within a family context as supported by the emerging evidence-base.**

PARTNERSHIP DEVELOPMENT: SUCCESS CRITERIA

- Sandwell Child & Family Obesity: Strategic Implementation Plan (2009-2014) and Sandwell Physical Activity, Physical Education & Sport Strategy (2009-2014) remains fully endorsed within new partnership structures and aligned with commissioner / provider requirements.
- Sandwell Child & Family Obesity Group (SCAFOG) remains fully active as a health professional forum, reflecting appropriate multi-agency membership and commitment.

## *Appendix 1 - Obesity: Definition & Measurement*

Body mass index (BMI)[30] is the accepted measure of obesity in adults, but needs to be "interpreted with caution because it is not a direct measure of adiposity". Factors such as muscularity, ethnicity and age also need to be considered. Waist circumference may be used, in addition to BMI, in people with a BMI of less than 35 kg/m². Table 1 presents the various BMI ranges used to define BMI status.

Table 1: **BMI definitions**

| **Definition** | **BMI range (kg/m2)** | **BMI for Asian Adults*** | **Risk of Co-morbidities.** |
|---|---|---|---|
| Underweight | Under 18.5 | Less than 18.5 | Low - but risk of other clinical problems increased |
| Normal /Healthy Weight | 18.5 - 24.9 | 18.5-22.9 | 18.5-24.9 |
| Overweight | 25-29.9 | 23-24.9 | Mildly increased |
| Obese I | 30-34.9 | 25-29.9 | High |
| Obese II | 35-39.9 | 30-34.9 | Very high |
| Obese III | 40 or more | 35+ | Extremely high |
| Morbidly obese | 40 and over | | " |
| Overweight inc obese | 25 and over | | " |
| Obese including morbidly obese | 30 and over | | |

* The proposed classification of overweight and obesity for Asian adult populations has been developed by the World Health Organization.

[30] BMI is defined as weight in kilograms divided by the square of the height in metres (kg/m2).

### *Appendix 2 - Ethnicity Grouping*

Ethnic groups are an amalgamation of the following:

| **Ethnic group** | |
|---|---|
| Chinese (& others) | Chinese<br>Other ethnic group |
| Black | African<br>Caribbean<br>Other black background |
| Bangladeshi (& Asian other) | Bangladeshi<br>Any other Asian background |
| Pakistani | Pakistani |
| Indian | Indian |
| Mixed | White and Asian<br>White and Black African<br>White and Black Caribbean<br>Any other mixed background |
| White | White<br>White British<br>White Irish<br>Any other white background |

## *Appendix 3 - Evidence Base - Clinical effectiveness of Bariatric Surgery*

(N.B. For further details please refer to *'Review of Sandwell's Bariatric Policy'* Bal Kaur – Sandwell PCT July 2010)

Bariatric surgery is associated with significant weight loss that can be maintained for up to 8 years. However calorie intake post operatively does increase over time with weight regain typically beginning after 2 years[31].

A Cochrane review of 18 trials involving 1891 subjects concluded that, on average, morbidly obese patients who underwent bariatric surgery lost 23-28kg more weight at 2 years than patients who were managed non-surgically. Impact on co-morbidities is significant. Buchwald et al recently conducted a systematic review of 22,094 patients. 86% resolved or improved diabetes, 79% resolved or improved hypertension, 84% resolved or improved obstructive sleep apnoea and there was improvement in hyperlipidaemiav[32]. Generally malabsorptive and mixed malabsorptive/restrictive procedures have been shown to be more effective in terms of weight loss and controlling diabetes than restrictive procedures. All surgical types produced similar effects on hyperlipidaemia and hypertension.

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Bariatric surgery is a major surgical intervention with a risk of significant early and late morbidity and of perioperative mortality. Obese patients are at far greater risk of surgical and anaesthetic complications than people of normal weight, and the risk increases with increasing BMI. On average, bariatric surgery is associated with 1% perioperative mortality, with various studies ranging from 0.1 to 2% for mortality at 30 days[33].

The rates of surgical complications/ adverse effects are considerable. The Cochrane review[34] found side effects to include heartburn and dumping syndrome especially following gastric bypass and revision, re-operation rates to be in the region of 44% for gastric banding and 4% for vertical banded gastroplasty. Maggard et al[35] looked at the question of postoperative adverse effects, and concluded that they occurred in about 20% of patients. Jain et al[36] found up to 20% of gastric bypass patients developing wound infections and 25% of gastroplasty patients requiring re-operation. Malabsorptive procedures carry more risks, post-operative side effects and deaths. They are not reversible operations meaning that the patients remains in a malabsorptive state for the rest of their life and will require prolonged follow-up and vitamin supplementation.

Laparoscopic techniques are frequently being used. Weight loss is similar between open and laparoscopic procedures. There are fewer complications with laparoscopic surgery, longer operating times, but reduced blood loss and quicker recovery- less bed days.[37]

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[31] Sarwer D.B; Wadden T.A. Fabricatore A.N (April 2005) Psychosocial and Behavioural Aspects of Bariatric Surgery. Obesity Research Volume 13 No 4.
[32] Buchwald H. (March 2005) Surgical Options. Supplement to the Journal of Family Practice: Management of Morbid Obesity: The Role of Bariatric Surgery.
[33] Dr N. Cleave (September 2006) Bariatric Surgery for the Morbid Obese in the Thames Valley Draft Report. www.phru.nhs.uk
[34] Colquitt J; Clegg A; Loveman E; Royale P; Sidhu MK (2007) surgery for Morbid Obesity (Review) The Cochrane Collaboration
[35] Maggard MA, Shugarman LR, Suttorp M et al. Meta-analysis: surgical treatment of obesity. Ann Intern Med. 2005; 142: 547-559.
[36] Jain A (April 2004) What works for Obesity. A summary of the research behind the obesity interventions BMJ Publishing Group Limited
[37] Colquitt J; Clegg A; Loveman E; Royale P; Sidhu MK (2007) surgery for Morbid Obesity (Review) The Cochrane Collaboration.

## *Appendix 4 - Cost Effectiveness of Bariatric Surgery*

(N.B. For further details please refer to *'Review of Sandwell's Bariatric Policy'* Bal Kaur – Sandwell PCT July 2010)

A Health Technology Assessment report published in 2002 for NICE[38] concluded that surgery was a cost-effective treatment option for morbid obesity, compared with conventional treatment. It assessed the information from four economic evaluations and found that comparison of surgery with non-surgical management gave the following incremental cost-effectiveness ratios expressed in QALYs over a 20-year period:

Gastric bypass £6289

Gastric banding £8527

Vertical banded gastroplasty £10,237

An economic evaluation [39] found that the base case cost-effectiveness ratios were influenced by sex, age and initial BMI with surgery being more cost-effective for women than men, younger rather than older patients and higher BMI levels. (See table X)

Table X: Cost per QALY by risk sub-group at ages 35 and 55

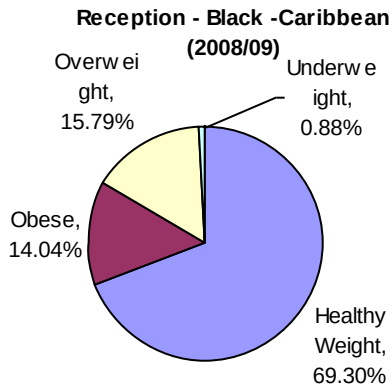
| | Age 35 Years | | Age 55 Years | |
|---|---|---|---|---|
| | BMI 40 kg/m2 | BMI 50 kg/m2 | BMI 40 kg/m2 | BMI 50 kg/m2 |
| Men | 28,600 | 10,700 | 35,600 | 13,300 |
| Women | 14,700 | 5700 | 16,100 | 5400 |

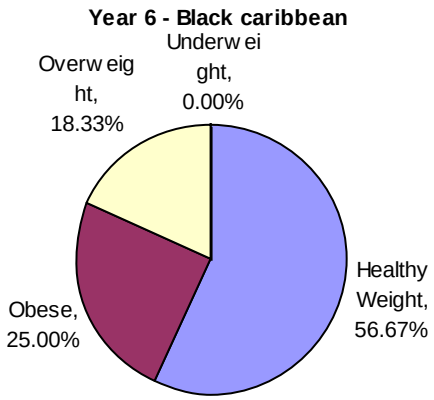
[38] Clegg AJ, Colquitt J, Sidhu MK, Royle P, Loveman E. Walker A. The clinical effectiveness and cost-effectiveness of surgery for people with morbid obesity: a systematic review and economic evaluation. Health Technol Assess 2002; 6 (12).

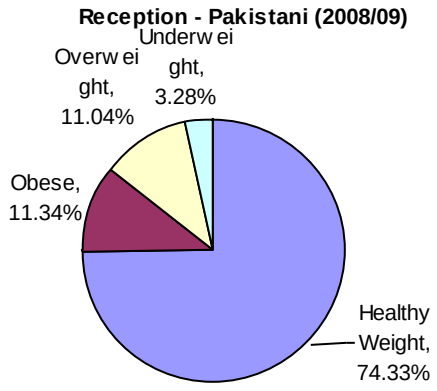
[39] Craig BM, Tseng DS. Cost-effectiveness of gastric bypass for severe obesity. Am J Med. 2002; 113: 491-98 Craig BM, Tseng DS. Cost-effectiveness of gastric bypass for severe obesity. Am J Med. 2002; 113: 491-98

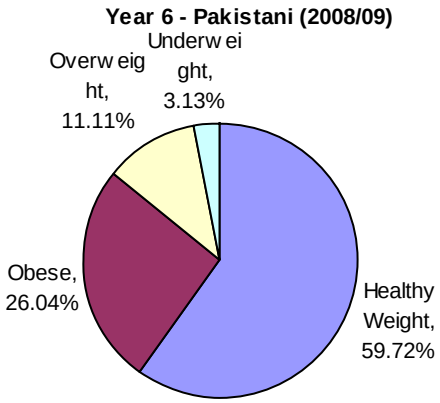
## *Appendix 5 BMI classification ( NCMP data 2008-09 and 2009-10) for different ethnic groups*

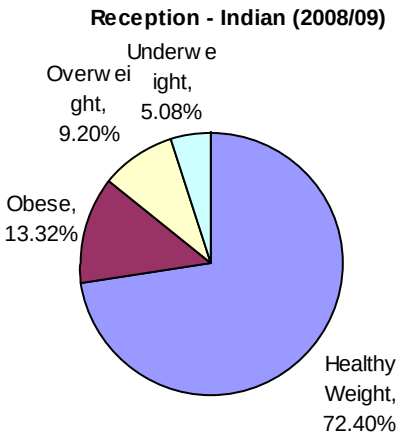
### 2008-09

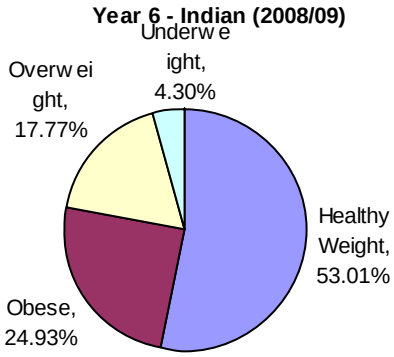


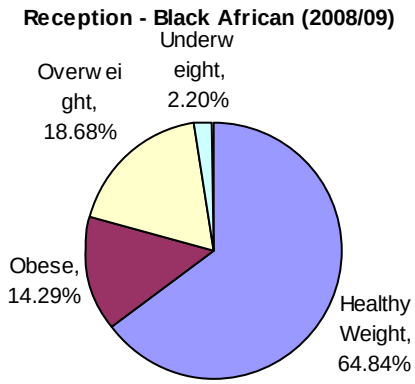



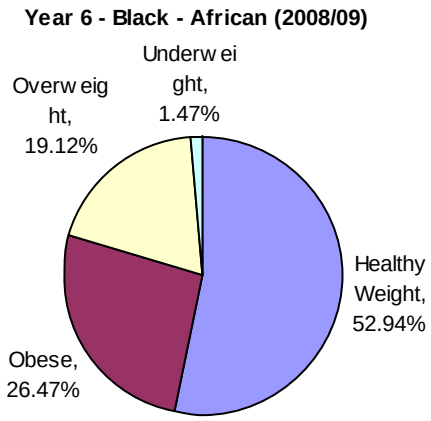



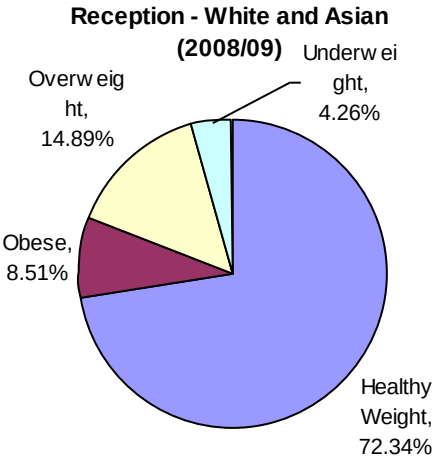



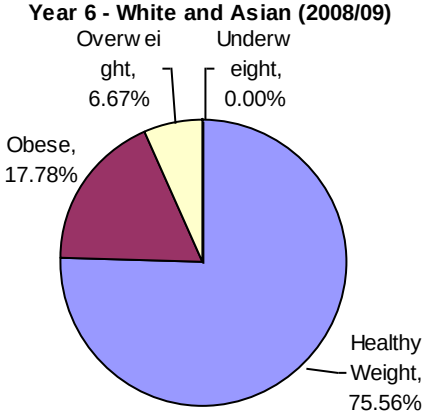



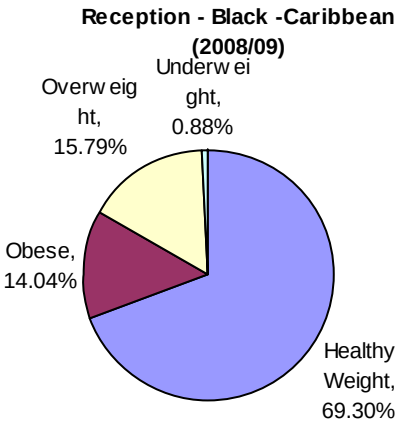



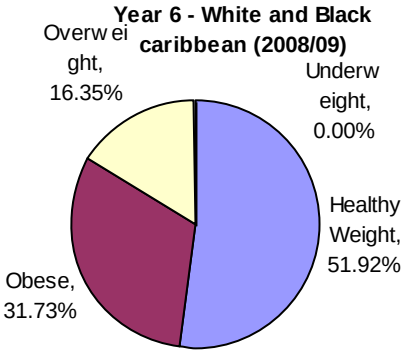

Reception - Black African (2008/09)
Underw eight, 2.20%
Overw ei ght, 18.68%
Obese, 14.29%
Healthy Weight, 64.84%

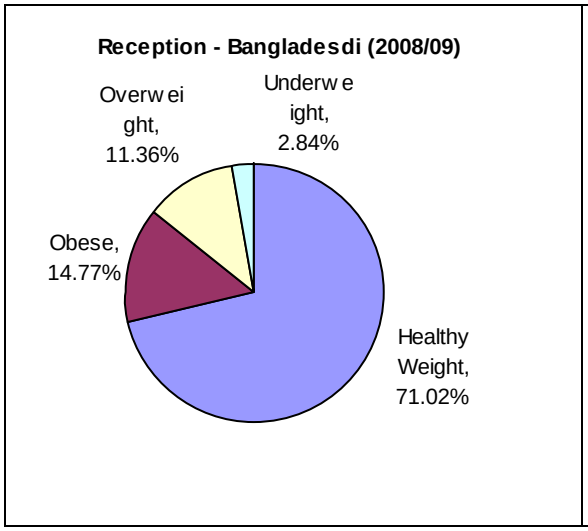

Year 6 - Black - African (2008/09)
Underw ei ght, 1.47%
Overw eig ht, 19.12%
Healthy Weight, 52.94%
Obese, 26.47%

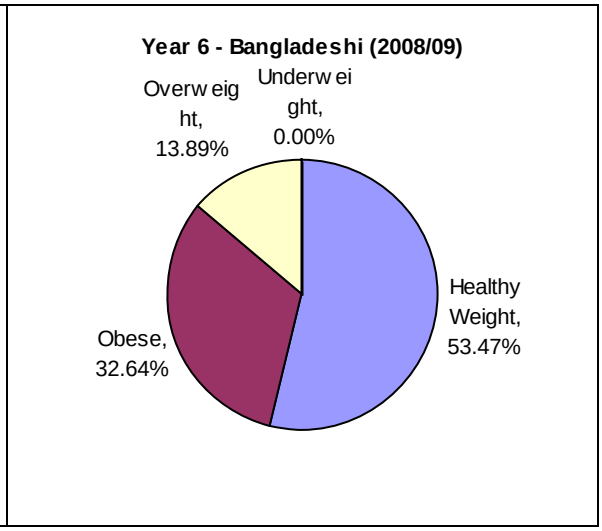

Reception - White and Asian (2008/09)
Underw ei ght, 4.26%
Overw eig ht, 14.89%
Obese, 8.51%
Healthy Weight, 72.34%


Year 6 - White and Asian (2008/09)
Overw ei ght, 6.67%
Underw eight, 0.00%
Obese, 17.78%
Healthy Weight, 75.56%

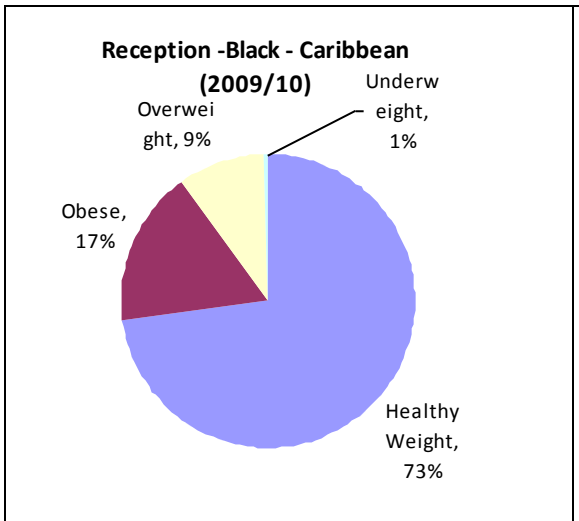

Reception - Black -Caribbean (2008/09)
Underw ei ght, 0.88%
Overw eig ht, 15.79%
Obese, 14.04%
Healthy Weight, 69.30%

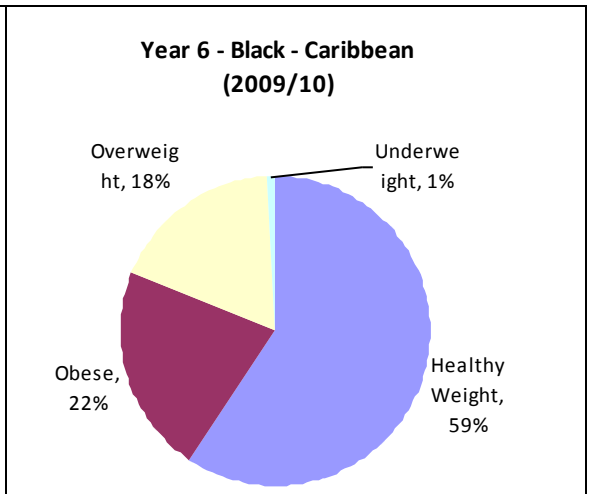

Year 6 - White and Black caribbean (2008/09)
Overw ei ght, 16.35%
Underw eight, 0.00%
Healthy Weight, 51.92%
Obese, 31.73%

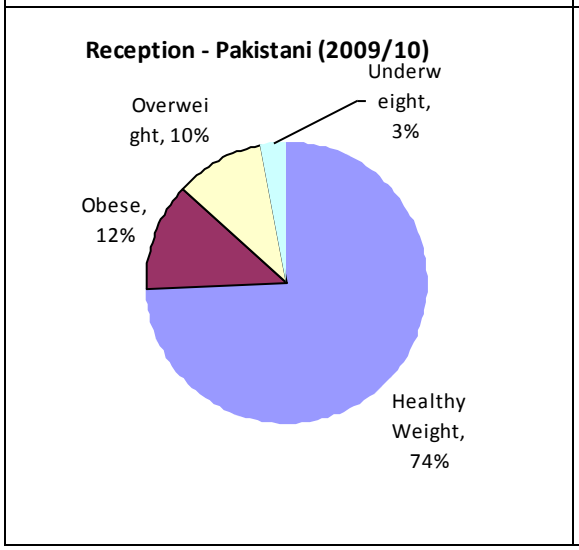

Reception - Bangladesdi (2008/09)
Overw ei ght, 11.36%
Underw e ight, 2.84%
Obese, 14.77%
Healthy Weight, 71.02%

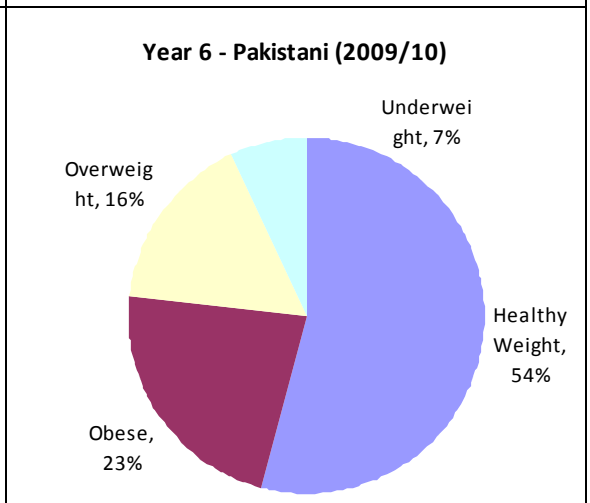

Year 6 - Bangladeshi (2008/09)
Overw eig ht, 13.89%
Underw ei ght, 0.00%
Obese, 32.64%
Healthy Weight, 53.47%

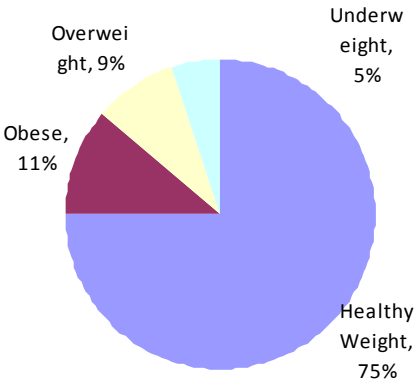
2009-10

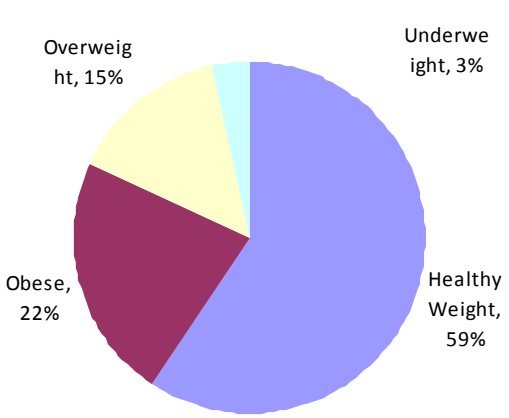

Reception -Black - Caribbean (2009/10)
Overwei ght, 9%
Underw eight, 1%
Obese, 17%
Healthy Weight, 73%

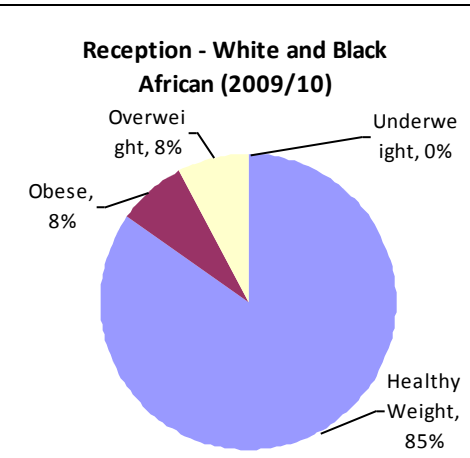

Year 6 - Black - Caribbean (2009/10)
Overweig ht, 18%
Underwe ight, 1%
Obese, 22%
Healthy Weight, 59%

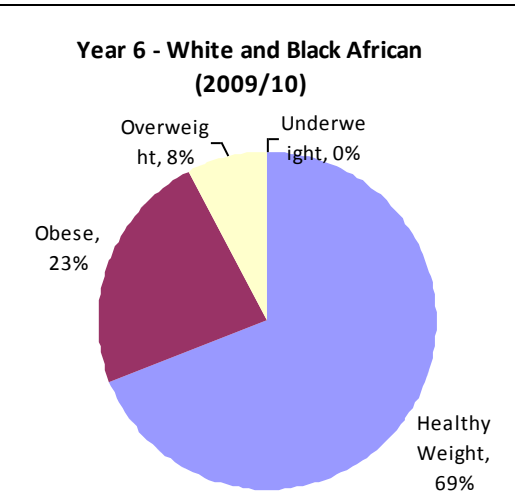

Reception - Pakistani (2009/10)
Overwei ght, 10%
Underw eight, 3%
Obese, 12%
Healthy Weight, 74%

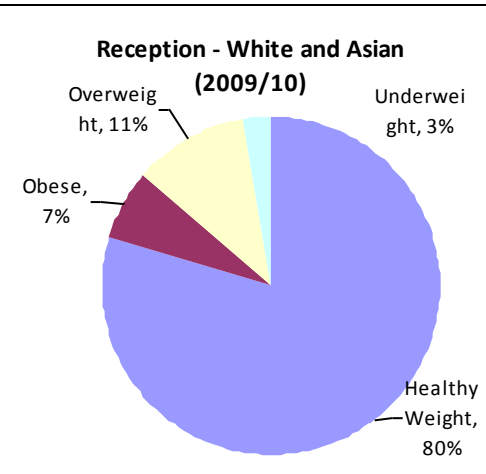

Year 6 - Pakistani (2009/10)
Underwei ght, 7%
Overweig ht, 16%
Healthy Weight, 54%
Obese, 23%

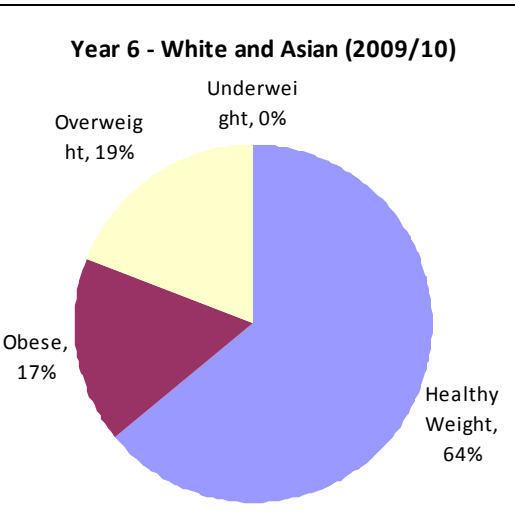

Reception - Indian (2009/10)
Overwei ght, 9%
Underw eight, 5%
Obese, 11%
Healthy Weight, 75%

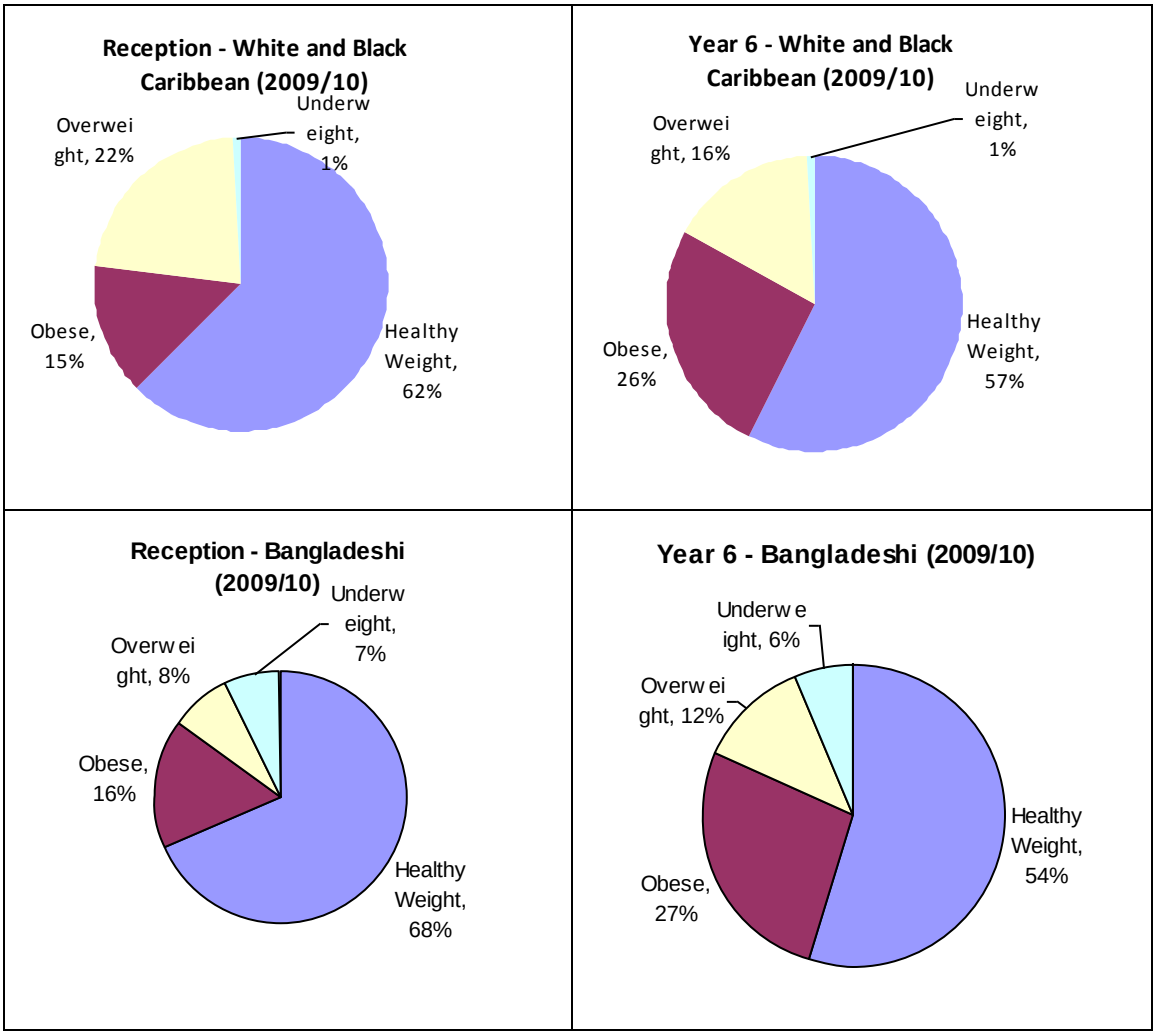

Year 6 - Indian (2009/10)
Overweig ht, 15%
Underwe ight, 3%
Obese, 22%
Healthy Weight, 59%


Reception - White and Black African (2009/10)
Overwei ght, 8%
Underwe ight, 0%
Obese, 8%
Healthy Weight, 85%


Year 6 - White and Black African (2009/10)
Overweig ht, 8%
Underwe ight, 0%
Obese, 23%
Healthy Weight, 69%


Reception - White and Asian (2009/10)
Overweig ht, 11%
Underwei ght, 3%
Obese, 7%
Healthy Weight, 80%


Year 6 - White and Asian (2009/10)
Underwei ght, 0%
Overweig ht, 19%
Obese, 17%
Healthy Weight, 64%


Reception - White and Black Caribbean (2009/10)
Overweight, 22%
Underweight, 1%
Obese, 15%
Healthy Weight, 62%
Year 6 - White and Black Caribbean (2009/10)
Overweight, 16%
Underweight, 1%
Obese, 26%
Healthy Weight, 57%
Reception - Bangladeshi (2009/10)
Overweight, 8%
Underweight, 7%
Obese, 16%
Healthy Weight, 68%
Year 6 - Bangladeshi (2009/10)
Underweight, 6%
Overweight, 12%
Obese, 27%
Healthy Weight, 54%

# Appendix 6: The Sandwell "*Start Up Shape up Sign Up*" (Triple S) Programme: Results from 2008

Authors: Shamil Haroon (public health registrar, Sandwell Primary Care Trust) and Miranda Pallan (clinical research fellow, University of Birmingham)

## Summary

Being physically fit is strongly associated with a reduced risk of being overweight or obese. Females are particularly prone to being overweight/obese. The findings reinforce the need to support interventions to promote physical activity in schools, particularly amongst females. Ongoing surveillance of child weight and physical fitness will allow us to quantify the need for interventions to tackle the growing problem of childhood obesity. Further work is needed to explore the relationship between different tests of physical fitness and overweight/obesity and the relationship between physical fitness and school grades.

## Introduction

Reducing childhood obesity is an important public health goal. The Sandwell Triple S programme is a weight and physical testing surveillance programme based in schools across Sandwell. Sandwell Primary Care Trust and the University of Birmingham looked at data from the programme from 2008 to understand the drivers of childhood obesity in order to inform the evidence-based commissioning of services to tackle this important public health problem.

## Method

6179 children were enrolled in the Triple S programme in 2008 of which 2943 had their height, weight and physical fitness measured through an endurance test. This test involved running as great a distance as possible within an allocated time. Five minutes were allocated for children in years 1 and 3, and eight minutes for children in years 5, 7, 9 and 11. Their weight and height were used to calculate body mass index z-scores (a measure used to assess the weight status of children) and categorised as either normal weight/underweight or overweight/obese using criteria set by the International Obesity Task Force. Factors including age, gender, socioeconomic deprivation, ethnic group, physical fitness and mode of travel were investigated to examine their relationship to the risk of being overweight/obese using a statistical technique called logistic regression. Physical fitness was categorised as either 'fit' or 'unfit', with 'unfit' being defined as belonging to the lowest quintile for performance on the endurance test.

## Results

The population characteristics are shown in table 1. A significant proportion (35.1%) of the children were from non-white ethnic backgrounds, mostly Asian or Asian British. 75.5% of children were either underweight or normal weight and 24.5% of children were either overweight or obese (figure 1). 13.3%

were classed as underweight. The proportion of overweight/obese seems to have increased with year group except for year 11 which had the lowest prevalence (figure 2). 32.0% of children who were unfit were overweight/obese vs. 21.8% in those who were fit (figure 3). The results of the logistic regression model indicate that being fit was associated with a 41% relative reduction (OR 0.59, 95% CI 0.49-0.72) of the risk of being overweight/obese after accounting for the effect of gender, age, ethnic group, physical fitness and mode of travel (table 2). Being Asian or Asian British was associated with a 31% relative reduction (OR 0.69, 95% CI 0.55-0.86) of being overweight/obese. Being female was associated with a relative increase in the risk of being overweight/obese by 23% (OR 1.23, 95% CI 1.03-1.47). Age, socioeconomic deprivation, ethnic groups other than Asian or Asian British and mode of travel were not found to be associated with the risk of being overweight/obese.

## Conclusion

Being physically fit, as measured by an endurance test, was the factor most strongly associated with a reduction in the risk of being overweight/obese. Conversely female sex appears to be a strong risk factor for being overweight/obese. These findings reinforce the need to invest in physical activity programmes for children, particularly promoting physical activity for females. A significant proportion of children (13.3%) were also underweight, highlighting an often neglected problem.

Further research is needed to look at longitudinal data to better understand the drivers of weight status and its relationship with levels of physical fitness. Further cross-sectional analyses should be conducted to explore the association between weight status and other tests of physical fitness incorporated in the Triple S programme to help fine tune the battery of tests conducted as part of this surveillance programme. Finally, cross-sectional analyses could be conducted exploring the relationship between physical fitness and school grades.

### *Limitations of the study*

The cross-sectional nature of this study prevents comment on the temporal relationship between weight status and physical fitness i.e. it does not tells us whether the level of physical fitness determines weight status or vice versa. Longitudinal studies are required to determine this.

Only a small proportion (47.6%) of all children tested in 2008 as part of the Triple S programme were included in this study due to incomplete weight and physical fitness measurements. The sample may therefore be biased by selective participation. However the study incorporated a large sample size (n=2943). In addition to this it is important that all the tests conducted in the Triple S programme are standardised in order to ensure the validity of these measurements. This will require ongoing training and support of school staff.

### *Acknowledgements*

Gemma Adams, Rebecca Crowder and Gordon Andrews

| Variable | No. | % | mean | SD | min | max |
|---|---|---|---|---|---|---|
| **sex** | | | | | | |
| **female** | 1530 | 52.0 | | | | |
| **male** | 1413 | 48.0 | | | | |
| **age (years)** | | | 9.37 | 3.17 | 5.01 | 17.4 |
| **year group** | | | | | | |
| **1** | 748 | 25.4 | | | | |
| **3** | 550 | 18.7 | | | | |
| **5** | 582 | 19.8 | | | | |
| **7** | 491 | 16.9 | | | | |
| **9** | 372 | 12.6 | | | | |
| **11** | 200 | 6.80 | | | | |
| **IMD** | | | 37.8 | 12.6 | 7.24 | 72.5 |
| **ethnic group** | | | | | | |
| **white** | 1843 | 62.6 | | | | |
| **mixed** | 168 | 5.71 | | | | |
| **Asian or Asian British** | 680 | 23.1 | | | | |
| **black or black British** | 147 | 4.99 | | | | |
| **Chinese or other ethnic group** | 38 | 1.29 | | | | |
| **unknown** | 67 | 3.08 | | | | |
| **weight** | | | | | | |
| **underweight** | 392 | 13.3 | | | | |
| **normal weight** | 1,831 | 62.2 | | | | |
| **overweight** | 456 | 15.5 | | | | |
| **obese** | 264 | 8.97 | | | | |
| **fit** | 2,175 | 73.9 | | | | |
| **unfit** | 768 | 26.1 | | | | |
| **active travel** | 1886 | 64.1 | | | | |
| **inactive travel** | 1021 | 34.7 | | | | |
| **Total** | 2943 | | | | | |

**Table 1. Population characteristics (IMD= Index of Multiple Deprivation)**

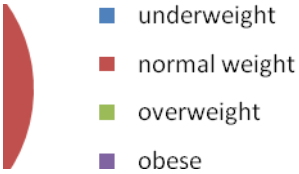



**Figure 1. Weight status**

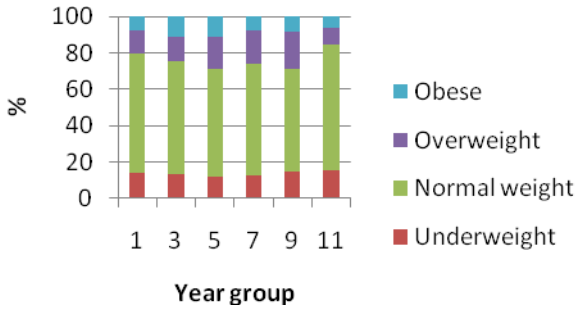



**Figure 2. Weight status by year group**

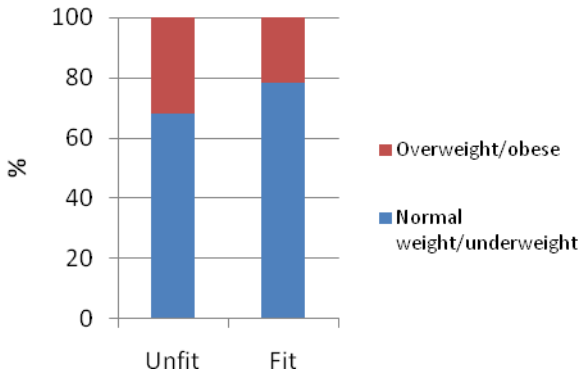



**Figure 3. Weight status by level of physical fitness**

| Variable | OR | SE | p | 95% CI | |
|---|---|---|---|---|---|
| **sex- female** | 1.23 | 0.11 | **0.02** | 1.03 | 1.47 |
| **age (years)** | 1.01 | 0.01 | 0.50 | 0.98 | 1.04 |
| **IMD deciles** | 1.02 | 0.04 | 0.51 | 0.95 | 1.10 |
| **ethnicity** | | | | | |
| **mixed** | 1.18 | 0.21 | 0.37 | 0.82 | 1.68 |
| **Asian or Asian British** | 0.69 | 0.08 | **0.001** | 0.55 | 0.86 |
| **Black or Black British** | 0.97 | 0.19 | 0.88 | 0.66 | 1.44 |
| **Chinese or other ethnic group** | 0.88 | 0.34 | 0.75 | 0.41 | 1.90 |
| **fit** | 0.59 | 0.06 | **<0.001** | 0.49 | 0.72 |
| **active travel** | 0.87 | 0.08 | 0.13 | 0.73 | 1.04 |

**Table 2. Logistic regression model for the relationship between overweight/obesity and gender, age, socioeconomic deprivation, ethnic group, physical fitness and mode of transport**