

# Regional Evaluation of Weight Management Programmes for Children and Families

**Commissioned by the Department of Health West Midlands**



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**Background:** In response to the increasing prevalence of obesity in children and adolescents, numerous interventions with the potential to reduce obesity levels or associated risk of chronic diseases in children and youths have been implemented across the UK, including the West Midlands. However, few of these interventions have been systematically evaluated and consequently, there is a need to examine their effectiveness. This report outlines an evaluation of seven child weight management programmes that were in place in the West Midlands region during July 2007-July 2009.

**Aims:** This project aimed to determine the following:

- The benefits to participating (a) children and (b) families in terms of health improvement and behaviour change;
- Possible barriers to change for (a) children and (b) families undertaking treatment programmes;
- The range of short and longer term support available for programme participants;
- The cost effectiveness of each intervention.

**Method:** The evaluation employed a multi-method strategy as follows:

- An audit of the Standard Evaluation Framework (SEF) essential and desirable data collected by each intervention programme;
- A review of programme materials, including the theoretical rationale and evidence base for each intervention programme;
- An assessment of physical and psychosocial benefits to programme participants;
- An economic evaluation of the interventions.

**Results:** In summary the results indicated that:

- No programme collected all of the essential or desirable SEF criteria, however 19 essential criteria were collected by all the interventions including child weight and height.

Physical activity and dietary measures were collected by the majority of programmes (N=6 and 5 respectively);

- The dietary and physical activity measures used by programmes were varied, however all asked about fruit and vegetable intake and number of days in the past week in which moderate activity had been undertaken for 30 or 60 minutes;
- Four programmes collected data on psychosocial outcomes, including information on self-esteem;
- Barriers to data collection included literacy levels and time constraints;
- Five programmes collected long term follow up data at 3 and/or 6 months;
- The quantity of data collected at follow up was often limited due to participant drop out, which appeared to relate to participant perceptions that once the weekly programme had finished, the intervention was complete;
- A variety of recruitment methods had been tried by all programmes, the most successful of which appeared to be links with community and schools events;
- Little success had been had from the use of NCMP letters for recruitment purposes, as parents either did not understand the implications of the letters or did not believe that their child had a weight problem;
- Recruitment to programmes was primarily by self referral which was thought to be successful because of awareness raising in the community and word of mouth;
- Retention rates ranged from 32.9% to 89% with the majority of programmes (N=6) having a retention rate of at least 50%;
- No differences were found in terms of demographics or starting weight between completers and non-completers for the majority of programmes (N=5);

- Barriers to attendance included the child not wanting to attend, other family commitments and problems with access to the venue;
  - Most programme deliverers reported that parental attitudes to their child's weight was also an issue, suggesting that many parents of overweight and obese children did not believe their child had a problem;
  - All the programmes were based either on NICE guidelines or theories of behaviour change and offered both nutritional advice and exercise classes;
  - Other support offered included one to one mentoring (N=2), cooking classes for parents (N=3) and goal setting and monitoring (N=4);
  - Long term support was offered by five programmes and ranged from referral to exercise programmes to one to one mentorship;
  - Financial costs, based on programme ranged from £203 to £669 per participant;
  - It should be noted that costs per participant increased if the programme had difficulty recruiting;
  - Weight change ranged from an increase in group mean of 0.4Kg to a decrease of 0.9Kg;
  - Even when group means showed an increase in weight there were often benefits for the majority of the group, with over half of all children either maintaining or losing weight in three programmes;
  - Weight loss is not the best indicator of change in weight status for children, due to changes in height and BMI or BMI SD which shows how far a child's BMI is from the population norm are preferred;
  - BMI change ranged from an increase of 2.7 points to a decrease of 0.9 points;
  - BMI SD decreased in four programmes (by 0.1-0.2 points) and remained unchanged in two programmes;
  - Psychosocial benefits reported by three programmes included improved self-esteem and perceived physical appearance;
  - Improvement in diet and exercise were reported by participants in all those programmes which measured these behaviours;
  - It should be noted however that these self-report measures may reflect a social desirability bias.
- Conclusions and Recommendations:**
- As all the programmes evaluated have strengths as well as weaknesses, it is recommended that sharing of good practice between programmes and PCTs is facilitated in order to improve outcomes/data collection in all areas across interventions;
  - Consideration should also be given to the systematic evaluation of any delivery tools currently in use (e.g. visual aids vs. hands-on lessons to teach nutrition education), in order to inform practice and allow commissioners and providers to assess what best delivers
  - There are differences in data collection and recording across the programmes and this can make comparison complicated;
  - It is therefore recommended that there is some standardisation of data collection in terms of what is collected and how the information is recorded;
  - Difficulties collecting follow up data make it difficult to gauge the long-term impact of the programmes;
  - Good follow up data is essential in order to assess the potential impact of weight management interventions on children's future health. It is therefore recommended that priority is given to establishing ways of collecting this data;
  - Given the difficulty of gauging the impact of weight change on a child's weight status, the use of BMI, rather than weight as a measure of physical change is recommended;
  - Changes in behaviour related to food intake and exercise should also be measured in a systematic and standardised way and this information fed back to clients as part of the change process. A set of standardised measures to assess this behaviour change is proposed;
  - Use of an interoperable data base either accessed through a centralised system or made available to all programmes locally is also recommended.

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# Introduction

This report outlines an evaluation of child weight management programmes within the West Midlands region, conducted by a team from the University of Worcester on behalf of Department of Health West Midlands (DHWM).

## **The prevalence of childhood obesity**

Childhood obesity has been described as a global epidemic and rising trends are apparent in both developed and developing countries (Flynn et al, 2006). In the UK alone, between 1995-2006, there has been a marked increase in the prevalence of childhood obesity. Among boys aged 2 to 15, the proportion deemed 'obese' increased overall from 10.9% in 1995 to 17.3% in 2006, and among girls from 12.0% to 14.7% (Office for National Statistics, 2008). The financial burden of this rise in obesity was approximated as £1 billion in 2002, although alarmingly it is predicted that this figure may rise further to £5.3 billion by 2025 (Office for National Statistics, 2008). Furthermore, the UK government has predicted that levels of obesity among children and young people will continue to rise if appropriate action is not taken. It has been suggested that by 2025, 14% of young people under the age of 20 will be obese.

However, as Flynn et al (2006) suggest, it is difficult to accurately estimate the true extent of the problem due to variations in the definition of childhood obesity between clinical and epidemiological studies. More specifically, the variability in growth rates and gender-specific variations in body composition throughout childhood and adolescence present significant challenges in providing an adequate definition of childhood obesity. Children are not 'mini adults' and, as a result cannot be classified using the same criteria.

Despite this, Body Mass Index (BMI) has been identified as an effective and evidence based measure of childhood obesity and has been shown to provide the best simple means of defining obesity in children and adolescents (Reilly 2007). BMI is calculated by dividing weight (in kilograms) by height squared (in

metres). A child with a high BMI (i.e. one which is within or above the 95th percentile) is classified as obese (Reilly, 2007). However, it has been suggested that BMI may not always provide the best measure of obesity and that children can easily be misclassified or misdiagnosed. Indeed, as Deakin, Goodridge and Heathcote-Elliott (2005) suggest, BMI does not distinguish between body mass due to fat and that due to muscular physique or the distribution of fat around the body. Consequently, alternative measures have been developed. Waist circumference or Waist-Hip Ratios (WHR) are often used in conjunction with BMI to establish the extent of childhood obesity and have been reported to be a better predictor of health outcomes than BMI alone (Ashwell & Dong Hsieh, 2005; Janssen et al, 2005). Another frequently used measure is BMI z-score or BMI SD which uses a standard deviation formula to provide a relative measure of BMI that is adjusted for a child's age and gender. However, Woo (2009) warns against using BMI z-scores as an outcome measure in youth weight-management programmes rather than BMI, because in children with BMIs of over 40, the correspondence between BMI and BMI z-score differs by age and sex. Thus a girl with a stable high BMI in adolescence will exhibit a decreasing BMI z-score, where a boy of the same BMI will show an increasing BMI z-score. BMI z-score is optimal for assessing children's adiposity on a single occasion, but measuring change in obesity is better achieved through multiple outcome measures. Indeed, as part of a series of briefing papers for commissioners, the National Obesity Observatory (NOO) recommends that, while BMI is currently the best measure of obesity for population surveillance, other measures of body fat should be taken alongside BMI wherever possible (Townsend, 2009).

### **Epidemiology of obesity**

The causes of obesity are complex and multifaceted, determined by both genetic and environmental factors (Flynn et al, 2006). The relative contribution of genetic factors is controversial and research has suggested that an underlying pathological condition only accounts for 2-5% of cases (Deakin, Goodridge and Heathcote-Elliott, 2005). However, there is consensus regarding the role of the environment as a determinant of obesity. Indeed, in recent years, research has

suggested that home and family environments are essential in the development of food preferences and consumption beliefs (Kime, 2008; Rosenkranz & Dziewaltowski, 2008). In light of this, the concept of an 'obesogenic environment' has been identified as a significant factor in the development of childhood obesity.

Indeed, prevalence rates of childhood obesity have been linked with various socio-economic and lifestyle factors including: household income, parental BMI, child gender and physical activity level. The Health Survey for England (2007) for example, reported that among girls aged 2-15, 22% of those in the lowest household income group were classed as obese compared with 9% of those in the highest income group. Similarly, the prevalence of obesity among children varied by parental BMI status such that in households where the birth parents were classed as obese, rates of child obesity were significantly higher. Thus 24% of boys aged 2-15 years living with obese parents were classed as obese, compared with 11% of those living in normal/underweight households. Equivalent figures for girls were 21% and 10% respectively. A negative relationship between obesity and participation in physical activities such as sport and exercise, walking and active play was also noted for girls, but not boys. Thus among girls aged 2-15, 21% of girls in the low physical activity group were classed as obese compared with 15% in the high physical activity group. No significant patterns were identified in either the low or high physical activity group for boys (Office for National Statistics, 2008).

### **Weight management Interventions**

In response to the increasing prevalence of obesity in children and adolescents, numerous interventions with the potential to reduce obesity levels or associated risk of chronic diseases in children and youths have been implemented in a variety of settings (Flynn et al., 2006; Goran, 1997; Steinberger & Daniels, 2003). These typically include school-based or family-based weight management programmes.

## **School based programmes**

Shaya et al. (2008) conducted a review of school-based obesity intervention programmes. Fifty-one studies across all school ages were selected for further analysis. Findings from the study indicated that no persistence of positive results in reducing measures of obesity in school-age children were observed; however a number of interesting points were highlighted. Firstly that whilst short-term interventions lasting less than 6 months show significant results in reducing blood pressure and increasing cardiovascular fitness (Wilson et al., 2005), there is no conclusive evidence for changes in body composition. Thus studies employing long-term follow-up measurements are needed. Furthermore it was noted that physical activity-gearred interventions illustrated the greatest efficacy for reducing obesity-related outcomes (Shaya et al., 2008).

## **Family based programmes**

Whilst the school setting is an effective setting to target, several reviews have evaluated family based weight intervention programmes (Boon & Clydesdale, 2005). Berry et al. (2004) identified 13 multi-component family based interventions. The review found that multi-component interventions for obese children (using behavioural interventions, nutrition education, and exercise) with or without parental involvement had varied outcomes. When parents and children were seen together, one of the parents, the children and the parents, or the children lost weight. Furthermore both behavioural modification and behavioural therapy interventions were reported to be relatively successful in improving weight-loss outcomes in both parents and children. Whilst the studies displayed some evidence of positive changes in weight status, the challenge to develop an 'effective' intervention that takes into account differences in age, environment and culture across the whole family remains (Berry et al., 2004).

## **Current evidence of the effectiveness of interventions**

A number of systematic reviews and critical appraisals have been undertaken with the aim of determining optimal interventions for both preventing and treating obesity in children and adolescents (Van Sluijs, McMinn, & Griffin, 2007). A large scale synthesis review from Flynn and colleagues (2006) collated 13,158 studies

relating to obesity in children and young people. These studies were reduced to a body of 158 articles for further analysis, with the intention of producing 'best practice recommendations'. A number of key findings were presented; in particular the majority of obesity intervention programmes outcomes at least in the short term indicated change towards improvement, thus supporting continued action. Critically it was noted that engagement in physical activity in school based interventions is to be encouraged. Indeed, clear associations were found between increased physical activity and improvement in chronic disease risk status in both secondary and primary schools, which concurs with current recommendations (American Institute of Medicine, 2004). Further findings suggested that the setting of the intervention was paramount, with the school setting identified as pivotal.

Results from the latest Cochrane review (Luttikhuis et al., 2009) showed that only 18 of 64 (28%) of the intervention programmes systematically reviewed demonstrated beneficial effects on child and youth adiposity from baseline to end of intervention or follow up. However, the most effective interventions combined dietary, physical activity and behavioural components, and parental involvement was recognised as an important feature of these behavioural programmes. The authors also gave a number of key recommendations regarding future research: in particular appropriate short- and long-term outcomes need to be defined for children and young people at various weight levels, rather than using conventional or adult-oriented outcomes (Luttikhuis et al., 2009). It was also reported that qualitative research should be employed within interventions to create an evidence base of the views of participants, as well as providers, potentially highlighting why interventions may be more, or less successful (Luttikhuis et al., 2009).

In sum, recent systematic reviews and critical appraisal exercises have consistently concluded that the evidence on interventions to treat paediatric obesity is extremely limited. The large majority of intervention evaluations have been methodologically weak and focused on short term outcomes. A review of 61 controlled trials concluded that the long-term efficacy of paediatric obesity treatment remains unclear and as yet there is limited evidence to support the

short-term efficacy of lifestyle interventions (McGovern et al., 2008). Furthermore, an evaluation of schemes to promote healthy weight in overweight and obese children (EPPI, 2008) suggested that whilst interventions are being commissioned by a variety of organisations, data informing the effectiveness of the interventions with regard to health outcomes were inconsistent. Consequently, it is essential that interventions are assessed for their effectiveness; especially as the notion of evidence based practice (EBP) becomes more prominent. In 2009, NOO produced a brief for commissioners, comprising a summary of best available evidence and recommendations for the commissioning of new programmes (Ells and Cavill, 2009). Emphasis was placed on the importance of good quality evaluation of weight management interventions. Indeed, as Belsey and Snell (2007) suggest, purchasers are increasingly examining the strength of research evidence on clinical applications when allocating resources. As a consequence, it is imperative to consider the strength of research evidence, assuring both clinical and cost effectiveness.

## **The Standard Evaluation Framework for weight management interventions**

In response to the limited evidence of the effectiveness of paediatric weight management interventions and the need for methodologically sound evaluation, NOO has developed a Standard Evaluation Framework (SEF) which can be used by relevant parties involved in the evaluation process.

The SEF provides introductory guidance on the principles of evaluation, and lists data collection criteria that can be used to 'support high-quality, consistent evaluation of weight management interventions in order to increase the evidence base' (NOO, 2009). These criteria are categorised as either essential (minimum requirement) or desirable (additional data that would enhance the evaluation). The framework is divided into five parts:

1. Intervention details;
2. Demographics of individual participants;
3. Baseline data;
4. Follow-up data (including impact and process evaluation);

## 5. Analysis and interpretation.

The supporting guidance describes why particular criteria have been categorised as essential or desirable, and gives further information on collecting data. The SEF is essential reading to those commissioning, running or evaluating weight management interventions. Furthermore its application will support high quality, consistent evaluation of weight management interventions in order to increase the available evidence base.

### **Childhood obesity in the West Midlands**

In the West Midlands region there has been a marked increase in the prevalence of childhood obesity. The Health Survey for England (2007) identified that among boys aged 2 to 15, the proportion classed as obese increased from 14% in 1998 to 20% in 2007. A similar picture was found for girls, with 12% classed as obese in 1998 rising to 18% in 2007 (Office for National Statistics, 2008). Clearly these rates are above the national prevalence rates, suggesting urgent action is needed in the West Midlands.

Indeed a recent survey conducted by the National Child Measurement Programme (NCMP) for England, identified the West Midlands as an area where the prevalence of childhood obesity is significantly higher than the national average (The Health and Social Care Information Centre, 2009). Measurements for the 2008/09 school year showed that in the West Midland region, nearly one in four (23.3%) of the reception age children measured were either overweight or obese. In Year 6, this rate was more than one in three (34.3%). Specifically, the percentage of obese children in Year 6 (19.8%) is nearly double that in Reception (10.1%). The percentage of overweight children is also higher in Year 6 (14.5%) than in Reception (13.2%). These figures showed a similar pattern to measurements collected in the school year 2007/2008.

It is therefore unsurprising that a number of weight management interventions targeting children and families have been established in the West Midlands in recent years. However, few of the interventions within the West Midlands have

been systematically evaluated to establish their effectiveness or evaluated in peer reviewed outcome focused publications. Consequently, there is a need to examine the extent to which these interventions contribute to the evidence base.

### **Aims of the Evaluation**

The aim of this project was therefore to evaluate the effectiveness of a number of family based intervention programmes currently in place in the West Midlands, as specified by DHWM.

For each programme the evaluation addressed the following question: 'Does the programme work and at what cost?' In order to answer this question fully, the study determined the following:

- The benefits to participating (a) children and (b) families in terms of health improvement and behaviour change;
- Possible barriers to change for (a) children and (b) families undertaking treatment programmes;
- The range of short and longer term support available for programme participants;
- The cost effectiveness of each intervention.

# Method

The evaluation employed a multi-method strategy incorporating both qualitative and quantitative methods in order to provide a rich and informative evaluation study.

## **Design**

A combination of methods including audit of routine data, semi structured interviews with programme managers and a systematic review of peer reviewed publication.

## **Sample**

The evaluation included a number of family based intervention programmes currently in place in the West Midlands, including:

1. Carnegie Fun for Life: Walsall
2. Fitter Families: Stoke on Trent
3. Goals: Sandwell
4. MEND: Birmingham; Herefordshire; Sandwell; Shropshire; North Staffordshire; Stoke on Trent; Walsall; Warwickshire; Wolverhampton; Worcestershire; Coventry; Dudley
5. One Body One Life: Coventry
6. Watch It!: Birmingham
7. YW8?: Telford and Wrekin

The sample consisted of all children and families who had participated in one of these programmes between 1st July 2007 and 1<sup>st</sup> July 2009.

## **Procedure**

Programme leads for each intervention were contacted via email to arrange an initial consultation meeting. Following this, semi-structured interviews were conducted with programme leads in order to establish the basic details of each intervention. Questions were based on the criteria that form Part 1 of the Standard Evaluation Framework (SEF) and participants were prompted to expand on key criteria where necessary. Intervention details were also supplemented by published evaluation reports produced by individual programmes where available. Programme leads were asked to supply routine data collected for each intervention for the period (1<sup>st</sup> July 2007-1<sup>st</sup> July 2009), including: demographics of the client group, baseline data and follow up data.

An audit of this routine data was then carried out, using the SEF for weight management interventions. Each intervention programme was compared against the SEF essential and desirable criteria. On completion of the audit, programme leads were contacted via email and asked to provide any missing data highlighted by the audit.

A systematic review of the literature was also completed. Studies were identified using Academic Search Complete, CINAHL, IBSS, PsycARTICLES, Medline and PubMed databases. The following terms were searched as keywords anywhere in the article: obesity, child, childhood, children, pediatric, paediatric, adolescent, family, community, weight management, programme and intervention. The search was conducted for the period January 1996 to December 2009. The following inclusion criteria were applied: published in English language, peer reviewed journals, and interventions aimed at children aged between 6-12 years and adolescents aged between 13-18 years of age. Articles were excluded if they were review articles, involved children under 6 years of age, or adults over 18 years of age, focused on bariatric surgery, school based interventions, pharmacological interventions, were inpatient programs or made reference to specific medical conditions or mental health issues.

## Analysis

Simple content analysis was carried out on all the qualitative data gathered from the interviews. Quantitative data provided by each programme were entered into an Excel spreadsheet. This enabled a review of each programme, to be carried out as follows:

- **Commentary on measures:** Assessment was made of the range of data collected by each of the intervention teams in order to establish the extent to which interventions follow the best practice model provided by the SEF. Information concerning the feasibility (including barriers to data collection) of collecting desirable as well as essential data was assessed in order to establish which measures should be routinely used in practice and so allow the creation of an interoperable design for the database to be used by all interventions locally. This part of the analysis was also used to inform recommendations for Key Performance Indicators.
- **Review of programme details:** Each programme was assessed with regard to: the target group, recruitment and retention rates, method of programme delivery and structure (including routine practice for ongoing support for participants) and effectiveness of the intervention. Effectiveness was assessed by establishing differences between paired baseline and follow up data concerning available physiological, behavioural and psychological measures. The statistical significance of any difference was tested using a paired samples t-test. However as statistical significance does not tell us anything about the magnitude of any differences, the effect size of any changes in weight related outcomes was also calculated (Cohen's d). Cohen's d measures the practical significance of the difference in pre and post intervention measures and therefore provides an indicator of the clinical significance of any changes in health outcomes following an intervention. All data are reported to within one decimal place.
- **Economic evaluation:** The costs of implementing the intervention were assessed and compared against the benefits generated from the use of

the intervention. Costs considered included staff training, salaries, purchasing of materials and so on. Comparison of outcome measures at baseline and end of intervention provided an indicator of the intervention's benefits.

- **Systematic review of the Evidence base:** Studies identified for inclusion in the review were assessed in terms of (1) direct relevance to the named interventions undergoing evaluation and (2) the robustness of the study design.

### **Ethics**

This evaluation came under the remit of audit rather than research as it concerned a quality improvement process, which is intended to investigate what is being done rather than what should be done (Wade 2005). However, the research team were cognisant of the need to ensure that the standards of audit in terms of design, data collection, and analysis should be at least as high as for research. Thus whilst there was no requirement in terms of research governance to seek ethical approvals from the NRES, the project gained ethical approval for the evaluation from the Institute of Health and Society research ethics committee, University of Worcester.

All data generated by the evaluation was treated confidentially, reported anonymously and stored in accordance with the Data Protection Act (1998).

# Results

## Commentary on Measures

### Collection of SEF essential and desirable information

Routine data collected by each intervention was audited against SEF essential and desirable criteria. None of the programmes included in the evaluation collected 100% of the information highlighted as either essential or desirable by the SEF (see Table 1).

**Table 1: Audit of essential and desirable criteria collected by each intervention**

	Essential Criteria (N=37)*	Desirable criteria (N=26)
	N (%)	N (%)
<b>Fitter Families</b>	23 (62)	8 (31)
<b>Fun4Life</b>	30 (81)	14(54)
<b>GOALS!</b>	31 (84)	19 (73)
<b>MEND</b>	36 (97)	22(85)
<b>OBOL</b>	35 (95)	21(81)
<b>Watch It!</b>	33 (89)	14 (54)
<b>YW8?</b>	36 (97)	23 (88)

\*SEF lists 32 essential criteria but for purpose of the audit 'description of intervention,' was split into its 6 components

As shown in Table 1, there was some variation between programmes in the extent of essential criteria collected. The number of essential criteria collected ranged from 62%-97%. The MEND and the YW8? Programme collected the most data at 97% of the essential criteria listed by SEF, compared with the Fitter Families weight management programme which collected only 62%. A similar pattern was evident for desirable criteria, with the percentage of completion ranging from 31% to 88%. The most data was collected by YW8? at 88% and the least by Fitter Families at 31%.

However, as Table 2 shows, there were 19 essential criteria which were made available by all the interventions. These included all easily accessible fields such as intervention name, contact details, intervention dates, timescales and locations. All interventions also collected basic data including participant age, weight and height.

In addition six desirable criteria were collected by every intervention: rationale for the intervention, cost to the participant, core staff competencies, Equipment and resources required, Incentives for attendance and commissioner of the intervention/ source of funding (see Table 2).

**Table 2: Essential and desirable data collected by all the programmes**

Section	Criteria	Essential	Desirable
PART 1: intervention details	1. Title/name of intervention	X	
	2. Aims and objectives (including primary and secondary outcomes)	X	
	3. Intervention timescale	X	
	4. Intervention delivery dates	X	
	6. Location and setting	X	
	7. Description of intervention:		
	a) Target population	X	
	b) Content	X	
	c) Delivery method	X	
	d) Deliverer	X	
	e) Unit of delivery	X	
	8. Rationale for intervention (including theoretical basis)		X
	9. Core Staff competencies required		X
	10. Equipment and resources required		X
11. Incentives for attendance		X	
13. Method of recruitment and referral	X		
17. Cost to participant		X	
23. Contact details	X		
24. Commissioner(s) of the intervention and sources of funding			X
PART 2: demographics of individual participants	27. Age	X	
	28. Sex	X	
	29. Ethnicity	X	
PART 3: baseline data	34. Height and weight (to calculate BMI)	X	
PART 4: follow-up data	41. Height and weight (to calculate BMI)	X	
	47. Number recruited	X	
	49. Number completed	X	

Details of the criteria not collected by every intervention are listed in Table 3 and Table 4. As can be seen 18 essential criteria were not collected by all interventions (see Table 3). Of these, the criterion most likely to be omitted from data collection was details of the quality impact of assessment (only Watch It!, OBOL and YW8? collected this information).

Six of the seven interventions stated that they collected information concerning participant satisfaction. However, this information was not supplied to the evaluation team.

Measurement of physical activity levels is essential according to SEF guidelines and this data was collected by all except one intervention team (Fitter Families). The measures used varied by intervention but mainly asked about the number of days in the past week during which moderate activity had been undertaken for 30-60 minutes. A measure of cardiovascular fitness was also included by MEND (resting heart rate), OBOL (resting heart rate and blood pressure), and Watch It! (Step Test).

Dietary measures e.g. the number of portions of each food group eaten per day, frequency of snack consumption and number of take-aways/fast food meals consumed, are also recommended as essential by SEF. This data was collected by 5 interventions (see Table 4). Once again actual measures varied, however one common question concerned the number of portions of fruit and vegetables consumed each day.

As Table 4 shows, 22 desirable criteria were only collected by some of the interventions, with over half of these criteria (14) being collected by less than 50% of the programmes evaluated. These items tended to relate either to policy details or additional outcome measures.

**Table 3: SEF essential criteria not collected by every intervention**

Essential Criteria	Fitter Families	Fun4 Life	GOALS!	MEND	OBOL	Watch It!	YW8?	TOTAL COLLECTED	Criteria changes March 2009
31. Measure of socio-economic status	✓	✓		✓	✓	✓	✓	6	
44. Physical activity levels and behaviour		✓	✓	✓	✓	✓	✓	6	
16. Cost of intervention per participant	✓	✓	✓	✓	✓		✓	6	
37. Measure of physical activity		✓	✓	✓	✓	✓	✓	6	
15. Participant admission/exclusion criteria		✓	✓	✓	✓	✓	✓	6	
54. Participants' satisfaction with the intervention		✓	✓	✓	✓	✓	✓	6	NEW
48. Number attended each session		✓	✓	✓	✓	✓	✓	6	NEW
46. Number invited		✓	✓	✓	✓	✓		5	UPGRADED
36. Measure of dietary intake and behaviour			✓	✓	✓	✓	✓	5	
43. Dietary intake and behaviour			✓	✓	✓	✓	✓	5	
50. Number of participants at each follow-up	✓	✓		✓		✓	✓	5	UPGRADED
52. Reasons for opt-out (where applicable)		✓	✓	✓	✓		✓	5	UPGRADED
56. Summary of results compared to baseline (for primary/secondary outcomes)			✓	✓	✓	✓	✓	5	UPGRADED
30. Disability		✓		✓	✓		✓	4	NEW
39. Follow-up data: minimum of 3, incl 1 year	✓			✓		✓	✓	4	NEW
19. Type of evaluation and evaluation design			✓	✓	✓		✓	4	UPGRADED
7. f) Details of quality assurance mechanisms				✓	✓	✓	✓	4	
20. Details of equality impact assessment					✓	✓	✓	3	UPGRADED

**Table 4: SEF desirable criteria not collected by every intervention**

Desirable Criteria	Fitter Families	Fun4 Life	GOALS!	MEND	OBOL	Watch It!	YW8?	TOTAL COLLECTED	Criteria changes March 2009
35. Additional proxy measures for adiposity		✓	✓	✓	✓	✓		5	
42. Follow-up data on additional proxy measures for adiposity		✓	✓	✓	✓	✓		5	
5. Duration of funding (including dates)		✓	✓	✓	✓		✓	5	
38. Potential facilitators /barriers to change			✓	✓	✓	✓	✓	5	NEW
45. Follow-up measures on facilitators/barriers to, lifestyle change			✓	✓	✓	✓	✓	5	NEW
12. Details of training needs (including QA)			✓	✓	✓	✓	✓	5	
14. Participant consent mechanism		✓		✓	✓	✓	✓	5	
22. Details of health needs assessments	✓	✓			✓	✓	✓	5	
51. Methods of data collection and timings			✓	✓	✓		✓	4	
18. Detailed breakdown of cost	✓		✓		✓		✓	4	
26. Details of type and extent of any clinical involvement			✓	✓		✓	✓	4	
55. Plans for sustainability			✓	✓	✓		✓	4	NEW
57. Details of any further analyses and statistical methods used			✓	✓	✓		✓	4	NEW
32. Additional information including marital status, medical history, etc		✓		✓	✓		✓	4	
25. Declaration of interest		✓	✓	✓				3	
33. Details of parental weight status		✓			✓		✓	3	
58. Limitations and generalisability			✓	✓			✓	3	NEW
21. Relevant policy and performance context				✓	✓		✓	3	
40. Follow-up data on key measures over a greater term than one year				✓			✓	2	NEW
53. Details of any unexpected outcomes and the reasons why							✓	1	

Additional outcome measures were used by four programmes in order to measure changes in psychological well-being. Table 5 provides a summary of psychological measures used.

**Table 5: Summary of psychological measures**

<b>Programme</b>	<b>Measure</b>
Fitter Families	None
Fun4Life	None
GOALS	The Self Perception Profile for Children (SPPC: Harter, 1985)
MEND	A modified version of The Rosenberg Self Esteem Scale (Rosenberg 1965)  Strengths and Difficulties questionnaire (SDQ: Goodman, 1997)  Body Esteem Scale (Mendelson & White, 1982)  Children's Eating Attitudes Test (ChEat: Maloney et al., 1988)
One Body One Life	None
Watch It!	The Self Perception Profile for Children (SPPC: Harter, 1985)  The Pediatric Quality of Life Inventory (PedsQL™: Varni et al, 1993)
YW8?	The Self Perception Profile for Children (SPPC: Harter, 1985) – Abridged version (24 questions)  Questionnaire based on Self-Determination Theory developed with colleagues at Coventry University

As indicated in Table 5, *The Self Perception Profile for Children* (SPCC: Harter, 1985) was the most frequently employed additional measure. The SPCC is a 36 item self-report scale, consisting of five domain specific sub-scales: scholastic competence, social acceptance, athletic competence, physical appearance, behavioural conduct and a global measure of self-esteem. Items are scored on a scale of 1-4 where one indicates low perceived competence and four indicates high perceived competence. All programmes used the full 36 item version of the questionnaire with the exception of YW8? who used an abridged 24 item version.

Until January 2008, MEND also used SPCC. However, they now use a modified version of The *Rosenberg Self-Esteem Scale* (RSE: Rosenberg 1965), which they call 'What I think about myself'. One of the most popular measures of self esteem, RSE has been shown to be valid and reliable across a wide range of age groups and to correlate well with SPCC (Hagborg, 1993). This uni-dimensional 10 item self-report scale is usually presented with four response choices, ranging from strongly agree to strongly disagree. The MEND version of the questionnaire has been modified to use a response scale similar to that used by SPCC, which asks respondents to rate how like themselves a statement is. The impact of this modification on the reliability and validity of the questionnaire is unknown. MEND also assessed body esteem separately using the *Body Esteem Scale* (Mendelson & White, 1992), a 24-item questionnaire with forced-choice, yes/no answers.

During the evaluation period MEND used the *Children's Eating Attitude Test* (ChEAT: Maloney et al, 1988), which is a 26 item, self-report questionnaire that assesses abnormal eating attitudes, dieting patterns and food preoccupation using a six-point, forced-choice Likert scale. Scores range from 0-78 with higher scores indicating dysfunctional eating attitudes. However, it has been noted that ChEAT scores generally go up over the course of treatment for obesity. Whilst this would normally be taken as an indicator that dysfunctional eating attitudes were increasing, there is some evidence that increased scores in the context of weight management interventions reflect restrictions of energy dense foods only. The interpretation of scores is therefore a complex one. The ChEAT is no longer a part of the package used by MEND due to concerns that overall ChEAT scores can mask positive attitudinal changes on individual test items.

Finally MEND included the parent-report version of the *Strengths and Difficulties Questionnaire* (SDQ: Goodman, 1997), a 25 item behavioural screening questionnaire that consists of five sub-scales: Emotional Symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and pro-social behaviour.

Watch It! also included the generic module of the Pediatric Quality of Life Inventory (PedsQL™: Varni et al, 1993), a 23 item questionnaire that measures health-related quality of life (HRQoL). Well-being is measured on four domains: Physical Functioning, Emotional Functioning, Social Functioning and School Functioning. Physical and Psychosocial summary scores can also be calculated. Two versions of the inventory were completed: the child-self report and a parent-proxy report. Responses are scored on a 5 point Likert scale (0 = never a problem through to 4 = almost always a problem).

YW8? included a specially constructed measure of lifestyle change based on Self-Determination Theory for completion by parents. This questionnaire was devised by the programme designer in collaboration with Coventry University. The questionnaire measured the motivation of parents when enrolling children in the programme.

## **Feasibility of data collection**

One barrier to data collection highlighted by several programme deliverers was the poor level of English literacy prevalent in target groups. This difficulty was a result either of education level, or English not being a first language. This caused problems with completion of consent forms and questionnaires. A number of centres delivering the MEND intervention found this to be a particular difficulty, primarily because of the number of paper based outcome measures used. Intervention providers often had to help families' complete forms which disrupted the structure of the class. Furthermore it was suggested that the burden on participants was potentially problematic and may have resulted in lost data.

Fun4Life staff noted that absenteeism was greatest on the 6<sup>th</sup> or 12<sup>th</sup> week when outcome data was being collected from participants. It is possible that participants avoid these weeks for fear of failure; in response to this, Fun4Life have started to take height and weight measures every week which seems to have reduced the extent of missing data.

Collection of long term follow-up data was highlighted as an issue by all the programmes; the main difficulty appeared to be encouraging families to attend for follow up once the intervention was perceived to be completed. This was less of a problem for Fitter Families, as it was run by school nurses who were able to carry out follow up by seeing children in school. However, despite the advantage of this, problems were encountered regarding parental consent to data collection. This barrier has now been overcome by asking parents to sign a form consenting to long term follow up in school, at the start of the intervention. Other solutions included running special activity events for families at which follow up data could be collected (Fun4Life); however this has had only limited success.

In addition, a number of physical outcome measures were suggested to be inherently problematic. Firstly the accuracy of assessing body fat was raised: scales may return different results depending on hydration levels, time of day and so on and callipers were suggested to be even less accurate. Secondly, the accuracy of waist circumference was also questioned: differences may be seen across time if measurements are taken over clothes, due to changes in the

number of layers worn; furthermore there may be difficulties locating the waist on an overweight/obese child. Finally fitness testing was noted to be time consuming by a number of programmes and was therefore often avoided all together.

## **Programme Details**

### **Fun4Life**

This intervention is commissioned by Walsall Council Sport & Leisure Development Services and funded by Walsall Council, Walsall PCT and Active England. The programme is run by five permanent team members (one Co-ordinator, two full-time and two part-time staff) plus a bank of casual staff. Each session has 6-7 staff present. Staff all have a health and fitness qualification. They are split into 2 competencies, lifestyle coaches and physical trainers.

**Theoretical Rationale:** This programme is based on the Carnegie Weight Management (CWM) approach developed by Professor Paul Gately at Leeds Metropolitan University. CWM combines Cognitive Behaviour Therapy with practical life-lessons. The focus is on empowering young people and eliciting behaviour change through re-education and support, in a nurturing environment. CWM also adheres to NICE clinical guidelines for obesity.

**Target group:** 8-16 year olds who are either overweight or obese and living in the Walsall area.

**Recruitment and retention:** Recruitment to the programme is typically through the WAY 4WARD programme, a one to one healthy lifestyle advice and support service run jointly by Walsall Council and NHS Walsall. Young people are initially referred to WAY 4WARD either by a health service professional (GP/School nurse/practice nurse) or may self-refer with the support of a parent or guardian. In practice the majority of those recruited are self-referrals. Families are then signposted to Fun4Life. NCMP letters were also used as an opportunity to signpost families to the programme and more recently direct leafleting has been tried, but with only limited success so far. In the two most recent clinics run by Fun4Life, 16 of the 28 attendees (57%) were self referrals, four (14.3%) were

referred by health professionals and seven (25 %) were in response to the NCMP letter.

Programmes typically recruit between seven and 20 participants each. During the evaluation period a total of 86 children were recruited to the intervention and of these 45 children (52%) completed the programme<sup>1</sup>. Four of the 41 non-completers started the programme on two separate occasions during the evaluation period, but did not complete. No significant differences were found between completers and non-completers in terms age ( $t=.19(63)$ ;NS), gender ( $X^2=2.34(1)$ ;NS), ethnicity ( $X^2=9.29(8)$ ;NS), or presenting weight ( $t=.03(63)$ ;NS).

**Demographic profile:** No data was available for eight of the non-completers. Of the remaining 78 children 40 were female and 38 were male. Child participants were aged between 8-15 years (mean=10.8, sd=2.2; mode=8). The majority (76.7%) were White British, with the remainder being Mixed Race (9.3%), Asian (10.5%) or Chinese (3.5%). Deprivation rates as measured by the DETR Index of multiple deprivation (IMD: DETR, 2000) ranged from 6.3-54.3 (mean=34.6; sd=13.0), suggesting that all families recruited to the programme were living in the most deprived 10% of Lower Layer Super Output Area (LSOAs) in England.

**Programme Structure:** Three programmes are run every year. Each programme comprises 12 sessions, with each session lasting three hours giving a maximum contact time of 36 hours. Each session includes education about nutrition and advice on eating habits, monitoring and individual goal setting and skill based sports. Parents are required to attend the one hour lifestyle class and are encouraged to join in the physical activities and individual monitoring, although this is not compulsory.

**Long term Support:** The aim is to keep in contact with all participants until they reach the age of 16 years through involvement in Walsall's wider Way4Ward exercise programme. Participants are therefore signposted into alternative activities post intervention. All participants are also seen 3 months & 6 months

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<sup>1</sup>For the purpose of this report 'completion' was defined as 75 per cent attendance as recommended by SEF

after their initial consultation. In addition Fun4Life organise quarterly events such as canoeing or assault courses which previous and current participants are invited to attend. This is also used as an opportunity to collect long term follow-up data.

**Short-term effectiveness of the intervention:** Weight measurements at the end of the programme showed that the mean weight for the group increased by 0.4Kg, or 0.5% from baseline (see Table 6). Short term changes in weight were not statistically significant ( $t=1.48(41)$ ;NS). However effect size calculations indicated that this change was small but of practical significance at 95% confidence level ( $d=-0.21$ ,  $CI=-5.71-5.31$ ). Weight decreased for 13 children (28.9%) (mean weight loss= 1.4Kg,  $sd=1.2$ ), whilst 12 (26.7%) had no change in weight and 20 (44.4%) had gained weight (mean weight gain = 1.6Kg,  $sd=0.8$ ).

**Table 6: Pre and post intervention physical outcome scores for Fun4Life**

<b>Measure</b>	<b>Pre-intervention mean (sd)</b>	<b>Post-intervention mean (sd)</b>
Weight (Kg) <b>(N=45)</b>	66.9 (18.8)	67.3 (18.9)
BMI <b>(N=44)</b>	29.0 (5.2)	28.9 (5.2)
BMI SD <b>(N=44)</b>	2.9 (0.58)	2.9 (0.58)
Waist Circumference (cm) <b>(N=42)</b>	91.9 ( 2.1)	91.1 (2.6)

Mean BMI decreased over the intervention period by 0.1 points, a decrease of 0.3% from baseline (see Table 6). Short term changes in BMI were not of statistical ( $t=1.53(43)$ ;NS) or practical significance ( $d=-0.19$ ,  $CI=-1.34-1.73$ ). BMI had decreased for 19 (42.2%) participants (mean decrease in BMI=1.12 point,  $sd=0.62$ ), 15 (33.3%) showed no change and 10 children (22.2%) showed an increase in BMI (mean increase 1.01 points,  $sd=0.50$ ) This follow up data was not available for one child. No change was seen in BMI SD.

Mean waist circumference decreased over the intervention, a loss of 0.8cm or 0.9% from baseline (see Table 6). Short term changes in waist circumference

were not statistically significant ( $t=-1.32(44)$ ;NS). However effect size calculations indicated that this change was large in terms of practical significance at 95% confidence level ( $d=1.7$ ,  $CI=1.07-2.49$ ). Twenty four (53.3%) participants showed a decrease in waist circumference (mean reduction=3.5cm  $sd=2.6$ ) and 18 (42.9%) showed an increase in this measurement (mean increase = 2.8cm,  $sd=2.1$ ). These data were not available for three children.

In addition to these standard measures, children were asked to estimate the number of days per week that they had engaged in aerobic exercise for a total of 60 minutes. The mean estimate at the start of the programme was 2.1 days ( $sd=1.6$ ) which had increased to 3.4 days ( $sd=1.7$ ) six months post intervention. Children were also asked to state the importance of physical activity to them on a scale of 1-10; pre-intervention the group mean score was 7.9, whilst post-intervention this score had increased to 9.1. Children were also asked about the amount of fruit and vegetables consumed daily. At the start of the intervention the mean score for this measure was 2.7 ( $sd=1.7$ ) which increased to 3.9 ( $sd=1.6$ ) at follow up.

**Long Term Follow Up:** As shown in Table 7, weight data was available for 7 participants at 3 month follow up and 3 participants at 6 month follow up. For those children who were followed up an increase of 3.3Kg (5.6%) can be seen at 3 months. By 6 months mean weight for those children still being followed up had increased by 4.8Kg (7.0%). However these numbers are very small and may not be representative of the group; given the small numbers significance of the change has not been calculated. The post-intervention weights of children who continued to 3 month follow up were lower (mean= 58.9, $sd=11.0$ ) than those who did not continue (mean= 68.8, $sd=19.7$ ), however this was not significant ( $t=1.87(14.4)$ ;NS).

**Table 7: Follow up physical outcome scores for Fun4Life**

<b>Measure</b>	<b>Post intervention mean (sd) (N=7)</b>	<b>3 month follow up mean (sd) (N=7)</b>	<b>Post 3 month follow-up mean (sd) (N=3)</b>	<b>6 month follow up mean (sd) (N=3)</b>
Weight (Kg)	58.9 (11.0)	62.2 (10.9)	67.8 (19.5)	72.6 (17.4)
BMI	25.7 (1.0)	26.5 (1.1)	26.5 (1.1)	26.4 (2.6)
BMI SD	2.6 (0.41)	2.7 (0.44)	2.7 (0.43)	2.7(0.29)
Waist Circumference (cm)	82.6 (5.4)	82.8 (7.2)	Not available	Not available

For those children who were followed up an increase in BMI of 0.8 points (3.1%) can be seen at 3 months, however by 6 months BMI has decreased by 0.1 (a decrease of 0.3%). BMI SD increased by 0.1 for those followed up at 3 months, but remained stable for those followed up at 6 months. Likewise waist circumference increased by 0.2cm over the 3 month follow up period, an increase of 3.8%. However, the small number of participants remaining at follow up must again be stressed.

## **Fitter Families**

Commissioned by the Directorate of Public Health NHS Stoke on Trent, the intervention is funded by Stoke PCT and run by the Stoke-on Trent School Nursing Service.

**Target group:** 6-16 year olds who are either overweight or obese and living in the Stoke area.

**Theoretical Rationale:** The programme was not based on any specific behaviour change theory. Content and structure was based on NICE clinical guidelines for obesity and individual staff experience of having previously run MEND programmes.

**Recruitment and retention:** Families usually referred by GP, School nurse, teacher or may self-refer. Recruitment is encouraged through publicity in schools and linking to school events (e.g. Health Promotion initiatives) and by raising health professional's awareness of the scheme. During the evaluation period a total of 50 children were recruited to the intervention of whom 5 were normal weight siblings. Of the 45 overweight/Obese children recruited to the intervention 40 children (89%) completed the programme. No data were available to allow any calculation of demographic or initial weight differences between completers and non-completers.

**Demographic profile:** During the evaluation period 24 female and 21 male children with a weight problem were recruited to the programme. Child participants were aged between 7-15 years (mean=10.9, sd=2.0; mode=12). The majority of children (98%) were White British, with the remainder (one child) being described as 'other'. Deprivation rates could not be calculated as no data was recorded that would allow this.

**Programme Structure:** Three programmes are run every year at local high schools. Each programme comprises 9 sessions, with each session lasting one and a half hours giving a maximum contact time of 13 and a half hours. Each

session includes education about nutrition and the opportunity to engage in physical activity. Healthy cooking classes are also provided. Families are actively encouraged to engage in the programme along with the target child, as this is primarily a family orientated intervention.

**Long term Support:** Ongoing support over 12 months. However the nature of this is dependent on family needs. Some families therefore have weekly home visits, whilst others request telephone contact and the child is followed up at school. However the child will be seen a minimum of 4 times throughout the year. Long term follow up data was available for 20 of the children seen during the intervention period, however measurements were all taken at different time points and were not always complete (for example weight but no height making it impossible to calculate BMI).

**Short-term effectiveness of the intervention:** As shown in Table 8, weight measurements at the end of the programme indicated that the mean weight of the group decreased 0.1Kg (0.18% decrease from baseline). Short term changes in weight were not statistically significant ( $t=.31(39);NS$ ). Effect size calculations indicated no notable practical significance at 95% confidence level for this difference ( $d=-0.01$ ,  $CI=-6.7-6.7$ ). A total of 9 children (22.5%) had lost weight (mean weight loss = 1.4Kg,  $sd=25.5$ ), 3 (7.5%) had no change in weight and 28 (70%) had gained weight (mean weight gain = 3.4Kg,  $sd=2.7$ ).

As height was not recorded for all participants at the end of the programme, change in BMI could only be calculated for 16 participants (see 8). Of these 12.5% showed a decrease in BMI (mean decrease = 0.85 points,  $sd=0.5$ ) with the remaining 87.5% showing an increase in BMI (mean increase -2.4 points,  $sd=1.5$ ). This increase was both statistically ( $t=-4.11(15);p<0.001$ ) and practically significant ( $d=-2.34,CI= -5.38-1.13$ ) - indicates a large practical difference). BMI SD remained unchanged. However as data were only available for 16 children it is likely that it is not representative of the group.

**Table 8: Pre and post intervention physical outcome scores for Fitter Families**

Measure	Pre-intervention group mean (sd)	Post-intervention group mean (sd)
Weight (Kg) (N=40)	67.7 (21.8)	67.6 (21.7)
BMI (N=16)	29.5(6.2)	32.2 (7.1)
BMI SD (N=16)	3.1 (.67)	3.1 (.66)

**Long Term Follow Up:** As shown in Table 9, weight data was available for 30 participants at 3 month follow up and 20 participants at 6 month follow up. For those who continued to be followed up mean weight had increased by 2.5Kg (3.8%) at 3 months however this was not statistically significant ( $t=-1.30(29)$ , NS). A small practical difference was found however ( $d=-0.99$ ,  $CI=-10.7-8.69$ ). At 6 months an increase of 2.2 Kg (3.0%) was seen and this was statistically ( $t=-4.66(19)$ ,  $p<0.001$ ) and practically significant ( $d=-0.99$ ,  $CI=-10.7-8.69$  – indicates a large practical difference). No significant difference was found between post-intervention weights of children who did (mean=66.4,sd=22.1) or did not continue to follow up (mean=71.1,sd=21.2);  $t=-.60(16.1)$ ;NS). No other measures were reported at long term follow up.

**Table 9: Follow up physical outcome scores for Fitter Families**

Measure	Post intervention mean (sd) (N=30)	3 month follow up mean (sd) (N=30)	Post 3 month follow-up mean (sd) (N=20)	6 month follow up mean (sd) (N=20)
Weight (Kg)	66.4 (22.1)	68.9 (22.5)	74.2 (22.2)	76.4 (22.1)

## GOALS

This programme was commissioned and funded by Sandwell PCT and the Working Neighbourhood Fund. The programme should run with three staff, but because of multiple community links and local interest in the programme pilot, 10 people were involved. The team comprised one overall co-ordinator responsible for organisation and monitoring, one physical activity co-ordinator, one assistant physical activity co-ordinator, two food co-ordinators, three 3 food workers and two Healthy Schools workers responsible for mentoring.

**Theoretical Rationale:** GOALS is based on a socialisation model of child behaviour, which states that the environment, including parental beliefs and behaviours will impact on child behaviour.

**Target group:** 8-13 year olds who are either overweight or obese and living in Sandwell.

**Recruitment and retention:** Referrals were from paediatricians, CAMHS and local schools. During the evaluation period a total of 7 children were recruited to the intervention and of these 6 children (85.7%) completed the programme.

**Demographic profile:** The seven participating children were aged between 8-14 years. No information is available about child gender, ethnicity or socio-economic status.

**Programme Structure:** One programme was run during the evaluation period. The programme comprised 18 sessions, with each session lasting two hours giving a maximum contact time of 36 hours. Session content varies but includes education about nutrition, advice on eating habits, food tasting, cooking skill development for parents and the opportunity to engage in a variety of physical activities including traditional activities (e.g. multi-activity sessions, sports skills) and a number of special tasters, including trampolining, indoor climbing, dance-mats and swimming. The non-judgemental whole family approach means that parents, siblings and grandparents are encourage to attend. Furthermore, some sessions are focused on the child only, others on the parents only.

**Long term Support:** All families have a personal mentor. Families are invited to follow up meetings with this mentor at three months and six months post-intervention. The aim of the sessions was to weigh and measure the child participant and discuss progress and reset goals. No six month data was available for analysis.

**Short-term effectiveness of the intervention:** Waist circumference decreased in all six children, with a mean decrease of 7.1cm from baseline. BMI stayed

constant for 5 of the children and was not available for one child. Self-reports indicated a decrease in consumption of unhealthy foods, an increase in physical activity and improved self-esteem and quality of life, however not enough information was available at baseline and follow up to permit comparisons to be made.

## **MEND**

Commissioning and funding bodies vary across the provision. The DHWM has commissioned and funded a large number of programmes. The Big Lottery Fund is another major funder of MEND Programmes in the West Midlands, as part of a national Well-being Grant awarded to MEND Central. Other funders and delivery organisations include PCTs, Sainsbury's supermarket, health and fitness operators, local community groups (e.g. the Football Foundation and the Youth Sports Trust) and county councils across the region.

**Target group:** 7-13 year olds who are either overweight or obese and living in Birmingham, Herefordshire, Sandwell, Shropshire, North Staffordshire, Stoke on Trent, Walsall, Warwickshire, Wolverhampton, Worcestershire, Coventry or Dudley.

**Theoretical Rationale:** The MEND programme was developed by a Consultant Clinical Psychologist and Specialist Paediatric Dietician in response to three guiding principles as follows:

(1) evidence from the literature describing outcomes of child obesity treatment programmes, including syntheses in the form of systematic reviews (Summerbell et al. 2003; Oude Luttikhuis et al. 2009);

(2) expert consensus in the form of published guidance and recommendations on best practice for the treatment of child obesity, specifically the National Institute for Health and Clinical Excellence (NICE) guidance for the prevention and treatment of child obesity (NICE, 2006);

(3) the possibilities for safely implementing a programme based on evidence and expert recommendation by using community settings to ensure the delivery of such a programme to the greatest number of families.

The programme aims to engage families through education, skills training and motivational enhancement techniques, underpinned by learning and social cognitive theories, to bring about individual-level behavioural change.

**Recruitment and retention:** Recruitment methods are varied across programme deliverer and include signposting from directories and websites, referrals from healthcare professionals, advertising in local papers, local health events and at leisure centres and GP surgeries, NCMP letters and through school events. A difference in recruitment can also be seen across the programmes: during the study period recruitment was highest in Wolverhampton (N=63), Dudley (N=39) and Shropshire (N=29); and lowest in Stoke (N=5), Bromsgrove (N=5) and Walsall (N=3). The low numbers in some areas make a comparison across regions difficult and the MEND figures have therefore been treated primarily as a homogeneous data set. However it may be useful for future studies to undertake further analysis to explain why this difference in recruitment rates exists.

During the evaluation period a total of 488 children were referred to the programme and of these 86% were recruited to the intervention (421 children). Of the 421 recruited to the intervention 252 children (59.8%) completed the programme. However, of these 13 were of normal weight upon starting the programme and so have been excluded from the rest of the analysis. No significant differences were found between completers and non-completers in terms of age ( $t=-1.41(587)$ ;NS), gender ( $X^2=3.66(1)$ ;NS), ethnicity ( $X^2=21.7(12)$ ;NS), presenting weight ( $t=.09(587)$ ;NS), or self-esteem ( $t=-.62(170.9)$ ;NS). However, a significant difference was noted in child behaviour, as measured by the parent reported SDQ Total difficulties scale ( $t=-2.03(237)$ ;  $p<0.05$ ). The mean score for this scale was higher for those not going on to complete the programme (mean=15.5, sd=6.3) than for those who did complete the programme (mean =12.7, sd=6.9).

**Demographic profile:** During the evaluation period 194 female and 227 male overweight or obese children were recruited to the programme. Child participants were aged between 7-15 years (mean=10.6, sd=1.81). Ethnicity was not recorded for the majority of children (58.6%). Of those for whom ethnicity was recorded, most were White British (49.4%), with the remainder being Mixed Race (4.49%), Asian (2.09%), Black (1.7%) or Chinese (0.4%). Deprivation rates as measured by the IMD ranged from 3.8-69.9 (mean=27.7; sd=16.2) suggesting that all families recruited to the programme were living in the most deprived 10% of LSOAs in England.

**Programme Structure:** More than 24 programmes are run every year across the different recruitment areas. Originally each programme comprised 18 sessions, with every session lasting two hours, giving a maximum contact time of 36 hours. From 2009, the programme increased to 20 sessions, giving a maximum contact time of 40 hours. Sessions run twice a week making this a highly intensive intervention. Each session includes education about nutrition and advice on eating habits, followed by an exercise class which includes team games such as tag. The educational component aims to teach children practical skills around nutrition, education about healthy food choices and behaviour change techniques using hands-on activities such as supermarket tours, recipe-tasting and food label reading. Parents are required to attend the educational part of the session, and then join a parental discussion group whilst the children are exercising.

**Long term support:** MEND families are supported for two years to make and maintain healthy lifestyle changes to help their child achieve a healthier weight. After completing the initial 10-week MEND phase of the intervention, families can continue to be motivated and supported by MEND World activities and resources. Resources and activities provided will differ depending on the programme deliverer and available local resources. Children are followed up where possible at 6 and 12 months post intervention. Follow up data was only available for 25 children at 6 months.

**Short-term effectiveness of the intervention:** Weight measurements at the end of the programme indicated that mean weight of the group decreased by 0.9 Kg, or 1.4% from baseline (see Table 10). These short term changes in weight were significant ( $t=5.21$  (238); $p<0.001$ ). Effect size calculations indicated that this change was small but of practical significance at 95% confidence level ( $d=-0.49$ ,  $CI=-1.86-2.83$ ). It was found that 130 children (54.4%) had lost weight (mean weight loss=2.0 Kg,  $sd=2.1$ ), 51 (21.3%) had no weight gain and 58 (24.3%) had gained weight (mean weight gain=1.6 Kg,  $sd=1.5$ ).

**Table 10: Pre and post intervention physical outcome scores for MEND**

Measure	Pre-intervention group mean (sd) (N=239)	Post-intervention group mean (sd) (N=239)
Weight (Kg)	62.2 (18.5)	61.3 (18.5),
BMI	28.3 (5.1)	27.4 (5.1),
BMI SD	2.9 (.61)	2.7 (.67)
Waist Circumference (cm)	89.3 (12.9)	87.0 (13.3)

Mean BMI decreased by 0.9 points, a 4.4% decrease from baseline (see 10). Short term changes in BMI were significant ( $t=11.5$  (238); $p<0.001$ ) and showed a large practical difference ( $d=1.25$ ,  $CI=0.6-1.9$ ). In total 151 (63.4%) of participants showed a decrease in BMI (mean reduction = 1.6,  $sd=1.01$ ), 63 (26.5%) showed no change in BMI and 24 (10.1%) showed an increase in BMI (mean increase=1.01,  $sd=0.6$ ). BMI SD decreased by 0.2 points, which was both statistically ( $t=11.7$ (237),  $p>.001$ ) and practically significant ( $d=1.17$ ,  $CI=1.09-1.26$ ; indicates a large practical difference).

Mean waist circumference decreased by 2.3cm, a reduction of 2.6% from baseline. Short term changes in waist circumference were significant ( $t=8.52$ (238); $p<0.001$ ). Effect size calculations indicated a moderate practical difference for this change ( $d=.79$ ,  $CI=-.86-2.48$ ). Furthermore 157 participants (66.2%) showed a decrease in Waist circumference (mean reduction=4.3cm,  $sd=2.9$ ), 29 (12.2%) showed no change in this measurement and 51 (21.5%) showed an increase in waist circumference (mean increase=3.0cm,  $sd=2.2$ ).

A number of MEND programmes also used the YMCA fitness test to assess cardiovascular fitness. Mean resting heart rate decreased significantly ( $t=6.8(98)$ ,  $p<0.001$ ) from 107.9( $sd=16.8$ ) pre-intervention to 97.5 ( $sd=15.2$ ) post intervention ( $N=99$ ), indicating an increase in cardiovascular fitness. This change also showed a large practical significance ( $d=0.98$ ,  $CI=-2.3-4.0$ ).

In addition children were asked a number of questions about how much physical activity they engaged in, their diet and self-esteem. As can be seen in Table 11, the amount of physical activity children reported engaging in had increased by the end of the intervention, whilst sedentary activity had decreased. The amount of fruit and veg consumed also increased. Global ChEAT scores increased, indicating a change in eating attitudes and behaviours; as noted earlier whilst this change would usually be interpreted as indicating an increase in maladaptive eating behaviours, for children participating in weight management programmes this is more likely to indicate self-restriction of energy dense foods which is a positive behaviour for this group.

Self esteem and body image also improved. Finally parents reported an improvement in behaviour (SDQ scores reduced from 13.0( $sd=6.8$ ) to 9.9 ( $sd=5.7$ ). The only difference in these measures to reach significance was the SDQ ( $t=9.33(238)$ ;  $p<0.001$ ).

**Table 11: Pre and post intervention behavioural outcome scores for MEND**

Measure	Pre-intervention group mean (sd)	Post-intervention group mean (sd)
Physical Activity ( <b>N=237</b> )	11.0 (7.0)	16.1 (9.7)
Number of days doing 60+ minutes of exercise ( <b>N=237</b> )	1.3 (1.6)	2.9 (1.9)
Sedentary Activity ( <b>N=237</b> )	17.3 (12.3)	10.6 (7.5)
Portions of Fruit and Veg consumed daily ( <b>N=215</b> )	2.8 (1.5)	3.9 (1.4)
Strengths and Difficulties Questionnaire (parent report) ( <b>N=207</b> )	13.0 (6.8)	9.9 (5.7)
About my body ( <b>N=178</b> )	8.6 (5.4)	12.4 (6.4)
What I think about me (Self-esteem) ( <b>N=87</b> )	15.9 (7.4)	19.3 (6.5)
About my eating (ChEAT) ( <b>N=56</b> )	15.1 (12.4)	16.2 (11.5)

**Long Term Follow Up:** As shown in Table 12, weight data was available for 25 participants at 6 month follow up. By 6 months for those children who continued to follow up, mean weight had increased by 1.3 Kg or 2.2%. This increase was not statistically significant ( $t=-2.0(24)$ ;NS), but suggested a moderate practical difference ( $d=-.69$ ,  $CI=-8.2-6.6$ ). No significant difference was found between the weights of children who did (mean= 60.3,sd=19.1) or did not continue to follow up (mean= 61.5,sd=18.1);  $t=-.33(29.5)$ ;NS).

A decrease in BMI of 0.1 points from baseline was also seen at 6 months. However this was not statistically ( $t=.52(24)$ ;NS) or practically significant( $d=.12$ ,  $CI=-2.11-2.43$ ). No difference was seen in BMI SD.

Waist circumference increased by .4 cm or 0.5% from baseline to 6 month follow up. This was not statistically ( $t=-.54(24)$ ;NS) or practically significant ( $d=-.16$ ,  $CI=-4.91-4.78$ ).

Heart rate increased from 94.9 (sd=10.6) to 97.8 (12.4) for the 14 children for whom follow up data is available. However this was not statistically significant ( $t=0.3(13)$ ;NS) and only of small practical significance ( $d=.31$ ,  $CI=-5.9-6.1$ ).

**Table 12: Follow up physical outcome scores for MEND**

Measure	Post intervention mean (sd) (N=25)	6 month follow up mean (sd) (N=25)
Weight (Kg)	60.3 (19.1)	61.6 (18.7)
BMI	27.6 (sd=5.7),	27.5 (5.9)
BMI SD	2.7 (.59)	2.7 (.63)
Waist Circumference (cm)	84.1 (12.1)	84.5 (12.6)

### **Comparison across MEND programmes**

As noted above differences in recruitment across regions meant that any comparative analysis within the MEND programme would be limited. Combining funders within a region meant that it was possible to undertake this analysis with six regions: Dudley, Hereford, Shropshire, North Staffordshire, Wolverhampton and Worcestershire. Numbers for follow up were however too small to provide a meaningful comparison: Worcestershire and Dudley had no follow up data;

Hereford, Shropshire and North Staffordshire had follow up data for seven children; and Wolverhampton had follow up data for three children .

Table 13 shows the pre and post intervention means for weight related outcomes these areas. The highest starting BMI/BMI SD were seen in Dudley, Hereford and Wolverhampton. All measures decreased from pre to post intervention. Changes in weight were significant for Dudley and Staffordshire programmes only, whilst decreases in BMI were significant for all regions. Changes in BMI SD were significant for all areas except Wolverhampton. Finally decreases in waist measurements were significant for all except the Shropshire programme.

**Table 13: Comparison of physical outcomes for MEND regions**

Measure	Dudley mean (sd) (N=33)	Hereford mean (sd) (N=25)	Shropshire mean (sd) (N=19)	N. Staffordshire mean (sd) (N=33)	Wolverhampton mean (sd) (N=49)	Worcestershire mean (sd) (N=38)
Pre intervention Weight (Kg)	75.5 (19.6)	67.7 (14.5)	58.2 (17.1)	54.2 (14.0)	73.4 (21.8)	56.0 (14.1)
Post intervention Weight (Kg)	73.3 (20.7)***	67.3 (15.0)	57.9 (17.3)	52.4 (13.9)***	72.9 (21.6)	55.5 (14.0)
Pre intervention BMI	31.3 (5.5)	30.6 (4.7)	27.7 (5.0)	26.5 (4.6)	30.6 (5.84)	26.2 (3.4)
Post intervention BMI	29.6 (5.7)***	29.8 (5.1)***	27.3 (5.2)*	24.9 (4.5)***	29.9 (5.8)*	25.3 (3.2)***
Pre intervention BMI SD	3.1 (.75)	3.1 (.62)	2.9 (.53)	2.7 (.59)	3.0 (.56)	2.6 (.54)
Post intervention BMI SD	2.9 (.9)***	2.9 (.7)***	2.8 (.6)**	2.4 (.7)***	3.0 (.6)	2.5 (.6)***
Pre intervention Waist (cm)	96.3 (11.1)	91.1 (10.7)	85.0 (13.2)	84.6 (12.5)	98.0 (14.3)	84.1 (9.5)
Post intervention Waist (cm)	94.3 (11.1)***	89.8 (11.7)	84.3 (13.3)	81.1 (13.1)***	95.4 (15.2)**	82.6 (8.7)*

\* difference to baseline significant at P<0.05; \*\*difference to baseline significant at P<0.01;

\*\*\*difference to baseline significant at P<0.001

## **One Body One Life (OBOL)**

Commissioned and funded by Coventry City Council and Coventry PCT, each group has a lifestyle coach and a health and physical activity leader. In addition, there is a community nutritionist based in the New Deal Communities (NDC) project.

**Theoretical Rationale:** One Body, One Life is based on goal setting theory which states that under certain conditions, setting specific difficult goals leads to higher performance when compared with no goals or vague, non-quantitative goals, such as "do your best" (Strecher et al., 1995) More recently, OBOL has been working with the University of Warwick to try Neuro-linguistic programming (NLP). NLP is a model of interpersonal communication which seeks to educate people in self-awareness and effective communication, and to change their patterns of mental and emotional behaviour. The programme is also based on NICE guidelines for obesity.

**Target group:** This programme differs to the others included in this evaluation as it is aimed at families where one or more members are an unhealthy weight (underweight, overweight or obese), not just children. In order to compare to the other programmes included in the evaluation, this report focuses primarily on the children recruited to the programme who were aged between 7-16 years.

**Recruitment and retention:** The team focus on recruiting through talks at schools and community groups. The focus of this recruitment is on healthy lifestyle rather than weight management per se. During the evaluation period a total of 800 individuals were recruited to the intervention, of whom 629 (78.6%) completed the programme. However these figures include adults and other family members, not just children. A total of 123 children with weight problems (under- and overweight) completed the programme, of whom 89 were overweight or obese.

No significant differences were found between completers and non-completers in terms of gender ( $X^2=1.23(1);NS$ ), or ethnicity ( $X^2=11.6(12);NS$ ). However mean age was found to be significantly different for completers and non-completers ( $t=-$

4.24(119),  $p < 0.001$ ), with non-completers more likely to be older (mean age=12 years (sd=2.6) than completers (mean age=9.8 years(sd=1.5)). Presenting weight was also found to be significantly different for completers and non-completers ( $t = -2.17(119)$ ,  $p < 0.05$ ), with non-completers more likely to be heavier (mean weight=57.2Kg (sd=18.7) than completers (mean weight=50.2Kg(sd=14.3)).

**Demographic profile:** During the evaluation period 57 female and 66 male children with weight problems completed the programme. Child participants were aged between 7-15 years (mean=9.75, sd=1.63). The majority (58.5%) were White British, with the remainder being Mixed Race (13.0%), Asian (7.3%) or Black (9.7%). This information was missing for the remaining 10.6% of the sample. Deprivation rates as measured by the IMD ranged from 5.42-80.34 (mean=41.17; sd=17.16) suggesting that all families recruited to the programme were living in the most deprived 10% of LSOAs in England.

**Programme Structure:** Thirty programmes are run every year. Each programme comprises 8-11 sessions, with each session lasting two hours giving a maximum contact time of 22 hours. Each session includes education about nutrition and advice on eating habits, monitoring and individual goal setting and group physical activity. The whole family is encouraged to attend the sessions and to join in the physical activities as well. Activities include typical school team games such as basketball, rounders, football and cricket as well as other activities tailored to the preferences of the group. Low impact activities are also available for physically disabled or older groups of children (e.g. Tai Chi).

**Long term Support:** A three month follow up is carried out with families over the phone. Families are asked about the exercise they are doing, increases in fruit and vegetable consumption and so on. Whilst this data was available it was not matched to individuals and so has not been included here. No objective data on weight or BMI is available at follow up.

**Short-term effectiveness of the intervention:** Weight measurements at the end of the programme indicated that the mean weight for the overweight and obese children on the programme had increased by 0.2Kg or 0.4% from baseline

(see Table 14). Short term changes in weight were not significant ( $t=-.12(88)$ ;NS). Effect size calculations indicated that this change was not of practical significance either ( $d=-0.06$ ,  $CI=-3.0-2.9$ ). Weight had reduced for 19 (20.9%) children (mean weight loss = 1.3Kg,  $sd=3.5$ ), 21 had no weight gain (23.1%) and 49 (53.8%) had gained weight (mean weight gain = 2.9Kg.  $sd=23.1$ ).

Mean BMI decreased by 0.4 points, a reduction of 1.7% from baseline (see Table 14). Short term changes in BMI were not statistically ( $t=1.18(88)$ ;NS) or practically significant ( $d=0.17$ ,  $CI=-0.7-1.2$ ). BMI had decreased for 20 (21.9%) participants (mean reduction = 2.8 points), 50 showed no change in BMI (54.9%) and 16 (17.7%) showed an increase in BMI (mean increase = 1.0 point). BMI SD decreased by 0.1, which was not statistically significant ( $t=1.5(88)$ ;NS). However effect size calculations indicated a small practical difference ( $d=.25$ ,  $CI=.10-.42$ ).

Mean waist circumference increased by 2.1cm, an increase of 2.7% from baseline (see Table 14). Short term changes in waist circumference were not significant ( $t=-1.30(88)$ ;NS). However effect size calculations indicated a small practical difference ( $d=-0.27$ ,  $CI=-3.5-2.1$ ). A total of 36 participants (39.6%) showed a decrease in Waist circumference (mean reduction=2.4cm,  $sd=1.7$ ), 10 showed no change (10.9%) and 32 (35.2%) showed an increase in this measurement (mean increase = 7.9cm,  $sd=17.2$ ).

**Table 14: Pre and post intervention physical outcome scores for OBOL overweight children**

<b>Measure</b>	<b>Pre-intervention group mean (sd) (N=89)</b>	<b>Post-intervention group mean (sd) (N=89)</b>
Weight (Kg)	50.2 (14.3)	50.4 (14.4)
BMI	23.6 (4.1)	23.2 (4.8)
BMI SD	2.2 (.7)	2.1 (.8)
Waist Circumference (cm)	78.0 (15.7)	80.1 (11.5)

Weight measurements at the end of the programme indicated that of the children who were underweight 20 (62.5%) had gained weight, 10 (31.3%) had no change in weight and 2 (6.3%) had lost weight. BMI had increased for 8 children (25%), remained the same for 22 (68.8%) and had decreased for 2 children (6.3%).

Furthermore 10 children (31.2%) showed an increase in Waist circumference, 2 (6.3%) showed no change and 20 (62.5%) showed a decrease in waist circumference.

Physical activity measures concerned issues such as the number of times the participant had taken part in physical activity for more than 30 minutes over the past week. Mean score at baseline was 8.7 (sd=6.8) which increased to 11.0 (sd=9.4) at the end of the intervention. In addition, OBOL measure resting heart rate and blood pressure. Heart rate increased from 89.4 (sd=14.2) to 90.3 (sd=15.6), however this change was not significant ( $t=-0.47(81)$ ;NS).

Children were also asked about the number of portions of fruit and vegetables eaten daily. Mean score at baseline was 2.9 (sd=6.8) which had increased to 3.6 (sd=1.5) at the end of the intervention.

### **Physical Outcomes for Adult Participants**

Data was available for 87 adults who had attended relevant OBOL venues during the evaluation period. The majority of these adults (N=78) were female and ages ranged from 18-56 years. Weight related outcomes pre and post intervention are presented in Table 15. Unfortunately it was not possible to match the adult participants to the children attending OBOL, so the relationship between parent and child weight cannot be explored here. Weight and BMI both decreased across the intervention, by 0.4Kg and 0.2 points respectively. Only waist circumference showed a significant change, decreasing by 1.9cm, a change of 2% from baseline.

**Table 15: Pre and post intervention physical outcome scores for OBOL Adults**

<b>Measure</b>	<b>Pre-intervention group mean (sd)</b>	<b>Post-intervention group mean (sd)</b>
Weight (Kg) <b>(N=87)</b>	76.6 (17.6)	76.4 (17.4)
BMI <b>(N=84)</b>	29.2 (5.9)	29.0 (5.9)
Waist Circumference (cm) <b>(N=84)</b>	95.1(19.0)	93.2 (18.5)*

Difference from baseline is significant at  $p<.001$

## **Watch It!**

Commissioned by the three Birmingham PCTs, this programme is funded by the PCTs and delivered by a team of Watch It! Trainers (non-health professionals) who are supervised by the Watch It! Programme Manager. The trainers are also provided with additional support and supervision by the programme's Psychologist, Dietician and Paediatric Consultant. Each session is run by two Lifestyle coaches and one physical activity leader.

**Theoretical Rationale:** This programme uses a solution focussed approach to behaviour change through motivational interviewing/coaching and behaviour modification techniques. It is therefore based on the Transtheoretical Model of behaviour change (Prochaska & Velicer, 1997). Described as an 'innovative Healthy Eating Lifestyle Programme (HELP)' the programme aims to change eating behaviour and attitudes, increase healthy eating and daily activity levels and reduce sedentary behaviour through one-to-one counselling.

**Target group:** 8-16 year olds who are obese (BMI>98<sup>th</sup> centile) and living in the Birmingham area. Watch It! therefore provides a specialised intervention programme, which is targeting children at the most severe end of the spectrum.

**Recruitment and retention:** A range of recruitment methods are used including advertising in schools, leisure centres and community centres, presentations to healthcare professionals and participation in school events (e.g. open days/health weeks. An ad van was also used during 2007 to target hard to reach areas, but was not deemed helpful. Most participants are recruited either through advertising (self referral) or are referred by healthcare professionals including health visitors, school nurses, dieticians and GPs. During the evaluation period a total of 314 children were invited to the intervention, of whom 161 were recruited to the programme. Of these, 53 children had (32.9%) completed the initial bronze level of the programme by the time of the evaluation. No significant differences were found between completers and non-completers in terms gender ( $X^2=.10(1)$ ;NS), ethnicity ( $X^2=18.2(16)$ ;NS), presenting weight ( $t=.60(124)$ ;NS) or self-esteem ( $t=-1.3(20)$ ;NS). A difference was noted in terms of age ( $t=2.03(159)$ ;

$p < .05$ ), with non completers (mean age= 10.0, sd=1.5) more likely to be older than completers (mean age=9.5 years, sd=1.14).

**Demographic profile:** During the evaluation period 30 female and 23 male obese children completed the bronze level of the programme. Participants were aged between 8-12 years (mean age = 10.2 years, sd = 1.1)). Data concerning ethnicity was missing for 2 (3.8%) participants. The majority of the remaining 51 children were Asian (N=24), Other (N=15) or White British (12). Deprivation rates as measured by the IMD ranged from 8.0 -76.2 (mean=46.59; sd=20.65), suggesting that all families recruited to the programme were living in the most deprived 10% of LSOAs in England.

**Programme Structure:** Twelve programmes run simultaneously every year. Eleven of these are run for 8-11 year olds and one based in South Birmingham is run specifically for 12-16 year olds. It is a year long programme which is divided into three phases: bronze, silver and gold. Families initially commit to attend for 3 months (the bronze phase) with an option to renew 3-monthly for a year. The bronze phase comprises 12 sessions, with each session lasting one and a half hours giving a maximum contact time of 24 hours. Participants are able to book weekly sessions, choosing from four available time slots. The first part of each session involves a one-to-one with a lifestyle coach and includes education about nutrition, advice on eating habits, monitoring and individual goal setting. This is followed by physical activity based on team games such as tag. The one-to-one nature of the coaching session means that participants can miss a week of contact without missing one of their 12 sessions. The intervention does not therefore run in a set period of weeks and individuals can take different lengths of time to complete the programme. Parents are required to attend the educational part of the session and siblings can join in the activities as long as there is space and they are of an appropriate age (this relates to liability insurance). This evaluation focuses primarily on the bronze level of the programme, as at the time of the evaluation only 17 out of the 161 participants recruited had completed all of the year long programme (Gold). It also allowed for closer comparison to other programmes.

**Long term Support:** On completion of the initial 12 sessions, participants are said to have reached bronze level. They are then able to work up to silver and gold level, which comprise 10 sessions and 7 sessions respectively, as outlined. Completion of all three phases can take up to 12 months. Data for silver and gold levels were available for 25 and 17 children respectively. Post-programme follow-up is offered to families 6 months after the completion of gold level.

**Short-term effectiveness of Bronze level:** Mean BMI increased by 0.3 points, a gain of 1.1% from baseline (see Table 16). Short term changes in BMI were not significant ( $t=-1.68(49)$ ;NS). However effect size calculations indicated a moderate practical significance ( $d=0.59$ ,  $CI=-0.71-2.0$ ). BMI had decreased for 22 (42.3%) participants (mean reduction = 0.9 points,  $sd=0.7$ ), 3 showed no change in BMI (5.8%) and 28 (53.9%) showed an increase in BMI (mean increase = 1.2 point,  $sd=0.9$ ). BMI SD decreased by 0.1 point a reduction of 1.1% is from baseline. This decrease was significant both statistically ( $t=2.08(49)$ , $p<0.05$ ) and practically ( $d=0.81$ ,  $CI=0.7-0.9$ ).

Mean waist circumference increased by 0.5cm, an increase of 0.6% from baseline (see Table 16). Short term changes in waist circumference were not statistically ( $t=-0.57$  (41); NS) or practically significant ( $d=-0.13$ ,  $CI=-3.6-3.7$ ). A total of 21 participants (48.8%) showed a decrease in waist circumference (mean reduction=4.3cm,  $sd=3.9$ ), and the remaining 22 (51.2%) showed an increase in this measurement (mean increase = 4.7cm,  $sd=3.1$ ).

**Table 16: Pre and post bronze level physical outcome scores for Watch It!**

Measure	Pre-bronze group mean (sd)	Post-bronze group mean (sd)
BMI (N=50)	28.5 (4.8)	28.8 (5.2)
BMI SD (N=50)	3.0 (0.5)	2.9 (0.6)
Waist Circumference (cm) (N=43)	87.5 (11.4)	88.0 (12.6)

Physical activity was assessed by asking about the total number of activities engaged in over the previous week. This increased from 26.8 ( $sd=17.9$ ) at baseline to 32.4 ( $sd=21.5$ ) at the end of the bronze level. In addition children took a step test as a measure of cardiovascular fitness. This increased

significantly ( $t=-6.7(33)$ ,  $p<0.001$ ) from 103.3 (sd=18.4) steps at the start of the intervention to 118.7 (17.6) steps at the end of bronze level.

Watch It! asked a range of questions about diet including how many portions of fruit and vegetables were consumed daily. Pre intervention the mean for the group was 7.0 (sd=4.2) which increased to 8.3 (sd=3.9) on the completion of bronze level.

Children also completed a measure of HRQoL (PedsQL™), and a measure of self-esteem. As Table 17 shows, HRQoL improved by 4.7 points over the course of bronze level of the intervention (7.2% increase from baseline). Self-esteem also increased by 0.2, an improvement of 7.1% from baseline.

**Table 17: Pre and post intervention psychosocial wellbeing scores for Watch-it**

Measure	Pre-intervention group mean (sd)	Post-intervention group mean (sd)
PedsQL™ Total Score (N=48)	65.2(16.9)	69.9 (17.9)
Global Self-esteem (N=40)	2.8 (0.7)	3.0(0.7)

**Silver and Gold level outcomes:** As shown in Table 18, data was available for a number of participants at silver level and gold level. An increase in BMI of 0.5 points from can be seen at silver and gold levels. BMI SD stayed the same at silver level and increased by 0.1 at gold level. Likewise waist circumference increased by 2.6 cm at silver level and 1.5 cm at gold level. The only change of significance was the increase in BMI at gold level.

**Table 18: Silver and Gold physical outcome scores for Watch It!**

Measure	Post bronze level mean (sd)	Silver level group mean (sd)
BMI (N=25)	29.9 (5.5)	30.4 (6.1)
BMI SD (N=25)	3.0 (0.5)	3.0 (0.7)
Waist Circumference (cm) (N=21)	91.4 (14.4)	94.0 (13.3)
	Post silver level group mean (sd)	Gold level group mean (sd)
BMI (N=17)	29.4 (5.0)	29.9 (5.3)*
BMI SD (N=17)	2.9 (0.60)	3.0 (0.5)
Waist Circumference (cm) (N=16)	90.8 (9.8)	92.3 (9.0)

\* difference to baseline significant at  $P<0.05$ ;

## **YW8?**

This programme is commissioned by the Senior Health Improvement Manager (Obesity and Nutrition) for Telford and Wrekin PCT and is funded through the Local Delivery Plan. Each session is delivered by a YW8? Mentor with the following competencies: basic knowledge of nutrition and physical activity; experience of facilitating groups; experience of working with children and families; communication skills; trained in behaviour change techniques; knowledge of positive parenting skills.

**Theoretical Rationale:** This programme uses Intervention Mapping (IM) (Bartholomew et al., 2006) methodology as a structured approach to designing, implementing and evaluating a public health study. The purpose of IM is to provide health promotion programme planners with a framework for effective decision making at each step in intervention planning, implementation and evaluation. The process produces a framework that links the determinants of particular health behaviours with performance objectives and strategies to be incorporated into the programme design.

**Target group:** Families of 8-13 year olds who are either overweight or obese and living in the Telford and Wrekin area.

**Recruitment and retention:** A variety of recruitment methods have been used including advertising in GP surgeries, leisure centres and schools, leafleting during health and community events, editorials in the local press, a feature on local radio, referral from CAMHs, NCMP letters and via adults already signed up to weight management programmes. No one method has proved to be most effective, however asking adults already signed up to weight management programmes if they have any children or grandchildren they are concerned about was reported to be quite successful, along with self-referrals resulting from word of mouth. However the least successful appeared to be the local radio feature and NCMP letters. A total of 600 letters were sent out by the PCT which generated 14 responses, mainly complaints; a total of 3 families joined YW8? as a result of these letters.

During the evaluation period a total of 70 children were recruited to the intervention and of these 46 children (66%) completed the programme. No significant differences were found between completers and non-completers in terms age ( $t=-1.89(69)$ ;NS), gender ( $X^2=.41(1)$ ;NS), presenting weight ( $t=.69(69)$ ;NS), self-esteem ( $t=.95(66.7)$ ; NS) or parental motivation when enrolling in the programme ( $t=.33(69)$ ;NS).

**Demographic profile:** During the evaluation period 46 male and 24 female overweight or obese children were recruited to the programme. Child participants were aged between 8-15 years (mean=10.9, sd=1.37). Ethnicity was not recorded for any of the children. Deprivation rates as measured by the IMD ranged from 3.98-61.10 (mean= 26.77, sd=14.27) suggesting that all families recruited to the programme were living in the most deprived 10% of LSOAs in England.

**Programme Structure:** Three programmes are run every year. Each programme comprises 12 sessions, with each session lasting two hours giving a maximum contact time of 24 hours. The first hour of the session is an interactive healthy eating workshop for the whole family which provides education about nutrition and advice on eating habits. This is followed by an hour of physical activity for the children; whilst the parents join a discussion group which covers issues such as how to make changes at home, how to help the child make healthier choices and positive parenting. Additional activities are also provided including healthy eating cooking classes and non-contact boxing classes.

**Long term Support:** Free family activity programmes are available at local leisure centres upon completion of the intervention.

**Short term effectiveness of the intervention:** Weight measurements at the end of the programme indicated that the mean weight for the group had decreased by 0.7Kg or 1.0% from baseline (see Table 19). Short term changes in weight were statistically ( $t=2.26(45)$ ;  $p<0.05$ ) and practically significant ( $d=.34$ ,  $CI=-5.64-6$  – indicating a small practical difference). A total of 25 children (54.3%), had lost

weight (mean weight loss = 2.1Kg, sd=2.0), 9 (19.6%) had no weight gain and 12 (26.1%) had gained weight (mean weight gain = 1.0Kg, sd=1.0).

Mean BMI decreased by 0.7 points, a reduction of 2.5% from baseline (see Table 19). Short term changes in BMI were significant ( $t=6.15$  (45); $p<0.001$ ) and effect size demonstrated a large practical difference ( $d=1.32$ ,  $CI=-0.47-3.03$ ). BMI had decreased for 29 (63%) participants (mean reduction = 1.2 points,  $sd=0.6$ ), 14 (30.4%) showed no change in BMI and 3 (6.5%) showed an increase in BMI (mean increase = 1.0 point,  $sd=0.5$ ).

**Table 19: Pre and post intervention physical outcome scores for YW8?**

Measure	Pre-intervention group mean (sd)	Post-intervention group mean (sd)
Weight (Kg) (N=46)	67.1 (20.7)	66.4 (20.3)
BMI (N=46)	29.2 (6.2)	28.4 (5.9)
BMI SD (N=46)	2.9 (.7)	2.8 (.7)

YW8? asked a range of questions about the amount of exercise engaged in. The mean score for this measure was 14.5 ( $sd=3.1$ ) at baseline, increasing to 19.7 ( $sd=2.1$ ) at the end of the intervention. In addition families kept a food diary which gave information about fruit and vegetable consumption. This data was not readily available for analysis, however the programme lead reported that pre-intervention children consumed 1.5 portions of fruit and vegetables, increasing to 3.3 portions post-intervention (an increase of 1.8 portions).

**Long Term Follow Up:** As shown in Table 20, weight data was available for 7 participants at 6 month follow up. By 6 months mean weight for those still being followed up had increased by 5.4 Kg or 8.4%. No significant difference was found between initial weights of children who did (mean= 64.3, $sd=16.4$ ) or did not continue to follow up (mean= 66.7, $sd=21.3$ );  $t=-.34(9.9)$ ;NS).

BMI increased by 0.3 points from baseline, however BMI SD remained constant. No other measures were reported at long term follow up.

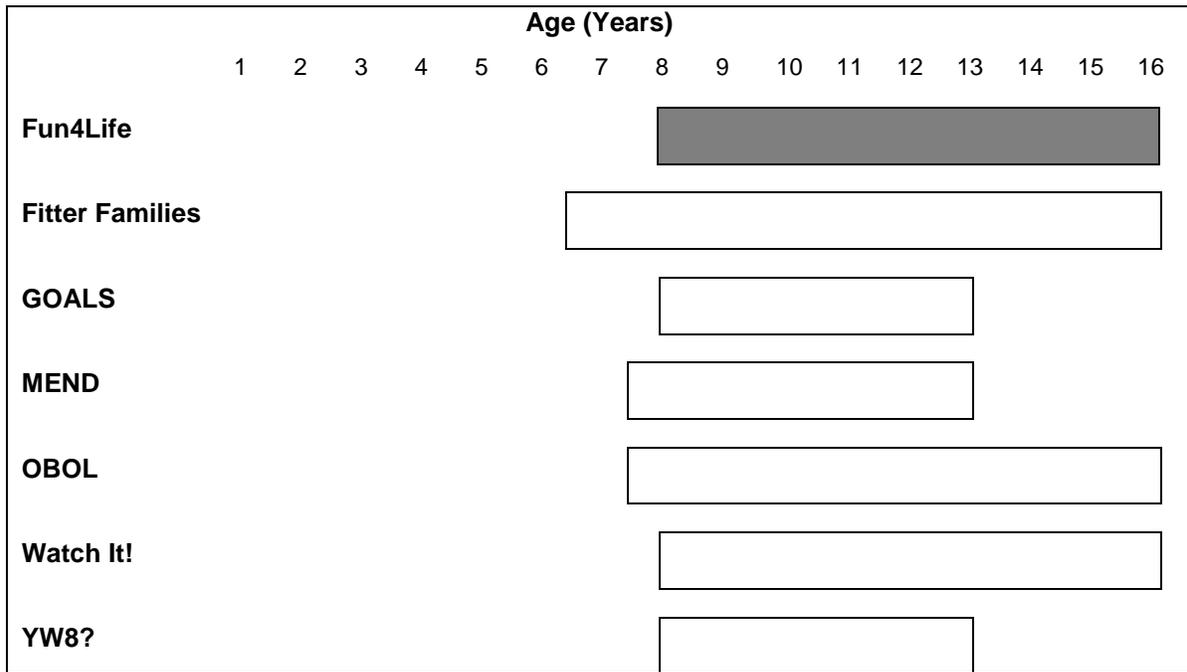
**Table 20: Follow up physical outcome scores for YW8?**

<b>Measure</b>	<b>Post-intervention group mean (sd) (N=46)</b>	<b>6 month follow up mean (sd) (N=7)</b>
Weight (Kg) (N=7)	64.3 (20.3)	69.7 (18.8)
BMI (N=7)	27.0 (4.8)	27.3 (5.8)
BMI SD (N=7)	2.6 (.7)	2.6 (.8)

## Comparison of Programmes

The age range targeted by the programmes was between 6 and 16 years old. This varied between groups (see Figure 1) with Fitter Families the only intervention that covered the full age range. The age range covered by all groups was 8-13 years. In general the demographics of groups were also similar with regard to child gender, ethnicity (mainly White British) and family deprivation (within the 10% of highest deprivation in England).

**Figure 1: Age Range Covered by Each Intervention**



Retention rates varied by intervention. All programmes with the exception of Watch It!, at Bronze level, had a retention rate of over 50%. Fitter families had the best retention rate at 89%.

Programmes also differed regarding success in collecting long term follow up data. The most successful programme in terms of long term follow up was Fitter Families who had 75% retention at 3 months, dropping to 50% at 6 months. The least successful programme for follow up was MEND, who were able to provide data for 10.5% of participants at 6 months (see table 21).

**Table 21: Retention rates for each programme**

<b>Programme</b>	<b>Retention rate at end of intervention % (N)</b>	<b>Completers returning at 3 month follow up % (N)</b>	<b>Completers returning at 6 month follow up % (N)</b>
Fun4Life	52 (45)	15.6 (7)	6.67 (3)
Fitter Families	89 (40)	75 (30)	50 (20)
GOALS	85.7 (6)	NA	NA
MEND	59.8 (239)	NA	10.5 (25)
OBOL	78.6 (629)*	NA	NA
Watch It!	32.9 (53)	47.3 (25)	32.1 (17)
YW8?	66 (46)	NA	15.2 (7)

\*includes all family members, not just children

Weight status was the main inclusion criteria used by all the programmes. All programmes targeted obese children (defined by being over the 95<sup>th</sup> centile for their age and gender). Four groups also included those that were overweight and seen at risk of becoming obese (See Table 22). One Body One Life was the most inclusive of all targeting anyone who was not a healthy weight, thus including underweight children as well as adults with weight problems in their remit.

**Table 22: Admission/Exclusion Criteria Applied by the programmes**

<b>Programme</b>	<b>Admission Criteria</b>	<b>Exclusion Criteria</b>
Fitter Families	<ul style="list-style-type: none"> <li>• Overweight/obese children</li> <li>• School age (6-16)</li> <li>• Adult family member must attend</li> </ul>	<ul style="list-style-type: none"> <li>• Must be physically able to participate</li> </ul>
Fun4Life	<ul style="list-style-type: none"> <li>• 8-16yrs</li> <li>• Overweight or obese</li> <li>• Includes family members</li> </ul>	<ul style="list-style-type: none"> <li>• Not suitable for underweight participants</li> </ul>
GOALS	<ul style="list-style-type: none"> <li>• 8-13 years</li> <li>• &gt;95<sup>th</sup> Centile</li> </ul>	
MEND	<ul style="list-style-type: none"> <li>• 7-12 years</li> <li>• Overweight or obese</li> <li>• Adult family member to attend</li> </ul>	
One Body One Life	<ul style="list-style-type: none"> <li>• Someone in family has a weight problems (under or over normal weight)</li> </ul>	<ul style="list-style-type: none"> <li>• Children with learning difficulties will be referred to a specific programme</li> <li>• Physical disabilities are referred to programmes with low impact exercise</li> </ul>
Watch It!	<ul style="list-style-type: none"> <li>• 8-11 years</li> <li>• &gt;98<sup>th</sup> centile</li> <li>• Registered with GP in catchment area</li> <li>• Be able to attend with parent/carer</li> </ul>	<ul style="list-style-type: none"> <li>• Those with significant learning disabilities or behaviour difficulties</li> </ul>
YW8?	<ul style="list-style-type: none"> <li>• 8 – 13 years of age</li> <li>• &gt;91<sup>st</sup> Centile</li> <li>• Parent/carer to attend too</li> </ul>	<ul style="list-style-type: none"> <li>• Complex learning or behavioural difficulties</li> </ul>

All programmes included an educational and a physical exercise component for the children. Although they all required at least one parent or guardian to be involved, programmes varied on whether the whole family were included and the extent of their involvement. Thus Fun4Life, Fitter families GOALS, On Body One Life and YW8 actively encouraged the whole family to attend, whilst MEND and Watch It! required a parent or guardian to be involved in the educational session, but not the physical activities. However, Watch It! allowed siblings to participate if there was enough room in the class and they were within their age limit for liability insurance purposes.

Although MEND and YW8? excluded parents from the activity session, they did use the children's exercise time for parents to engage in further discussion and learning. YW8? also used this session to teach positive parenting skills.

The educational components all included a dietary and nutritional element, looking at eating habits and alternative strategies. In addition, Fitter Families, GOALS and YW8? all gave their clients an opportunity to participate in healthy eating cooking classes. GOALS also included an additional section for an inclusive group discussion on sensitive topics such as bullying. All interventions included goal-setting as part of the weekly session. Watch It! provides 30 minutes of one-to-one counselling every session, for goal setting and associated activities. GOALS included a discussion at the beginning about the importance of setting SMART (attainable) goals. The theory sessions also included confidence building activities and Watch It! facilitated sessions on positive thinking and finding ways to overcome fears, temptations and taunts.

Long term support also varies across the programmes. Thus Fun4Life and GOALS introduce a variety of activities that the children will have access to when they leave in the hope that each will find an activity that they will want to continue with beyond the intervention, such as swimming or trampolining. MEND and Watch It! use a series of short team based games such as tag to motivate the children to run around and interact.

Watch It! differs from the other programmes in that the main intervention has a further two levels available for participants that complete their initial Bronze level. The child and parent/carer can continue with the exercise and lifestyle coaching until they complete the Gold level which takes about a year. A post programme follow up is offered six months after completion of Gold level.

Activ8 family exercise sessions run at a local leisure centre and are free to those participating in or having completed the YW8? programme.

Fun4Life aims to sustain continued contact with their graduates until the age of 16. This is supported through Walsall's wider Way4Ward exercise team.

Graduates of their intervention are able to continue to participate in physical activities for a small fee although they were also encouraged during the programme to find a mainstream activity to continue with also. As well as this, Fun4Life organise quarterly events such as canoeing or assault courses where previous and current participants are welcome to attend.

Part of GOALS intervention plan is that their graduates get a session with their personal mentor to reset goals at 3 and 6 months post intervention. Actual details of this for the programme in Sandwell were unavailable.

### **Barriers to Change**

Table 23 shows the most common reasons given by intervention participants for either not starting or not completing a programme. As can be seen lack of commitment from the child was the most common reason provided.

**Table 23: Reasons for not starting programme or for non-completion**

<b>Explanation given:</b>	<b>N</b>
Child didn't want to go/continue	61
Other family commitments	26
Venue location/ Lack of transport	24
Family issues	20
Parents work commitments	15
Illness	13
Lack of commitment from parents	13
Course cancelled	12
Parent(s) didn't feel it was right for their child	10
Problems with the group	9

However as noted by a number of programme leads, it is difficult to contact the majority of non-attenders and non-completers, therefore there may be other reasons for non-attendance/completion which are not listed in this table. Indeed, the overall feeling from those delivering the programmes is that whilst problems with travel and other commitments may be very real, there is another issue

related to parental beliefs about their child's weight. Anecdotal evidence suggests that many parents of overweight or obese children do not believe their child has a weight problem and this is supported by a small scale survey carried out on behalf of Telford and Wrekin PCT (Ci, 2009).

### **Economic Evaluation**

Estimated costs and benefits of the interventions are provided in Table 18 below. As can be seen financial cost per participant were highest for GOALS and lowest for YW8?. In terms of physical benefits MEND provided the best outcomes with regard to weight loss and change in BMI.

**Table 24: Estimated costs and benefits of the interventions**

		Fun4Life	Fitter Families	GOALS	MEND	One Body One Life	Watch It!	YW8?
<b>Estimated Costs</b>	<b>Staff Pay Costs</b>	Not specified	£27,988	Not specified	£95,625	£199,800	£82,945	£29,589
	<b>Staff Training Costs</b>	Not specified	Not specified	£16,960*	£26,640	£10,500	£9,798	£3,668
	<b>Non-Pay costs</b>	Not specified	£7,500	Not specified	£183,750	£29,652	£50,368	£18,106
	<b>Cost per participant</b>	£300	£396-423	£500-600	£510	£236	£669	£203
	<b>Cost to Participant</b>	0	0	0	0	0	0	0
<b>Physical Benefits</b>	<b>Weight change (Kg)</b>	+0.4 (0.5% increase from baseline)	-0.1 (0.2% decrease from baseline)	Not known	-0.9 (1.4% decrease from baseline)	+0.2 (0.4% increase from baseline)	Not known	-0.7 (1.0% decrease from baseline)
	<b>BMI change</b>	-0.1 (0.3% decrease from baseline)	+2.7 (8.9% increase from baseline)	No change	-0.9 (4.4% decrease from baseline)	-0.4 (1.7% decrease from baseline)	+0.3 (1.1% increase from baseline)	-0.7 (2.5% decrease from baseline)
	<b>BMI SD change</b>	No change	No change	NA	-0.2	-0.1	-0.1	-0.1
	<b>Waist Circumference change (cm)</b>	-0.8 (0.9% decrease from baseline)	Not collected	-7.1 (7.1% decrease from baseline)	-2.3 (2.6% decrease from baseline)	+2.1 (2.7% increase from baseline)	+0.5 (0.6% increase from baseline)	Not collected
<b>Other Benefits</b>	<b>Self esteem change</b>	NA	NA	NA	+3.4	NA	+0.2	+1.7
	<b>Physical appearance</b>	NA	NA	NA	+3.8	NA	NA	+1.5
	<b>Health Related Quality of Life change</b>	NA	NA	NA	NA	NA	+4.7	NA
	<b>Behaviour Change - number of days exercise</b>	+1.3	NA	NA	+1.6	+2.3	+8.5*	+1.27
	<b>Behaviour Change – portions of fruit and vegetables consumed</b>	+1.2	NA	NA	+1.1	+0.7	+1.3	+1.8
	<b>General lifestyle</b>	NA	NA	NA	NA	+1.1	NA	NA

\*total number of activities per week

Estimated costs provided in Table 24 are based on programme estimates when running at full recruitment. Further information was requested from all the programmes in order to try to estimate the cost per participant during the evaluation period more accurately. The figures in Table 25 show this information. A range of costs have been estimated based on numbers recruited and numbers retained during the evaluation period. These figures suggest that programmes

may cost more than anticipated per child when not running at full capacity. However it should be noted that not all programmes were able to provide detailed cost data, which means comparisons between interventions should be treated with caution. Also staffing costs may be overestimated as they are likely to include professionals who are employed by the PCT in another capacity, not just to deliver weight management interventions. It should also be noted that in areas where programmes had difficulty recruiting costs may have been even higher. In Stoke PCT for example, problems recruiting to intervention may have resulted in costs of between £1548-1747 per child.

**Table 25: Summary of Programme Costs for 2008/9**

Programme	One-off Costs	Staff wages	Staff Training	Materials	Recruitment Costs	Total (excluding one-off costs)	Numbers recruited/retained	Cost per child
<b>Fun4Life</b>	£2,150	£26,815	£2,000	£1,050	£600	£304,65	89/45	£342-£677
<b>Fitter Families</b>		£34,936		£7,900		£428,36	50/40	£857-£1,071
<b>MEND</b>	£18,750	£95,625	£26,640	£30,500	£7,500	£287,265	421/252	£682-£1,139
<b>One Body, One Life</b>	£16,850	£199,800	£10,500	£19,102	£10,550	£256,802	800/629*	£321-£408
<b>Watch IT!</b>		£82,945	£9,798	£31,311	£4,397	£128,451	161/53	£798-£2,424
<b>Y W8?</b>	£5,500	£23,500	£3,668	£9,700	£2,000	£38,868	70/46	£555-£845

\*includes adults and children

## **Systematic Review of the Evidence Base**

A total of 49 papers were identified that fitted the inclusion criteria. Of these 24 papers concerned the named interventions under evaluation. Twenty publications were initially identified for MEND, however of these only 10 described an evaluation process related to the intervention. Consequently, the 10 descriptive papers were excluded from the review. A further paper was also excluded for MEND as it targeted preschool children. Of the nine remaining MEND publications, three were papers, five were published as abstracts and one as a conference poster. The other remaining three papers concerned Watch It!. No published papers were found for the remaining interventions. However unpublished evaluations are available for the Sandwell Goals pilot, the YW8? programme and the Birmingham Watch It! programme.

**Table 26: Summary of Peer reviewed evidence found for each intervention during the literature review**

Intervention	Published outputs
Fun4Life	No peer reviewed evidence
Fitter Families	No peer reviewed evidence
GOALS	No peer reviewed evidence
MEND	<p>Kolotourou, M., Chadwick, P., Cole, T.J., Lawson, M., Singhal, A., &amp; Sacher, P.M. (2009). The MEND Programme: National effectiveness data. <i>Obesity Facts</i>, 2 (suppl. 2), 27-28.</p> <p>Sacher, P.M., Chadwick, P., Kolotourou, M., Cole, T.J., Lawson, M., &amp; Singhal, A. (2007). The MEND RCT: Effectiveness on Health Outcomes in Obese Children. <i>International Journal of Obesity</i>, 31(Suppl.1).</p> <p>Sacher, P.M., Chadwick, P., Kolotourou, M., Cole, T.J., Lawson, M.S., &amp; Singhal A. (2007). The MEND Trial: Sustained Improvements on Health Outcomes in Obese Children at One Year. <i>Obesity</i>, 15:A92.</p> <p>Sacher, P., Chadwick, P., Wells, J., Williams, J., Cole, T., &amp; Lawson, M. (2005). Assessing the acceptability and feasibility of the MEND Programme in a small group of obese 7–11-year-old children. <i>Journal of Human Nutrition &amp; Dietetics</i>, 18(1), 3-5.</p> <p>Sacher, P.M., Gray, C., &amp; Lawson, M. (2005). The MEND Programme is effective in reducing glycaemic load, total energy intake and waist circumference in a small group of obese 7-11 year old children. <i>Obesity Reviews</i>, 6(Suppl. 1), 410</p> <p>Sacher P.M, Kolotourou M, Chadwick P, Singhal A, Cole T.J, Lawson M. (2006). Is the MEND Programme effective in improving health outcomes in obese children? <i>International Journal of Obesity</i>, 30; 2:S41.</p> <p>Sacher, P.M., Kolotourou, M., Chadwick, P., Singhal, A., Cole, T.J., &amp; Lawson, M.S. (2007). The MEND Programme: effects on waist circumference and BMI in moderately obese children. <i>Obesity Reviews</i>, 8:7-16:12.</p> <p>Sacher, P.M., Kolotourou, M., Chadwick, P., Singhal, A., Cole, T.J., &amp; Lawson, M. (2006). The MEND Programme: effectiveness on health outcomes in obese children. <i>Obesity Reviews</i>, 7(Suppl. 2), 89</p> <p>Sacher, P.M., Kolotourou, M., Chadwick, P., Cole, T.J., Lawson, M., Lucas, A., &amp; Singhal, A. (In Press). Randomized controlled trial of the MEND Program: a family-based community intervention for childhood obesity. <i>Obesity</i>.</p>
OBOL	No peer reviewed evidence
Watch It!	<p>Dixey, R., Rudolf, M., &amp; Murtagh, J. (2006). WATCH IT!: Obesity management for children: a qualitative exploration of the views of parents. <i>International Journal of Health Promotion &amp; Education</i>, 44(4), 131-137.</p> <p>Murtagh, J., Dixey, R., &amp; Rudolf, M. (2006). A qualitative investigation into the levers and barriers to weight loss in children: opinions of obese children. <i>Archives of Disease in Childhood</i>, 91(11), 920-923</p> <p>Rudolf, M., Christie, D. McElhone, S., Sahota, P., Dixey, R., Walker, J., &amp; Wellings, C. (2006). WATCH IT!: A community based programme for obese children and adolescents. <i>Archives of Disease in Childhood</i>, 91, 736-739.</p>
YW8?	No peer reviewed evidence

# Conclusions and Recommendations

## Summary of Findings

### Routine data collection:

- No programme collected all of the essential or desirable SEF criteria;
- YW8? collected the most SEF data (97% of essential and 88% of desirable criteria);
- Fitter Families collected the least data (62% of essential and 31% of desirable criteria);
- Nineteen essential criteria were collected by all the interventions including child weight and height;
- Physical activity and dietary measures were collected by six and five programmes respectively;
- The dietary and physical activity measures used by programmes were varied, however all asked about fruit and vegetable intake and number of days in the past week in which moderate activity had been undertaken for 30 or 60 minutes;
- Four programmes collected data on psychosocial outcomes, including information on self-esteem;
- Language and literacy were often cited as a barrier to questionnaire data collection;
- Fitness testing was noted to be too time consuming and so was not undertaken by the majority of programmes (only OBOL, Watch It! and some MEND programmes collected this data);
- The accuracy of body fat and waist circumference measurement was also raised;
- Five programmes collected long term follow up data at 3 and/or 6 months;
- However the quantity of data collected at follow up was often limited due to participant drop out;
- The main barrier to long term data collection appeared to relate to participant perceptions that once the weekly programme had finished, the intervention was complete.

## **Recruitment and retention:**

- Recruitment methods varied across programmes, but included advertising, and links with community and schools events, of which the latter were seen as highly successful by a number of programmes. Furthermore those not accessing intended to do so in the future;
- A number of programmes had also tried to use NCMP letters for recruitment purposes, however this had had limited success. Anecdotal evidence suggested that this was because parents either did not understand the implications of the letters or did not believe that their child had a weight problem and this is supported by a small scale survey conducted in Telford and Wrekin PCT (Ci, 2009);
- Self referrals were generally noted to be higher than health professional referrals and were often thought to be successful because of awareness raising in the community and word of mouth;
- The importance of maintaining a presence in the local community in order to promote weight management as an issue was highlighted by the majority of programmes. This highlights the importance of health promotion for maintaining the effectiveness of these programmes;
- Watch It! appear to be more likely to recruit from health professionals than other programmes. This may be explained by the links created with local providers and the way the programme has been promoted to health professionals ;
- During the intervention period recruitment ranged from seven children (GOALS) to 421 children (MEND);
- Retention rates ranged from 32.9% (Watch It!) to 89% (Fitter Families), with the majority of programmes (N=6) having a retention rate of at least 50%;
- No differences were found between completers and non-completers on available measures for five programmes;
- However, non-completers were found to be significantly older than non-completers for two programmes, OBOL and Watch It!;
- Barriers to attendance included the child not wanting to attend, other family commitments and problems with access to venue;

- However, most programme deliverers reported that parental attitudes to their child's weight was also an issue, suggesting that many parents of overweight and obese children did not believe their child had a problem;
- The five programmes collecting long term data reported problems collecting this data and by 6 months participation rates had dropped to under 12% for four of these five programmes;
- Fitter Families school nurses were most successful at collecting this long term data (50% participation at 6 months);

### **Programme Structure:**

- All programmes offered nutritional advice and exercise classes;
- Other support offered included one to one mentoring (GOALS & YW8?), one to one counselling sessions (Watch It!), cooking classes for parents (Fitter Families, YW8? & GOALS) and goal setting monitoring (OBOL, MEND, GOALS and Fun4Life.);
- Long term support was offered by five programmes and ranged from referral to exercise programmes to one to one mentorship;

### **Costs and Benefits:**

- Financial costs provided by the interventions ranged from £203 (YW8?) to £669 per participant (Watch It!);
- Calculation of cost per participant based on staff salaries, training and intervention materials for the intervention period ranged from £321-408 (OBOL) to £798-2,424 (Watch It!);
- However these figures should be treated with caution as staffing costs may be overestimated as they are likely to include professionals who are employed by the PCT in another capacity, not just to deliver weight management interventions. Programmes appeared to encounter a number of difficulties when asked to identify all their costs;
- Weight change ranged from an increase in group mean of 0.4 Kg (Fun4Life) to a decrease of 0.9Kg (MEND);

- However, even when group means showed an increase there were often benefits for the majority of the group, with over half of all children either maintaining or losing weight in three programmes;
- Weight gain for more than half the group was seen in Fitter Families (70%) and OBOL (53.8%);
- However, it should be remembered that for children weight loss is not always the best indicator of change in weight status, as continued growth in terms of height means that if weight stays stable a change in weight status may still be seen, making BMI a better indicator of change. This is clearly illustrated by the outcomes for one programme (Fun4Life) where mean BMI decreased even though mean weight increased.
- BMI change ranged from an increase in group mean of 2.7 points (Fitter Families) to a decrease of 0.9 points (MEND);
- BMI decreased or stayed constant for over half the group for YW8? (93.4%), MEND (89.9%), OBOL (76.8%) and Fun4Life (75.5%). Because BMI in children increases with age, maintenance of BMI can reflect an improved weight status, making unchanged BMI potentially as important as decreased BMI;
- BMI increased for 87.5% of the group for Fitter Families, however this may not be representative of the group as BMI was only available for 16 of the 40 children who started the programme;
- It has also been argued that BMI SD is the measure of choice when considering weight change for children, although some have cautioned against its use when comparing groups over time (Woo, 2009);
- Two programmes (Fun4Life and Fitter Families) showed no change in children's BMI SD, three programmes (OBOL, Watch It! and YW8) showed a decrease in BMI SD of 0.1. One programme (MEND) showed a decrease in BMI SD of 0.2. These changes suggest the children's weights have moved closer to the population norm;
- Because of the difficulty assessing weight change in childhood, NOO recommend the use of additional measures of adiposity. Waist circumference was used as an additional measure by six of the programmes (Fun4Life, Fitter Families, MEND, OBOL and Watch It!);

- Changes in waist circumference ranged from a decrease in group mean of 7.1cm (GOALS) to an increase of 2.1cm (OBOL);
- All programmes that measured waist circumference found that this measurement decreased for more than a third of participants, ranging from 39.2% for OBOL to 66.2% for MEND;
- Psychosocial benefits were reported by three programmes and included improved self-esteem (MEND, Watch It! And GOALS) and perceived physical appearance (MEND);
- Improvement in diet and exercise were reported by participants in all those programmes which measured these behaviours;
- However it should be remembered that these are self-report measures and may therefore reflect a social desirability bias;

#### **Recent changes in programme provision:**

- WELL FIT is being developed by the team in Sandwell PCT using their own expertise (nutritional expert and physical exercise expert) as well as their experience of running both a GOALS and MEND programme. This is due to start at the beginning of 2010 with the aim of eventually rolling it out across the PCT;
- A new GOALS programme for younger children has been commissioned by Walsall PCT to start running in November 2009;
- Since January 2010, the MEND programme began recording parental weight, in order to assess programme outcomes for the whole family.

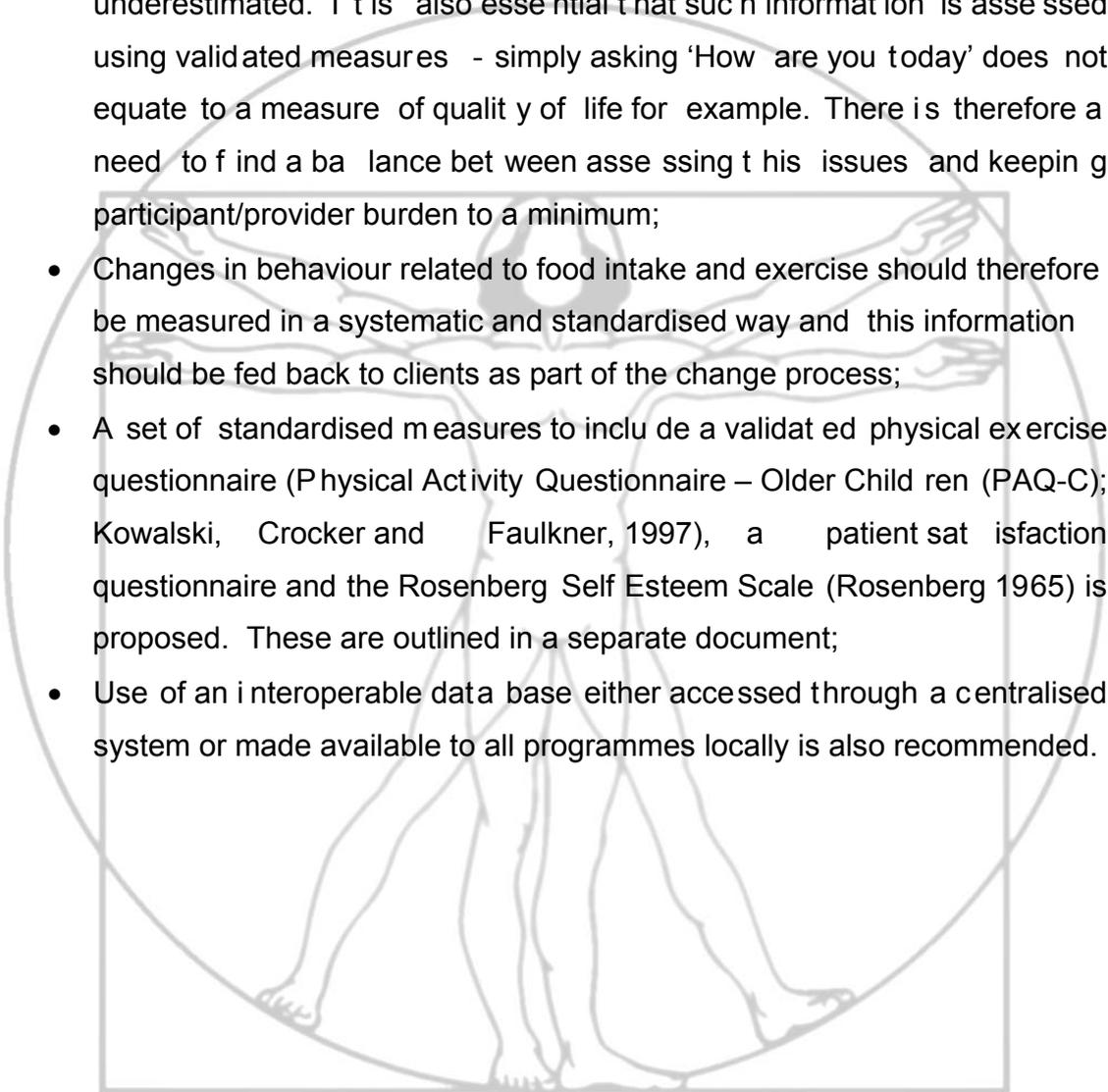
#### **Programme Quality:**

- All the programmes are based either on NICE guidelines or theories of behaviour change;
- Theoretical rationales were provided by Watch It!, Fun4Life, MEND, YW8? and OBOL;
- Two programmes were also supported by published peer reviewed articles (MEND and Watch It!);

- All the programmes evaluated have strengths as well as weaknesses;
- Fitter Families, for example, are very good at retaining participants at long term follow up, whilst others such as MEND seem to have a positive impact on health outcomes;
- It is therefore recommended that sharing of good practice between programmes and PCTs is facilitated in order to improve outcomes/data collection in all areas across interventions;
- Consideration should also be given to the systematic evaluation of any delivery tools currently in use (e.g. visual aids vs. hands-on lessons to teach nutrition education), in order to inform practice and allow commissioners and providers to assess what best delivers;
- YW8? (£203/participant) is the least expensive programme and appears to offer value for money in terms of weight loss, psychosocial functioning and behaviour change;
- Although more expensive than YW8? MEND also appears to offer good value for money in terms of level of benefits to weight status, psychosocial functioning and behaviour change;
- However the success of MEND regarding recruitment differs across the region and this impacts on local costs. Thus at the present time it may provide value for money in some areas and not others. It is therefore recommended that this issue is evaluated further;
- Watch It! (£669/participant) is the most expensive programme. However it offers a specialised service which is directed at the extremes of the BMI distribution.
- Watch It! provides a therapeutic intervention in which the emphasis is upon one-to-one counselling, rather than following the health promotion model which is the basis for the majority of programmes considered here;

- OBOL also differs from other programmes included in the evaluation. It takes the most inclusive approach, aiming to recruit whole families, not just children, making comparison to other programmes more complex.
- There may also be a difference between programmes depending on whether they are community roll outs or research projects. Interventions which are part of such projects are likely to have a team of dedicated research staff and this may impact upon retention rates and the pursuit of long term data;
- The different approaches of the programmes evaluated here should be taken into account when deciding what constitutes value for money and good outcomes. Commissioners may want to consider questions such as whether they want a therapeutic or a health promotion approach; are they intending tackling weight issues in all age groups or are children the target group; are they dealing with a population in which the extremes of the BMI distribution are most prevalent and so on;
- There are differences in data collection and recording across the programmes and this makes evaluation complicated;
- It is therefore recommended that there is some standardisation of data collection in terms of what is collected and how the information is recorded e.g. portion size as measured in nutrition/food intake questionnaires should be defined and standardised across programmes;
- Difficulties collecting follow up data make it difficult to gauge the long-term impact of the programmes;
- Good follow up data is essential in order to assess the potential impact of weight management interventions on children's future health. It is therefore recommended that priority is given to establishing ways of collecting this data;
- Given the difficulty of gauging the impact of weight change on a child's weight status, the use of BMI or BMI SD, rather than weight as a measure of physical change is recommended;
- Additional measures of adiposity (e.g. waist circumference) should also be considered;

- Programmes differed in their approach to collecting psychosocial data. Some suggested that the use of too many scales was burdensome both for staff and participants. This is a significant issue as it may lead to participant drop out and influence staff attitudes and approach when collecting this data. However the importance of collecting good quality data on behaviour change and psychosocial wellbeing should not be underestimated. It is also essential that such information is assessed using validated measures - simply asking 'How are you today' does not equate to a measure of quality of life for example. There is therefore a need to find a balance between assessing these issues and keeping participant/provider burden to a minimum;
- Changes in behaviour related to food intake and exercise should therefore be measured in a systematic and standardised way and this information should be fed back to clients as part of the change process;
- A set of standardised measures to include a validated physical exercise questionnaire (Physical Activity Questionnaire – Older Children (PAQ-C); Kowalski, Crocker and Faulkner, 1997), a patient satisfaction questionnaire and the Rosenberg Self Esteem Scale (Rosenberg 1965) is proposed. These are outlined in a separate document;
- Use of an interoperable data base either accessed through a centralised system or made available to all programmes locally is also recommended.



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