Cost Effectiveness of Weight Management Services in Wirral

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Version History

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1.0	4th September 2013	Brendan Collins		
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Thanks to everyone who provided data, intelligence and comments for this report.

Summary

- This document describes an economic evaluation of weight management services in Wirral. These are services to help overweight and obese adults and children to lose weight.
- It also includes synthesis of local obesity prevalence data, particularly child height and weight which has not previously been analysed locally in detail.
- Local prevalence data on obesity is poor, with survey data being unreliable and General Practitioner collected data being incomplete. The best quality data is collected in children aged 4-5 and 10-11 as part of the National Child Measurement Programme (NCMP).
- The majority of adults in the UK are either overweight or obese, and rates of obesity have increased over the past 20 years. There are an estimated 64,540 obese adults and 96,238 overweight adults in Wirral, and 7,170 obese and 6,046 overweight children aged 2-15.

- Obesity has a social gradient - the most deprived parts of Wirral have around a 25% higher prevalence of diabetes than the least deprived areas (despite having a younger population) which indicates that the health consequences of obesity are felt more in these areas.
- The gap between the most deprived and the least deprived in terms of child obesity rates has got wider over the last 20 years. This gap also gets wider as children get older, so 2 year olds have similar obesity rates in the most and least deprived areas, but 10 year olds from the most deprived areas are more than twice as likely to be obese as those from the least deprived areas.
- The estimated annual healthcare cost of overweight and obesity in Wirral is around £103million, or around 16% of the total healthcare budget.
- There are 4 main weight management services in Wirral, two adult services and two children & family services. In total these services cost around £873,213 per annum. This table shows a summary of the four services, and their cost effectiveness; the two adult services came out as cost effective with a cost per QALY gained of less than £20,000, while the two child & family services came out as having a cost per QALY that probably would not be considered to be cost effective. This was mainly because there was only data for a small number of children who been through these services and succeeded in having a lower or maintained body mass index after 12 weeks.

	Service			
Service	Adult LWMS 'Weigh 2 Change'	'Weigh to Grow'	'Measure up'	MEND [Mind, Exercise, Nutrition, Do it!] (Including 'All Fired Up')
Provider	Wirral Community Trust	Wirral Community Trust	5 Boroughs Partnership	MEND subcontracted to NW APEX
Time period for this evaluation	Sept 2011-Aug 2010	Sept 2011-Aug 2012	Sept 2011-Aug 2012	April 2011-March 2012
Client group	Adults 16+	Children 4-16 and families	Adults 18+	Children 5-16 and families
Target N clients (attending first session)	1200	120	1000	600
Actual N clients attending first session (percentage of target in brackets)	925 (77%)	81 (67.5%)	605 (60.5%)	161 (26.8%)
Spend estimate	£509,839	£100,000	£79,074	£184,300
QALYs gained	34.46	2.8	7.01	2.52
Net cost per QALY (after cost savings)	£5,646	£26,610	£2,139	£63,924

- The Adult Lifestyle and Weight Management Service (ALWMS) have started collecting general health-related quality of life (EQ-5D) and subjective wellbeing (SWEMWBS) surveys from their clients. For the cohort of clients who had completed before and after surveys, these measures showed a statistically significant improvement, which means that on average this service is improving individual's level of health & wellbeing.
- Weight management services have been successful in recruiting clients from the most deprived areas, and services will impact positively on the Marmot objectives of child development, schooling, employment, minimum income and benefits, healthy environment and green spaces, transport, and reducing health and social inequalities.

Recommendations

- Adult weight management services seem to provide reasonable value for money but need to do more to achieve their target numbers of clients, and also need to demonstrate long term outcomes.
- Adult weight management services should try to collect follow up data for more clients, including clients who have dropped out of using services, to see how they have fared compared with clients who have stayed in services.
- We need to understand more about people's motivations to change and who needs to use specialist services, and how maximum efficiency can be achieved, such as giving some psychological support to people who are using commercial services.
- Interventions aimed at children and families do not seem to be very successful in providing value for money, based on the data they have provided. These services need to be looked at in detail to see how they can be improved or made more efficient. They should also consider how to capture outcomes data about families as well as the children using the service.
- More needs to be done to get health professionals to refer to weight management programmes. Because clients can self-refer, health professionals can just give out leaflets instead of instigating difficult conversations with patients about their weight.
- People were enticed by Slimming World when it was commissioned by Wirral because they felt they were getting a commercial product for free. Some people would go to their GP asking to be referred to Slimming World then end up in the LWMS because they were too obese or had too many co-morbidities to be accepted in Slimming World. Wirral should consider the type of appeal that commercial products have and use this for their own commissioned services.
- Interventions should be considered to be commissioned on a Payment by Results (PbR) basis, where qualified providers only get paid for the number of clients completing an intervention. This has the potential to stimulate and broaden the market and make services more efficient.
- Wirral should consider commissioning weight management interventions on a bigger footprint with Wirral's neighbours which could bring economies of scale and shared knowledge.

- Most people who are overweight or obese are not using specialist services, and for those that do, a lot of them do not lose a significant amount of weight. So other interventions need to be considered to really make a difference to obesity rates at a population level. These interventions could start with an asset based approach looking at what is available already to reduce obesity.
- Wirral officers need to work together through the Health & Wellbeing Board to consider fast food outlets, sports provision, green spaces and employers which have a potential to have a bigger impact than weight management interventions.
- Wirral could set a population-based target for number of people setting personal weight challenges from NHS and Local Authorities and their commissioned providers.
- Encourage workplaces to give incentives for groups to lose weight.
- Wirral should push for national policy measures such as limiting sugar in foods and beverages or increasing taxes on sugar sweetened beverages, and displaying calories prominently on alcoholic drinks which are a big source of calories.
- A national data collection exercise, perhaps led by Public Health England and/or the NHS Benchmarking Network, would be useful to benchmark weight management services in terms of their costs and outcomes, as there is currently little or no benchmarking data.

1. Introduction

This document outlines an economic evaluation of weight management services in Wirral. This is one of a series of economic evaluations of public health commissioned services that have been commissioned by Wirral to investigate how cost effective public health services are. These evaluations are funded by Wirral public health who commissions these services but are carried out independently. This report is based on mainly on existing intelligence, analysing service data and looking at the evidence, as well as talking to people and fact finding. It does not consider qualitative outcomes or performance data in any detail.

Weight management services are needed where individuals need support to lose weight or to stabilise their weight, because being overweight or obese is likely to increase an individual's risk of disease and early death, and their risk of emotional or psychological problems or social isolation.

2. Policy Context

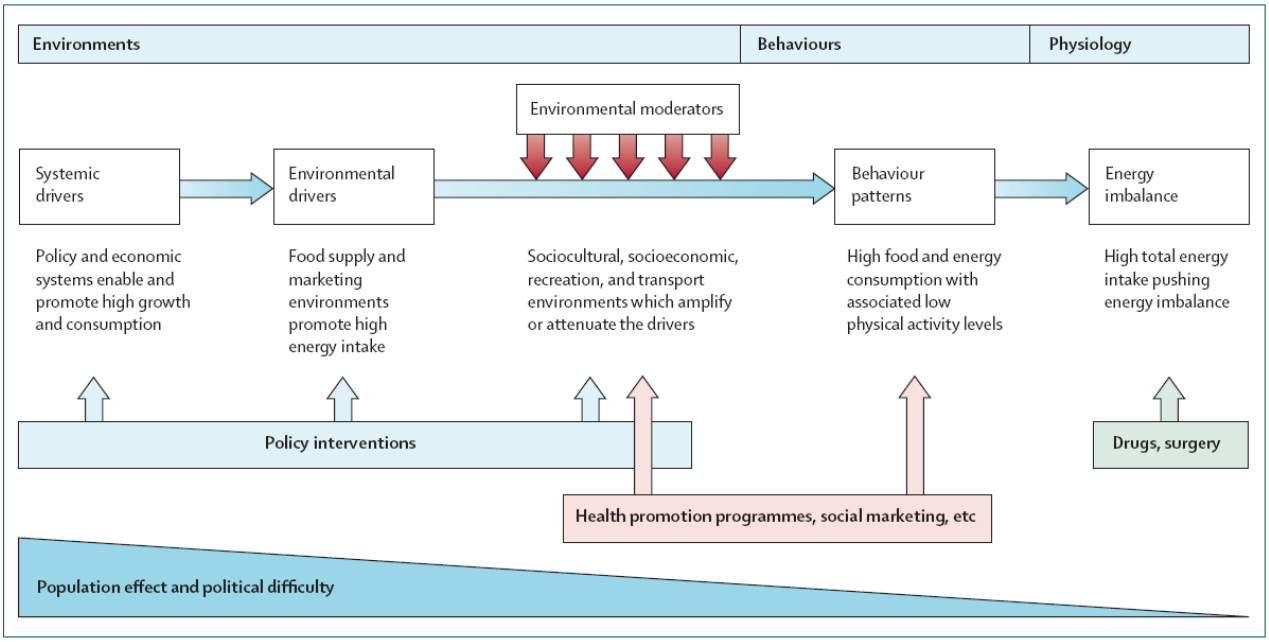
Since the 1970s the UK has observed a continuous increases in the proportion of the population with a body mass index (BMI) in overweight (BMI 25-29.9 kg/m^2) and obesity (BMI > 30 kg/m^2) ranges. It is estimated that between the 1920s and the 1970s, people's calorie intake reduced as their levels of activity reduced. BMI is not a totally accurate measure of health risk or body fat in individuals - so some people who are very muscular have high BMI, and people of Asian background experience diabetes risk at a lower BMI than people from white backgrounds- but BMI works as a measure for most people, and at a population level. Using past trend, forecasts predict a continued rise in obesity prevalence, from 26% to 41-48% in men and from 26% to 35-43% in women by 2030 (Wang et al.,

2011). Obesity levels in the UK are similar to those in the USA 15 years before. The main causes of obesity are as follows;

1. People not getting enough physical activity.
2. People doing less physical jobs and more office-based sedentary work (the “white collar revolution”).
3. People being more sedentary at home - spending time on the internet, watching TV or playing computer games.
4. People having more labour saving devices so using fewer calories in housework.
5. People travelling more by car, and walking and cycling less.
6. The relative decrease in food prices (which fell at 1% per year between 1987 and 2007, although have risen since).
7. People eating out more and not preparing food themselves; a high density of restaurants and fast food outlets.
8. People having less time to prepare food, with more families having both parents at work.
9. People eating more ready meals which are generally more calorific.
10. Intensive marketing of high calorie foods.
11. Children not being breastfed or only being breastfed for a very short time increases their chance of being overweight or obese.
12. Smoking rates falling; when people quit smoking they often gain some weight, though not enough to make it preferable to smoke.
13. Psychosocial issues around food manifesting later in life; people who grew up in poverty who then have access to rich foodstuffs.
14. People getting more calories from drinking alcohol, the average amount of alcohol per year drunk in England & Wales increased from 5 litres per year in the 1950s to over 11 litres per year in 2007.
15. People comfort eating - rates of social isolation and family breakup have increased.

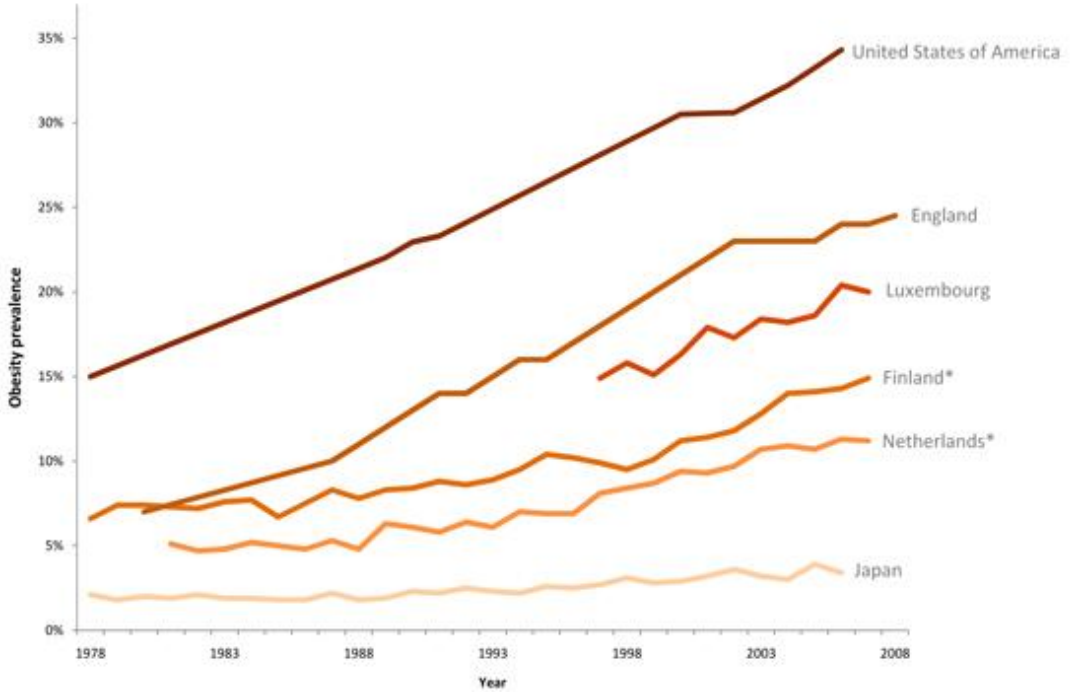
Obesity has an emotional as well as a general health impact on individuals. Individuals who are obese are often subjected to abuse and discrimination, partly through psychological mechanisms where people identify obesity with a lack of control and with the parts of their own behaviour that they dislike, so because many people will struggle with their weight in some way, obese people represent the side of themselves that they try to suppress.

Figure C1. A framework to categorise obesity determinants and solutions (from the Lancet, 378 p. 808)



Obesity Trends & Projections

Figure P1. Trend in obesity prevalence in selected countries. Source: OECD.



During the next twenty years, the obesity attributable disease risk in the UK is projected to add an excess 544,000 – 668,000 cases or diabetes, 331,000 – 461,000 of coronary heart disease and stroke and 87,000 – 130,000 cancers.[1] In addition, a continuing trend in obesity would present a loss of 2.2 – 6.3 million quality adjusted life years (QALYs) and higher annual health care costs of £648 million by 2020 and £2 billion by 2030. Prevalence of overweight and obesity increases with age and is generally higher in the older age groups from 45 years old onwards among both men and women (Health Survey for England, 2011). The Wirral Lifestyle Survey (2007) found that 14.4% of women and 11.8% of men reported themselves as obese. This is likely to be a gross underestimate as self-reported lifestyle surveys are known to be biased towards healthier responses. The findings from the Survey show that the highest levels of obesity and lowest levels of healthy weight are experienced by those in the most disadvantaged parts of Wirral. The most deprived parts of Wirral have around a 25% higher prevalence of diabetes than the least deprived areas (despite having a younger population) which indicates that the health consequences of obesity are felt more in these areas.

Table P1. Prevalence of overweight and obesity in England, 2009.

	Children 4–5 years old	Children 10–11 years old	All adults	Adults 45–65 years old
% obese	9.8%	18.7%	23.0%	over 30%
% overweight or obese	23.1%	33.3%	61.3%	over 70%

The most recent key policy document around obesity was '*Healthy Lives, Healthy People: a call to action on obesity in England* (2011)'[2]. This paper had a target of a reduction in obesity prevalence in both children and adults by 2020 and called for closer working with the food and drink industry to reduce the nation's calorie uptake by 5 billion calories per day to promote a neutral energy balance. The document stressed that reducing calorie intake is much more important than increasing physical activity in reducing people's risk of diseases caused by obesity.

The Government office for science's Foresight report of 2007 was a report on a large project that looked at obesity. This report will make reference to this report several times, but in brief, it found that most adults in the UK were overweight, with modern lifestyles ensuring that every generation is heavier than the last – `passive obesity'. The Foresight team's modelling predicted that by 2050 60% of men and 50% of women could be clinically obese. Without action, obesity-related diseases will cost an extra £45.5 billion per year. The report said that the obesity epidemic cannot be prevented by individual action alone and that a societal approach was required, similar to that needed to tackle climate change. The report said that tackling obesity requires far greater change than anything tried so far, and at

[1] Health and economic burden of the projected obesity trends in the USA and the UK, Wang y, McPherson K, Marsh T et al.
[2] *Healthy Lives, Healthy People: a call to action on obesity in England* (2011) Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_130401

multiple levels: personal, family, community and national, and requires partnership between government, science, business and civil society. Obesity has been described as being a 'wicked problem' because it is has complicated set of causes which can combine in a non-linear way and can change over time, people have different views on it, and attempts to fix it can have unintended consequences. Obesity often comes as a side effect of prosperity and economic freedom. Wicked problems require a lot of collaboration and innovation to solve. One thing to be optimistic about is the fact that babies are not born obese, so every year there is a new opportunity for the children born that year to not become obese and have the risk of obesity-related diseases.

The Public Health Outcomes Framework (PHOF) is a national framework for England measuring the changes in population health which runs from 2013-2016. Indicators in the PHOF that are directly related to weight and diet are;

2.6.i Excess weight - children aged 4-5 classified as overweight or obese

2.6.ii Excess weight - children aged 10-11 classified as overweight or obese

2.11 Diet

2.12 Excess weight in adults

2.13.i Adults achieving at least 150 minutes physical activity per week

2.13.ii Proportion of adults classified as ""inactive""

There are many other indicators that will be indirectly related, as being overweight increases the risk of many diseases, and the PHOF has outcomes around premature mortality, cancer, heart disease, liver disease and mental health.

Costs associated with obesity – national and local

A toolkit produced by the National Heart Forum in 2007 included estimates of PCT-area level costs of overweight and obesity. For Wirral the estimated cost for 2010 was £102million. Wirral's total NHS healthcare spend in 2010/11 was £636million, so based on these estimates, overweight and obesity contributed 16.1% of the healthcare budget.

Table P2. Estimated costs of overweight & obesity.

	Estimate annual costs to NHS of overweight & obesity (£million)			Estimate annual costs to NHS of obesity (£million)		
	2007	**2010**	**2015**	**2007**	**2010**	**2015**
Wirral	98.5	102.2	109.3	51.1	55.3	63.6
England total	13,891	14,416	15,415	7207	7,805	8,962

From Healthy Weight, Healthy Lives: A Toolkit for Developing Local Strategies (2007)

3. Previous Modelling Work

NICE have commissioned modelling around prevention of type 2 diabetes[3] and weight management in pregnancy[4]. Previous modelling work of results from the Lifestyle and Weight Management Service carried out by the Health Economics Unit at University of Liverpool Management School in 2009 found that the service's level of recording of 12 week outcomes data was very poor. Using reduced risk of CHD and diabetes and associated cost savings and QALYs gained, the analysis found that there was a net cost per QALY of around £13,000 for the services which would be considered cost effective. NICE's cost per QALY threshold for willingness to pay for public health interventions is usually quoted as anything less than £20,000 per QALY gained so this would be considered cost effective.

4. Prevalence Data and Intelligence

The main intelligence resource for Wirral is the Joint Strategic Needs Assessment (JSNA).[5] This contains prevalence data and intelligence and the JSNA website also has some previous evaluation of weight management services.

QOF (the Quality and Outcomes Framework) is a mechanism through which General Practitioners in England are paid for maintaining disease registers and meeting quality standards. QOF Obesity prevalence is based on patients aged 16 and over with a BMI greater or equal to 30 recorded in the previous 15 months. Current prevalence figures are unadjusted by age, subject to practice and patient compliance and do not capture non-registered or non-attending patients. The total QOF obesity prevalence for Wirral for 2011/12 was 12.5% which was greater than the England average of 10.7%. However both of these are likely to be much lower than the true prevalence of obesity which is likely to be between 20% and 30%. At practice level in Wirral, obesity prevalence varies hugely, from 5.7% to 24.1%. QOF obesity prevalence has been fairly constant for the last 3 years in Wirral (Figure P2). There are modelled estimates of obesity rates based on health survey for England, which are produced at middle layer super output area (MSOA) level. These estimates show a social gradient with the most deprived areas having a 50% greater prevalence of obesity than areas where people are more financially comfortable (Figure P3).

[3] http://www.nice.org.uk/nicemedia/live/12163/57046/57046.pdf
[4] http://www.nice.org.uk/nicemedia/pdf/WeightManagementInPregnancyEvidenceReviewScHARR.pdf
[5] http://info.wirral.nhs.uk/ourjsna/

Figure P2. QOF obesity prevalence in adults by practice in Wirral.

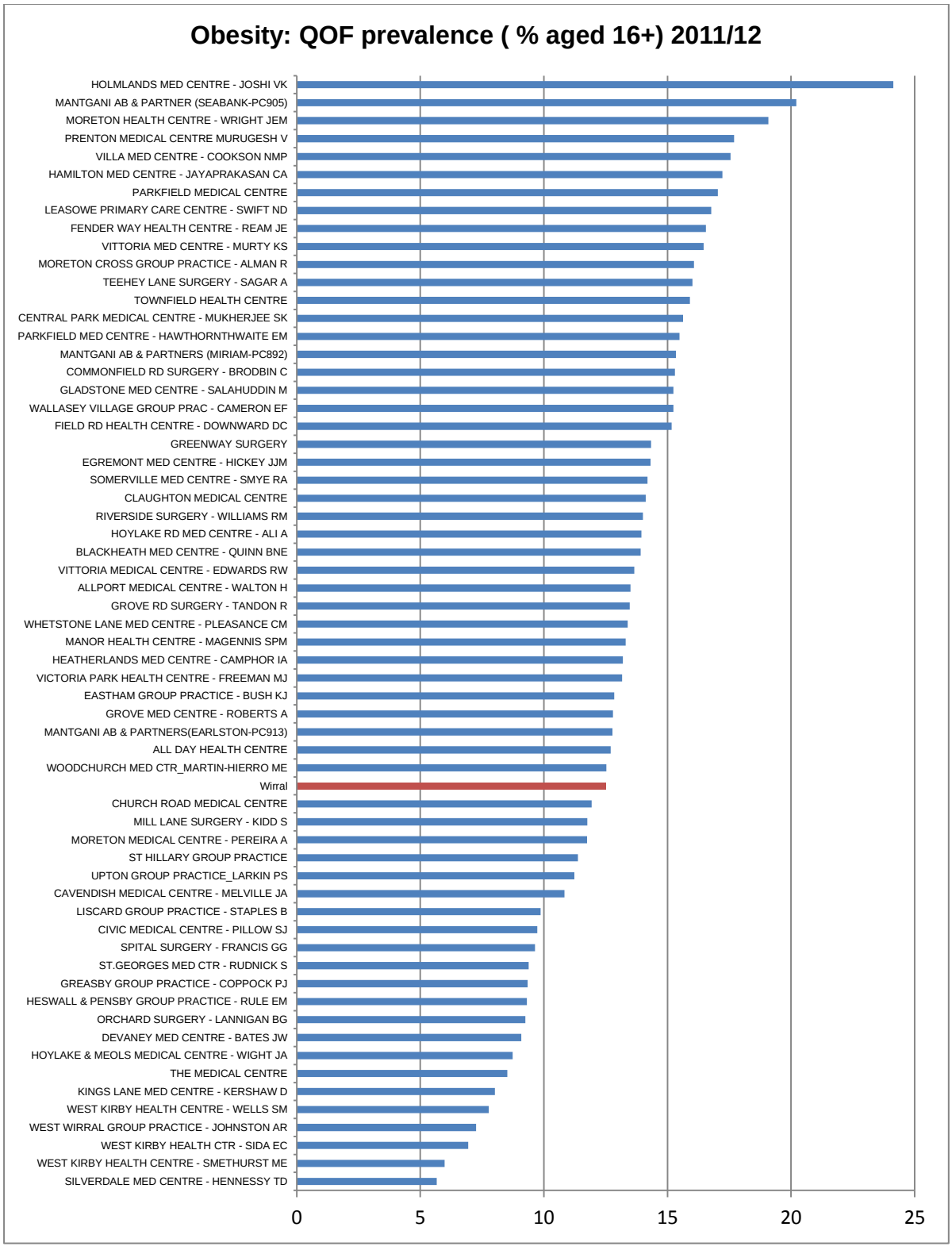
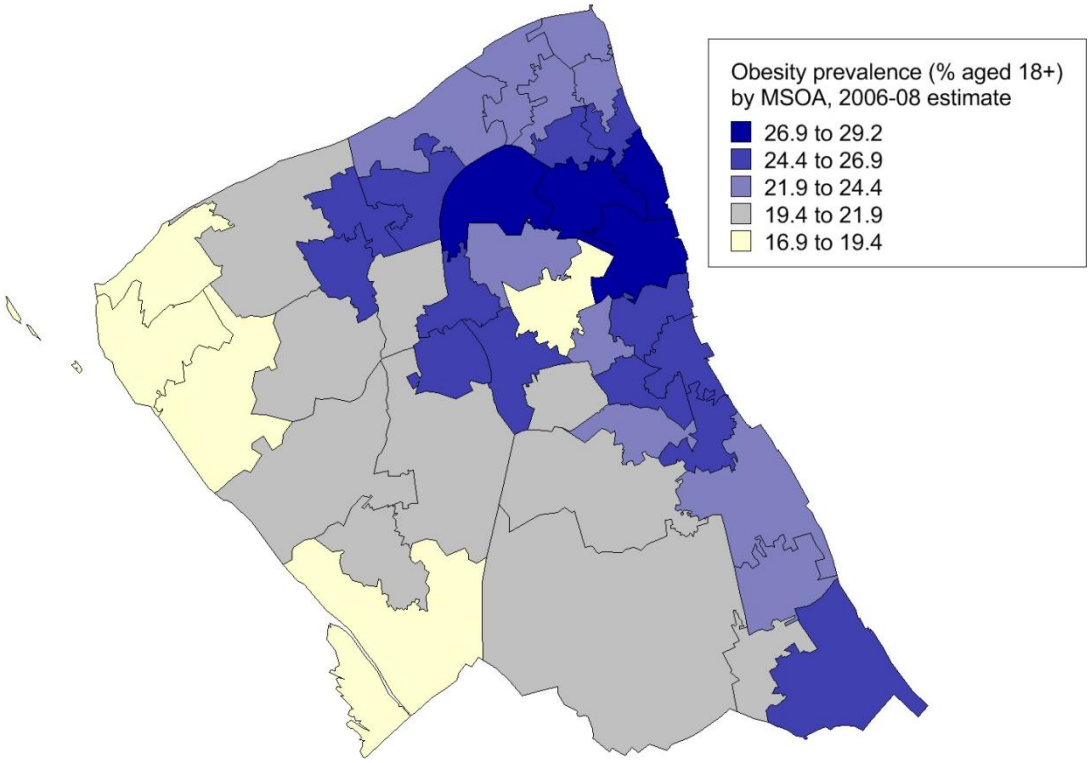


Figure P3. Estimated obesity prevalence in adults by MSOA in Wirral. Source:



5. Child Health Data

We were provided with data for heights and weights in the Wirral child health database going back to 1990. This mainly includes data for 2-6 year olds measured by health visitors, and from 2006 onwards includes data for children aged around 4-5 and 10-11 measured in the National Child Measurement Programme (NCMP). Research carried out previously by Iain Buchan at Manchester University which used the Wirral child health database has shown a trend in the proportion of children who are overweight and obese increasing in the most deprived areas, and of children getting taller and heavier. Figure P4-P6 show the trends for years that had data available, using IOTF (International Obesity Taskforce) weight categories[6]. The proportion of 2-3 year olds in Wirral categorised as obese has increased dramatically from 2.7% to 7.2% in around 20 years. The proportion of children categorised as being thin has fallen at the same time.

[6] Cole TJ, Lobstein T. Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. *Pediatr Obes* 2012; 7: 284–294.

Figure P4. Trend in children aged 2-3 by IOTF weight category (not including normal weight). From Wirral child health database, 1990-2008.

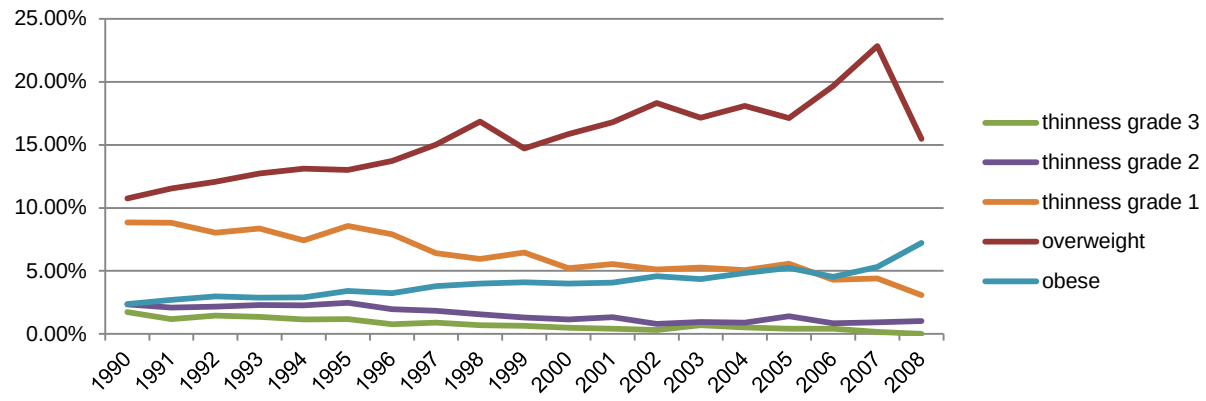


Figure P5. Trend in children aged 4-6 by IOTF weight category (not including normal weight). From Wirral child health database, 1993-2012.

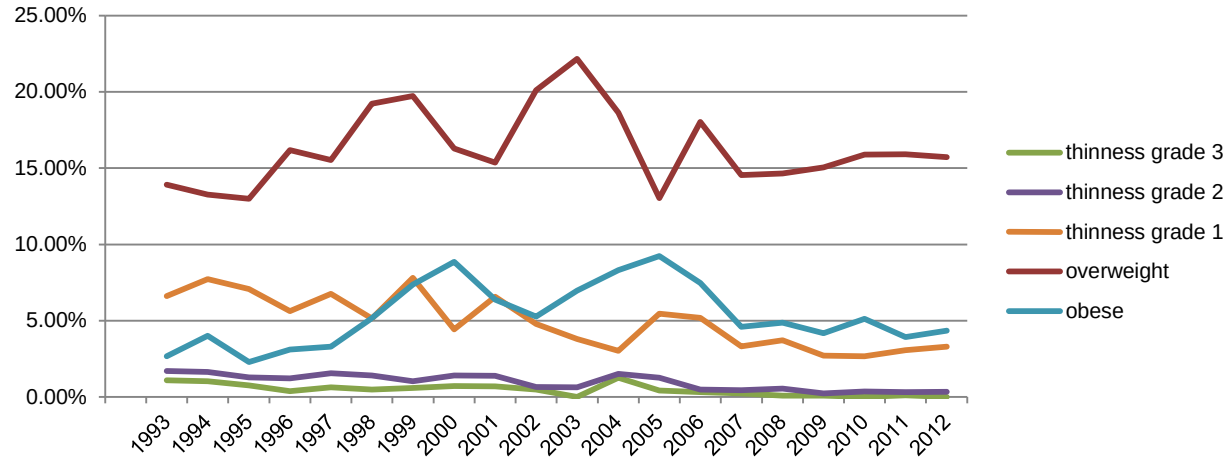
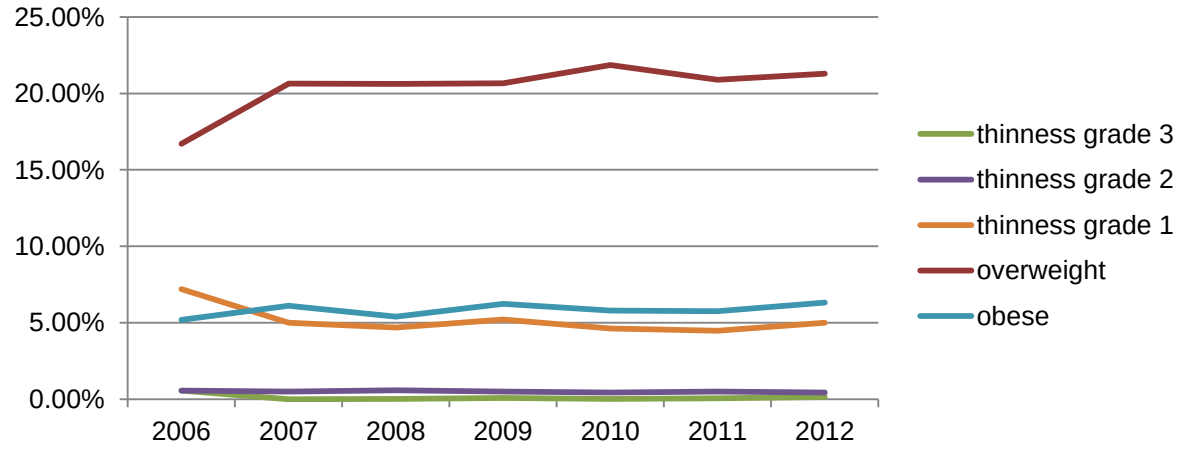


Figure P6. Trend in children aged 9-11 by IOTF weight category (not including normal weight). From Wirral child health database, 2006-2012.



Time series child health data

Of children who were measured as being obese at 2 years old and had also been measured at other ages, 30% were obese at 3 years, 36% were obese at 5 years and 24% were obese at 10 years. The odds ratio for children being obese at 5 years, given they were obese at 2 years was 8.8 (95% CIs 7.0 – 11.0) and the odds ratio for being obese at 10 years, given they were obese at 2 years was 5.6 (95% CIs 4.5 – 7.0). This means that being obese at age two is a reasonably strong predictor of being obese at older ages.

For children measured as being obese at age five who also had measurements at age ten, being obese at age five was a big predictor of being obese at age ten (odds ratio 27.7, 95% CIs 18.3 – 41.9). 54% of children who were obese at five were also obese at aged ten, while only 15% were normal weight. Figure P7-P9 show children who have been measured at age 2, 5 and 10 and the proportion and numbers moving between categories. Many children who are normal weight at younger ages become overweight and obese as they get older which means that proactive interventions are needed, and there is a lot more movement between categories between age two and age five than age five and age ten. 85% of children who are classed as obese at age five will be overweight or obese when they are ten. This may suggest that there is more potential for interventions to work if they are aimed at families with younger children, and that once children are obese at age five there is a good chance they will stay obese.

Figure P7. Numbers of children by 2 year and 5 year weight categories (only includes children measured at both 2 years and 5 years).

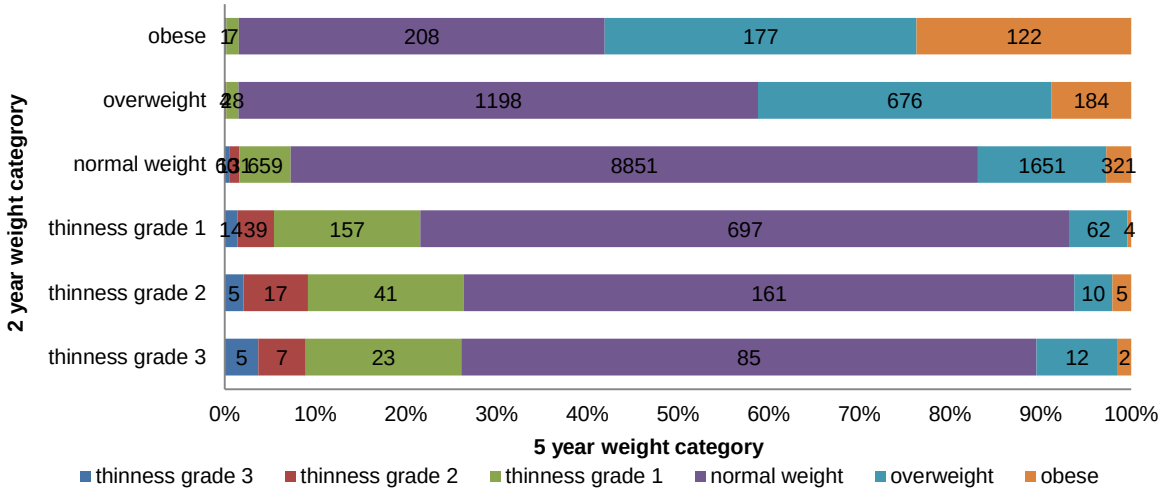


Figure P8. Numbers of children by 2 year and 10 year weight categories (only includes children measured at both 2 years and 10 years).

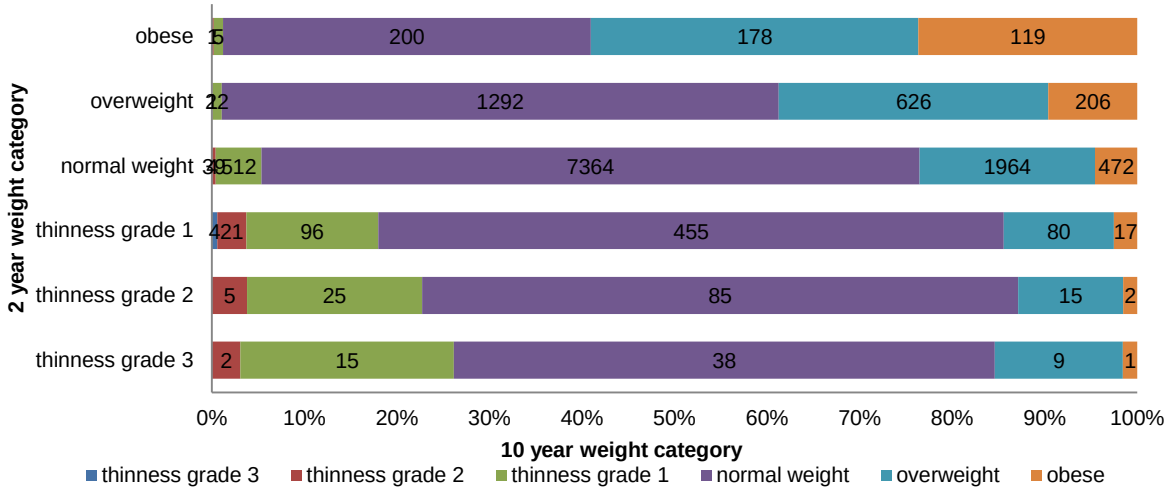
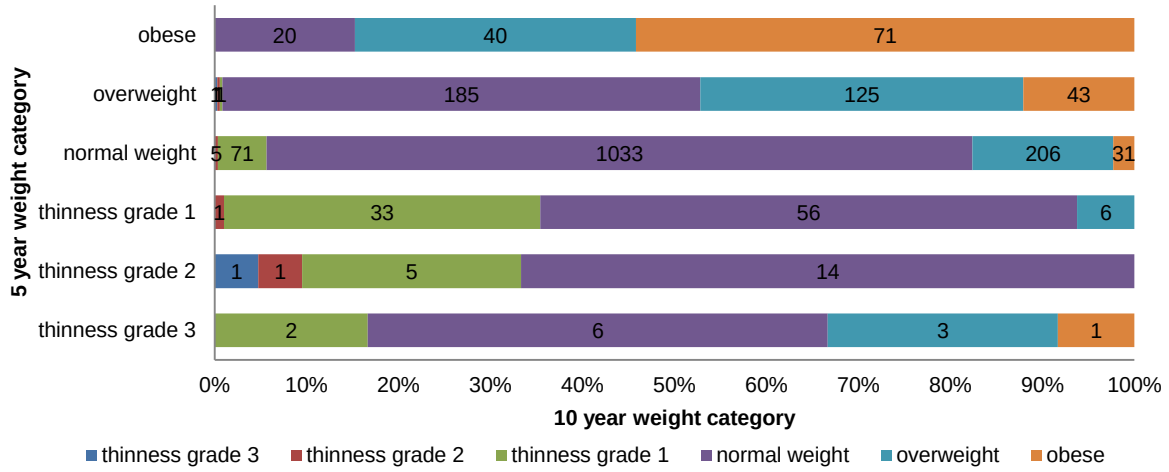


Figure P9. Numbers of children by 5 year and 10 year weight categories (only includes children measured at both 5 years and 10 years).



Deprivation & child health data

The child health data has postcodes which can be matched up to socioeconomic deprivation estimates. In this case we have used the IMD (Index of Multiple Deprivation) 2010 data. Some areas will have become more deprived or affluent over the time period from 1990-2013, but in general areas of Wirral have not changed that much. It was postulated that thinness grade 3 may be higher in the most deprived areas due some cases of under nourishment related to poverty but this was not the case, child thinness was not associated with deprivation. Figure P10 shows the overall trend for child obesity rates, showing that since 2004 rates have shown a diverging trend with the most deprived having increasing obesity rates and the least deprived having falling obesity rates. As we will see this is partly due to older ages being measured in the NCMP from 2006.

Figure P10. Percentage of children who are obese by year, showing only children from the most and least deprived quintile nationally in Wirral.

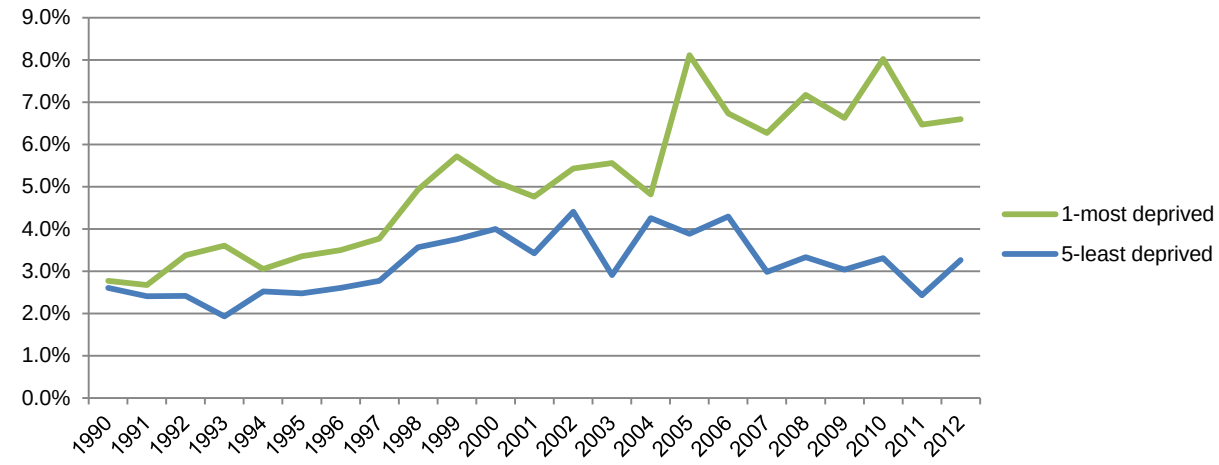
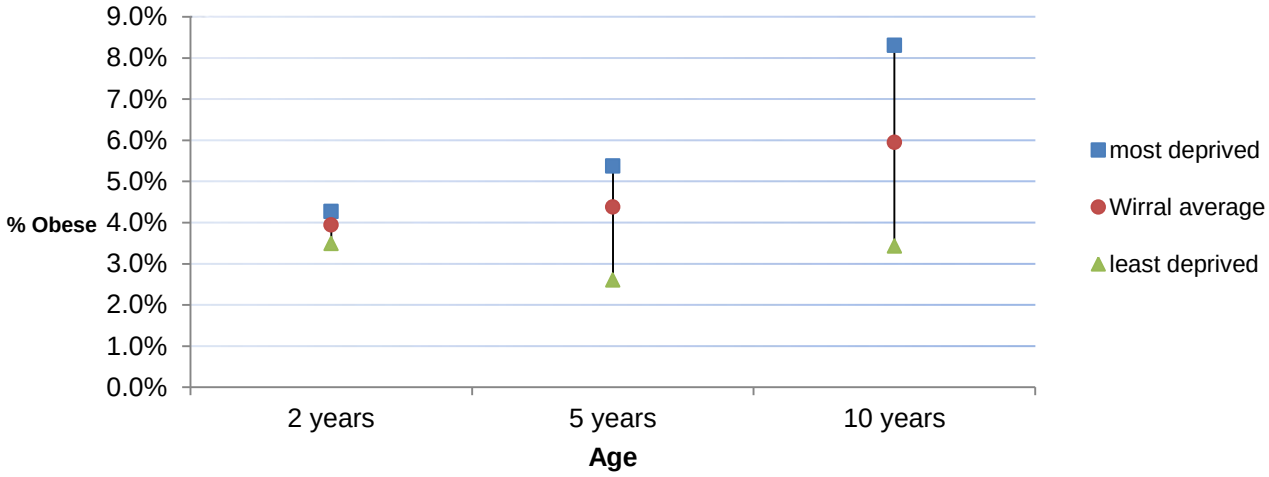


Figure P11 shows dramatically what happens with deprivation and child obesity over age groups. As children get older the gap goes from the most deprived having 1.2 times as many as the least deprived children obese at age two, to 2 times as many children obese at age five, and 2.4 times as many at age ten, so any interventions to reduce health inequalities around obesity need to happen while children are at an early age.

Figure P11. Percentage of children who are obese by age of exam, showing children from the most and least deprived quintile nationally, and the whole of Wirral.



6. Wellbeing Survey Data

A wellbeing survey carried out across the North West in 2009 included a large sample (1,500 people) for Wirral. This survey included questions on whether individuals were meeting the physical activity target of a minimum of 5 sessions each of 30 minutes a week of physical activity. The answers to these questions can then be matched up to individual's health related quality of life (EQ-5D) answers and subjective wellbeing (SWEMWBS) answers to look at the relationship between physical activity and health and wellbeing. The health-

related quality of life scores were greater for people who met the physical activity targets, particularly in the older age groups (Figure W1). The subjective wellbeing scores were higher for more active individuals in all age groups (Figure W2). Active older people had the highest wellbeing scores of all groups. This does not indicate on its own that physical activity causes better health and wellbeing as it may be an effect of people with poorer health or more social and wellbeing problems are less able to be active. But the pattern of health and wellbeing across age groups indicates quite strongly that getting people to be more active where possible can improve their health and wellbeing.

The difference in EQ-5D index scores between active and inactive individuals aged 55 and over is 0.2, which over 10 years would equate to 2 additional quality adjusted life years (QALYs) experienced by active individuals. The quoted threshold for society's willingness to pay for a QALY though public health interventions is £20,000 per QALY gained, so any intervention that made older people more active (without pushing them too hard so that their health was at risk in other ways) should produce large economic benefits to society, as long as it was not too costly.

Figure W1. Self-reported health related quality of life (EQ-5D) index scores, by age group and whether individuals met physical activity targets, based on wellbeing survey data for Wirral, 2009.

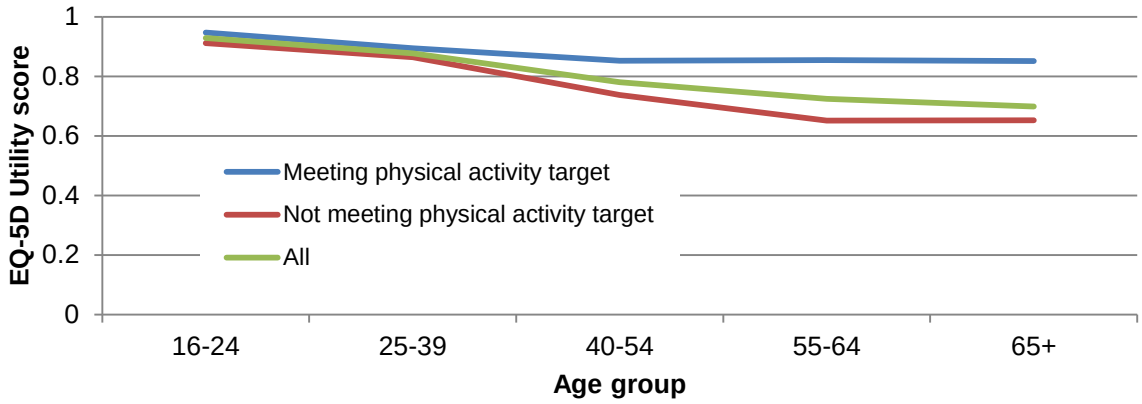
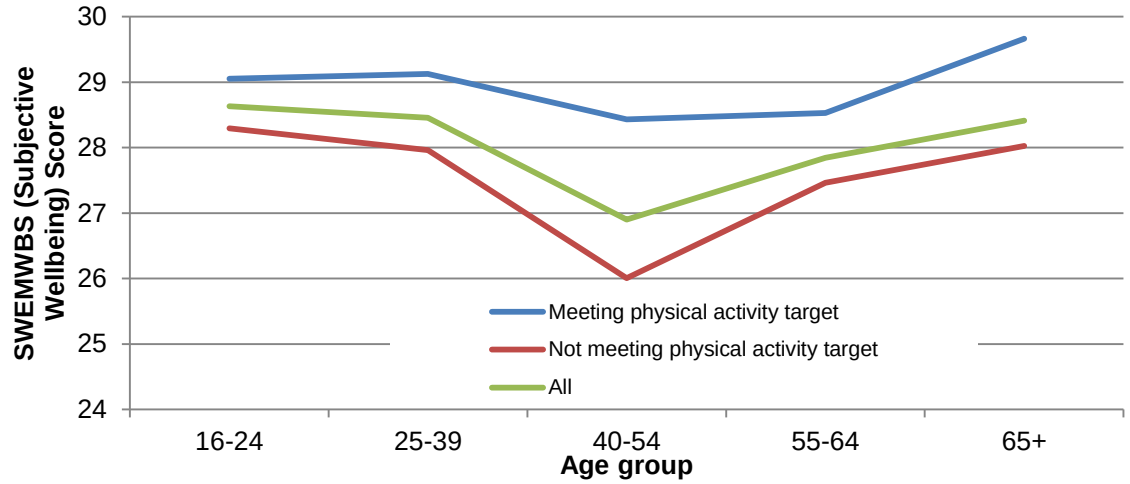


Figure W2. Subjective wellbeing (SWEMWBS) scores, by age group and whether individuals met physical activity targets, based on wellbeing survey data for Wirral, 2009.



7. Configuration of Services

In 2011/12 there were four main weight management services commissioned by Wirral, with three providers (see Table C1). The adult lifestyle and weight management service (LWMS) also act as a point of referral to the other adult weight management service 'Measure Up'. MEND provide a service for ages 5-7 and ages 7-13. There is also 'All Fired Up' which is a service for ages 14-19 which is now under the MEND umbrella. With regard to children aged under 4 years, Wirral do not commission 'Mini MEND' a service that MEND offer for children aged 2- 4; this is because it is felt that Health Visitors have a key role with very young children and it is important not to make families feel stigmatised, with courses around confidence, self-esteem, and parenting more important than referring toddlers into services. Weight is collected for 2 year olds by health visitors; however it is only recorded in the child health system for around 40% of children.

Table C1. List of weight management services.

Service	Provider	Time period for evaluation	Client group	Actual N clients (attending first session)	Actual N clients attending first session	Spend estimate
Adult LWMS 'Weigh 2 Change'	Wirral Community Trust	Sept 2011-Aug 2010	Adults 16+	1200	925	£509,839*
'Weigh 2 Grow'	Wirral Community Trust	Sept 2011-Aug 2011	Children 4-16 and families	120	81	£100,000*
'Measure up'	5 Boroughs Partnership	Sept 2011-Aug 2012	Adults 18+	1000	605	£79,074
MEND (including 'all fired up')	MEND subcontracted to NW APEX	April 2011-March 2012	Children 5-16 and families	600	161	£184,300
Totals (all services)				2920	1772	£873,213

* 'Weigh 2 Grow' and 'Weigh 2 Change' are commissioned under one contract so there is uncertainty around the spend split between the two services.

8. Other Services that Impact on Obesity

Other programmes that impact on obesity include the NCMP (National Child Measurement Programme) which aims to measure height and weight for all children in reception year (age 5-6) and year 6 (age 9-10). Local enhancements to the NCMP in Wirral use the opportunity to give advice to parents where children are overweight or obese.

Bariatric (weight loss) surgery is offered to patients from Wirral who meet the NICE criteria; this service is commissioned across the North West. Patients on the bariatric pathway have to go through local weight management services first, i.e. the LWMS in Wirral, and need to demonstrate they are motivated and can make a lifestyle change. Aintree and Countess of

Chester hospitals perform the surgery. Clients have a choice of what kind of surgery they want, usually either having gastric banding or a gastric bypass.
Orlistat is the only drug at the moment that is licensed in the UK for obesity (although some new GLP-1 analogue diabetes drugs like Exenatide and Liraglutide are also meant to produce weight loss in individuals with type 2 diabetes). Orlistat acts by inhibiting fat absorption, reducing the amount of fat people get from their food. Most previous licensed weight loss drugs have been stimulant type drugs, like Sibutramine which have been taken off the market because they pose a heart risk. Some newer drugs in development are similar in nature. In 2011/12 financial year there were 4,767 Orlistat items prescribed at a cost of £140,142 which comes from GP prescribing budgets. Wirral weight management services are not involved in prescribing Orlistat. Orlistat can also be bought over the counter in 60mg doses (Doctors can prescribe up to a 120mg dose). We do not have data about how many people in Wirral have bought Orlistat for themselves. In the USA, two new obesity drugs, Qsymia [a mix of Phentermine/topiramate] and Belviq [Lorcaserin] have been approved in the last two years so may be approved for the UK market in the future.

The Health Action Areas (HAAs) include some weight and exercise interventions in their services. Healthy Settings and the school nursing service both have health promotion activities around healthy eating. Health Visitors are involved in giving advice and weighing and measuring children. Nutrition & Dietetics services see patients with weight and food issues. There are also eating disorder services. There is regional obesity work that CHaMPs (Cheshire & Merseyside Partnerships for Health) have carried out in the past.

9. Reach of Services

A big consideration for weight management services is how many people they are reaching. In 2011/12 smoking services saw around 8,000 smokers (of whom around 50% quit at 4 weeks), which is around 1 in 7 smokers. So you would hope that over a period of several years a high proportion of smokers would come into contact with services. The target number of individuals attending adult weight management services in 2011/12 was 2,200. There are an estimated 64,540 obese adults and 96,238 overweight adults in Wirral[7], so assuming services are mostly used by obese people this would be around 1 in 30 obese people accessing these services, which means the other 29 out of 30 people are not- although they may have family members accessing services. For child weight management services the target number of families attending a first session is 820 (the actual numbers were a lot lower at around 240). The estimated number of obese children (aged 2-15) in Wirral is 7,170 and overweight children is another 6,046[8], so if obese children only were using services, this would equate to 1 in 9 obese children.

[7] Based on applying Health Survey for England 2011 data to Wirral census population data for 2011.
[8] Based on applying Health Survey for England 2011 data to Wirral census population data for 2011.

10. Economic Modelling Methods

The cost effectiveness of Wirral's four weight management services was modelled using data from the National Social Marketing Centre's Value for Money (VfM) tool. A series of Value for Money Tools have been developed by the National Social Marketing Centre with a health economist, Graham Lister, and data from NICE. [9] This tool measured the impact of adult or child clients who had lost weight as a result of the intervention, and their change in risk of disease and death. These estimates are based on applying WHO (World Health Organisation) burden of disease data around the burden of ill health (years lived in disability or YLD) and mortality (years of life lost) that are due to obesity. These summary DALYs (disability adjusted life years) lost through obesity are converted to QALYs (quality adjusted life years). These are calculated based on individuals achieving a behaviour change and moving from being high to low risk of experiencing obesity-related illnesses. Obesity has been linked to immediate and long-term health risks, including asthma, type II diabetes, cancer, heart disease, and increased mortality[10]. The National Obesity Observatory estimates that moderate adult obesity (BMI 30-35) was found to reduce life expectancy by an average of three years, while morbid obesity (BMI 40-50) reduces life expectancy by 8-10 years. Costs to the NHS for obesity are taken from the 2008 Foresight report *Tackling Obesity Future Choices* adjusted for England and 2007/8 expenditure levels. Cost for local authorities are allocated based on spend on social care. In 2008/09, £7.8 billion was spent nationally on social care for adults with health related problems. Because long term costs relate closely to the number of people requiring support, the full costs are taken into account in estimating potential savings. These savings are allocated on the basis of weighted years lived with disability attributable to obesity. These figures are inflated to 2012/13 prices.

11. Additional Impact on Marmot Objectives

Weight management services will have an additional impact on Marmot objectives that may not all be captured explicitly in our economic analysis;

- Child development

Children of obese parents are more likely to be obese themselves, through genetic, developmental and environmental factors. Reducing adult obesity should therefore help to make children healthier.

- Schooling

Healthier children are less likely to take time off school. Being obese can lead to bullying/teasing at school and self-esteem issues so helping families to be healthier can reduce this.

- Employment

[9] NSMC Value for Money Tools. Available at: http://www.thensmc.com/resources/vfm
[10] http://www.noo.org.uk/NOO_about_obesity/obesity_and_health

Reduction in obesity can be expected to increase employment and increase productivity. Reducing obesity rates in the population should reduce the number of days that are lost due to obesity-related illnesses like diabetes, and individuals retiring earlier or dying earlier than average. The Health Select Committee estimated lost earnings attributable to obesity at £2.3–3.6 billion per year, accounting for an annual total of 45,000 lost working years. Subsequent work suggests that the total impact of obesity on employment may be as much as £10 billion per annum.[11]

- Minimum income and benefits

Reduction in obesity can be expected to reduce the numbers dependent on benefits, but also increase pension payouts due to longer life expectancy. A recent estimate suggests that the costs of welfare (incapacity and unemployment benefits) for obese people may currently be between £1 billion and £6 billion in the UK.[11]

- Healthy environment and green spaces

Increasing exercise amongst obese people should increase the demand for green spaces. Encouraging people to eat healthier food may increase the demand for local fresh produce which may encourage more sustainable local food production. Encouraging sustainable transport reduces pollution and vehicle noise.

- Transport
-

Sustainable transport and reduced rates of obesity go hand in hand. Weight loss programmes that encourage cycling, walking and running will reduce pollution and traffic congestion. Cycling has a 'safety in numbers' effect where the more people who cycle, the lower the individual's risk of having an accident becomes.[12]

- Reducing health and social inequalities

Obesity shows a social gradient so reducing obesity in the population should reduce health inequalities.

[11] Health Select Committee Report, Obesity. 2004
[12] Jacobsen, P. L. (2003). "Safety in numbers: more walkers and bicyclists, safer walking and bicycling". Injury Prevention 9 (3): 205–209.

12. Adult Lifestyle and Weight Management Service 'Weigh 2 Change'

12.1 Description of Intervention

Wirral Community NHS Trust provide an Adult Weight Management Service, 'Weigh 2 Change' (WTC) across Wirral to obese adults in line with the Clinical NICE Obesity Guidance 43 (National Institute for Health and Clinical Excellence (2006) *Obesity: The Prevention, Identification, Assessment and Management of Overweight and Obesity in Adults and Children*. Clinical Guidance). The objective of the intervention is to offer advice, help and support to obese adults by promoting realistic healthy weight targets through addressing healthy eating, physical activity and improving self-esteem, that is appropriate to the individual's needs. The service has been funded from 1st April 2011 to 31st March 2014. The service is funded together with the child weight management service. The service is for obese adults (16 years and over) living in Wirral, with a Body Mass Index (BMI) of 35+, and for overweight (BMI 25+) pregnant women. The service is meant to aim for a maximum weekly weight loss of 0.5-1kg and aim towards individuals losing 5% of their body weight over 12 weeks and moving towards a more healthy BMI within one year through long term lifestyle changes like looking at food labelling, portion sizes and increasing physical activity.

The interventions typically offer clients 12 weeks of intensive support and follow up support for 12 months. There is a psychological wellbeing practitioner to try to keep clients engaged with services for up to 3 years. The service has recently recruited two mental wellbeing posts. Recruitment to the interventions is continuous over time. The service mainly has group sessions but also has some 1 to 1s. Services are mainly delivered face to face by trained staff, mostly specialist and intermediate level weight management advisors.

In previous years, the service gave out leisure passes to clients to use council run sports centres, gyms and swimming pools. These passes were funded by Wirral Council, but are no longer provided, so now WCT would have to pay £43 for each pass, and many clients do not use them. Some session venues are provided free of charge to WCT but the majority are paid for at around £40 per session. The only costs to participants are childcare, travel costs and other incidental costs. Some sessions involve time with an exercise physiologist, or some involve time in a kitchen looking at food preparation and portions.

The service recruits from across Wirral but is meant to particularly target people from the most deprived areas. The service is meant to be flexible and include vulnerable people, people with co-morbidities and people with learning disabilities among its clients. The service has a remit around training health, social care and community front line staff and volunteers in brief interventions and sign posting to encourage people to manage their weight. This will produce knock on benefits in addition to the benefits experienced by individuals using the service directly.

The service also provides weight management for people who are on the bariatric surgery pathway; this pathway stated that all patients should attend a minimum six month programme with local specialist obesity management services to ensure that they were

motivated to make a long term lifestyle change and are mentally and physically prepared for surgery and life after surgery. The surgery itself is commissioned by North West specialist commissioning and provided by Aintree Hospital and Countess of Chester.

12.2 Demographics

The data we looked at was for completers for September 2011 - August 2012. Based on a 12 week programme these would have been referred roughly from May 2011-April 2012. The LWMS also deal with some referrals for Measure Up and bariatric surgery patients. There are also some referrals for services that are no longer commissioned in Wirral (pharmacy and slimming world).

Table L1. Number of referrals coming through Wirral NHS Community Trust Service, May 2011-April 2012.

Service	N referrals
Bariatric	89
Knowsley-Measure Up	1197
LWMS Advisor	3689
Pharmacy	2
Slimming World	165
Grand Total	**5142**

Age and Gender

The age & gender distribution of clients who completed the WTC programme is shown in Table L1. Three quarters of clients were females, with the biggest age groups being over 35s.

Table L1. Age and gender distribution of clients for WTC.

Age Group	Female	Male	Total
Under 18	0.9%	0.0%	0.9%
18-34	11.1%	5.3%	16.3%
35-44	12.0%	2.6%	14.6%
45-59	29.6%	9.0%	38.6%
60+	21.4%	8.1%	29.5%
Total	**75.0%**	**25.0%**	**100.0%**

The average referral BMI was 38.7 for females and 38.9 for males, so on average clients were in the obese category. The average BMIs were much higher than for the Measure Up service, as would be expected as the WTC is more of a specialist service than Measure Up (Table L2). The majority of clients had a BMI greater than 35 (Table L3).

Table L2. Average referral BMI of clients for WTC.

Age Group	Female	Male	Total
Under 18	34.0		34.0
18-34	40.4	40.1	40.3
35-44	38.6	40.1	38.9
45-59	38.9	38.0	38.7
60+	37.6	38.9	38.0
Total	**38.7**	**38.9**	**38.7**

Table L3. Average referral BMI category of clients for WTC.

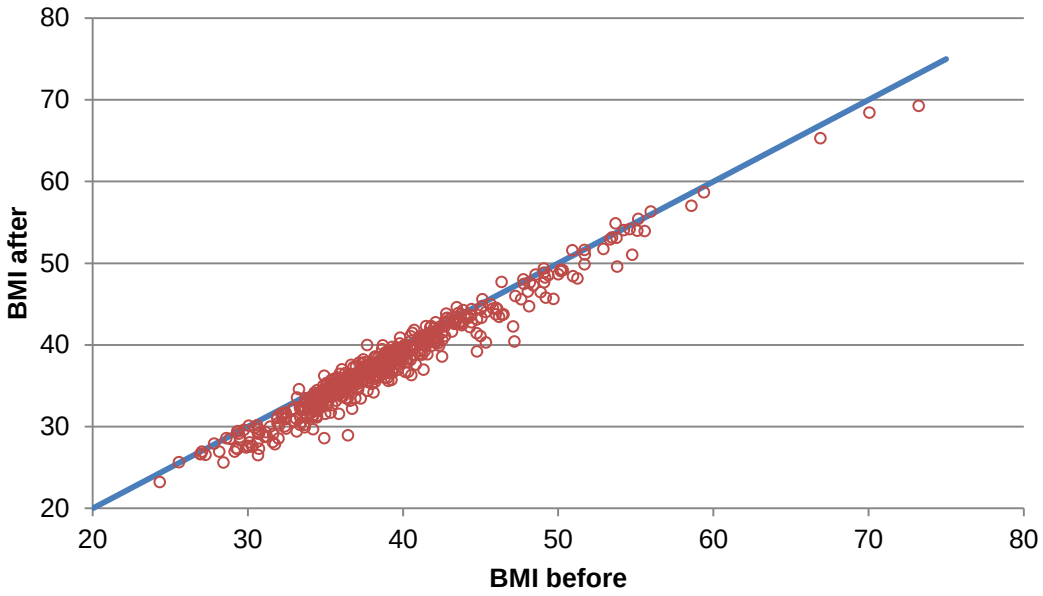
Referral weight category (based on BMI)	Female	Male	Total
overweight	17	3	20
obese i (BMI 30-34.9)	77	28	105
obese ii (BMI 35-39)	171	63	234
obese iii (BMI > 40)	134	39	173
Grand Total	**400**	**133**	**533**

Men generally lost more weight than women. The group who lost the most weight were men aged 35-44 (Table L4). Men and women aged under 18 (who made up a very small number of referrals) did not lose weight. Figure L4 shows a scatter of before and after BMI. Most clients are below the line indicating that their BMI has fallen. 88% of clients (467 out of 533) lost weight.

Table L4. Average BMI change by age and gender, WTC.

Age Group	Female	Male	Total
Under 18	0.3%	0.0%	0.3%
18-34	-2.8%	-3.1%	-2.9%
35-44	-3.9%	-4.7%	-4.1%
45-59	-3.1%	-4.2%	-3.4%
60+	-3.9%	-3.8%	-3.9%
Grand Total	-3.4%	-3.9%	-3.5%

Figure L4. Scatter showing before and after BMI, WTC.



In terms of different types of interventions, clients in the 12 week groups lost the most weight. One to one clients (who had a higher baseline BMI) lost the least weight (Table L5).

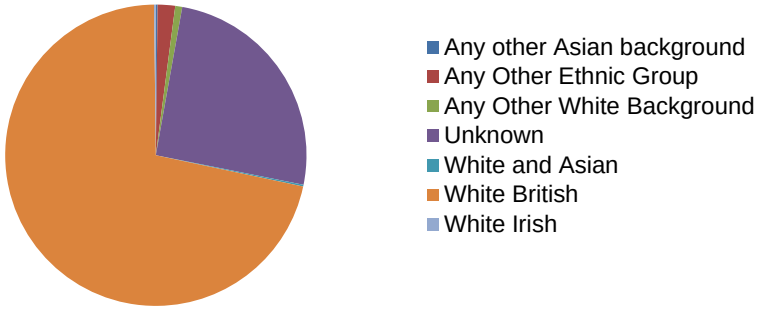
Table L5. Average BMI change by type of intervention, WTC.

Intervention	Number of completers	Average of Age	Average of BMI	Average BMI change
Group 12 week	417	53.0	38.74	-3.64%
Group non-12 week	68	46.2	37.26	-3.36%
One to one	48	45.2	40.69	-2.58%
Total	**533**	**51.4**	**38.73**	**-3.51%**

Ethnicity

25% of clients did not have ethnicity recorded. The majority of the rest were White British. 3% were non-White British (Figure L6).

Figure L6. Attendees by ethnicity, WTC.



Other health problems and disabilities

2.8% of clients were recorded as having a disability. 16.3% of clients had some kind of co-morbidity recorded, which were mainly diabetes, asthma, breathing problems, hypertension and depression.

Socioeconomic status and deprivation

In total 36% of clients were from the 20% most deprived areas nationally, based on the Index of Multiple Deprivation (IMD) 2010. This is slightly higher than the proportion of the Wirral population (32%). In particular a large proportion of clients were from the 3% most deprived areas nationally. This indicates that the service has been quite successful in recruiting clients from the most deprived communities. Baseline BMI was similar between groups. There did not seem to be any relationship between deprivation and average BMI change with all groups having similar weight loss.

Table L7. Number of attendees and average BMI change by deprivation quintile, WTC.

Deprivation group	N clients	% of clients	Average baseline BMI	Average BMI change
Most deprived 3% nationally	73	13.7%	39.8	-2.7%
Most deprived 3-5% nationally	22	4.1%	38.9	-4.8%
Most deprived 5-10% nationally	48	9.0%	39.7	-3.3%
Most deprived 10-20% nationally	50	9.4%	39.1	-3.4%
Rest of Wirral	336	63.0%	38.3	-3.7%
Total*	533	100.0%	38.7	-3.5%

* 4 clients were not matched up to deprivation group but are included in the total.

12.3 Cost of service

The adult lifestyle and weight management service and the child and family service are commissioned under the same block contract, worth £610,000 p.a. It is estimated that £100,000 of this is for the child and family service, leaving £510,000 for the adult service, some of which is spent on managing referrals to the other services, and providing training and health promotion. This means an estimated cost per client completing of £957 for the adult service.

12.4 Economic modelling results

Table L8 shows the anticipated costs, cost savings and QALYs from the Value for Money tool for this intervention based on 467 individuals achieving behaviour change, a one year persistence of 30% and subsequent long term persistence of 80%. Overall the intervention results in a net gain of 34.46 QALYs, with 4.85 deaths avoided. The cost per QALY before cost savings is £14,794 per QALY gained which compares favourably with NICE's willingness to pay threshold of £20,000 - £30,000 per QALY gained. Once savings from reduced healthcare needs in future, and reduced needs for social care for obesity-related illnesses are taken into account, the cost per QALY is £5,646. The service is estimated to add over 11 years of life expectancy across its clients.

Table L8. Costs and estimated cost savings and QALYs from 'Weigh to Change' intervention. Shown with lower and upper limits (sensitivity analysis).

Results	Health Impact QALY	Public Sector Services Cost Savings £	Net Cost to Public sector £	Net cost Per Health Gain £/QALY	Sensitivity Analysis		
Outcomes	34.46		£509,839	£14,794	**Value for money before savings high and low estimates**	£8,339	£30,848
Cost Savings to NHS from Health Gain £		£256,944	£252,895	£7,338	**Value for money net of NHS cost savings high and low estimates**	£3,519	£13,019
Cost Savings to Local Authority services arising from Social care & adult Wellbeing Services		£58,330	£194,565	£5,646	**Value for money net of NHS and LA savings high and low estimates**	£2,707	£10,016
Deaths Avoided	2.8				**Low and High estimates**	1.34	4.96
Years of Life Added	11.55				**Low and High estimates**	5.54	20.49

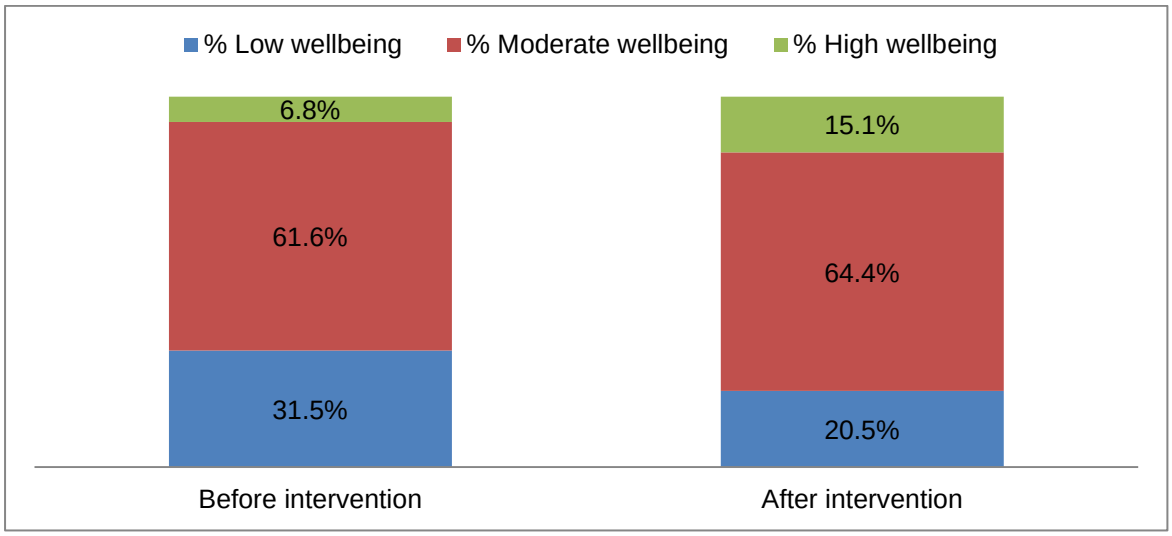
12.5 General Health (EQ-5D) and Subjective Wellbeing (SWEMWBS) Data

The Lifestyle and Weight Management Services (LWMS) started collecting general self-reported health related quality of life (EQ-5D) and subjective wellbeing (SWEMWBS [Short Warwick-Edinburgh Mental Wellbeing Scale]) data from adult clients in July 2012. They were mainly followed up after 12 weeks. See Appendix 1 and 2 for more information about EQ-5D and SWEMWBS. There was a reasonable level of correlation between before and after SWEMWBS, EQ-5D VAS and EQ-5D index scores, indicating that the data represented a consistent population over time.

As of September 2013, there was complete data at baseline and follow up for 73 clients with before and after SWEMWBS data, 53 clients with before and after EQ-5D Visual Analogue Scale data, and 75 clients with before and after EQ-5D index data (i.e. all 5 questions on the EQ-5D had been answered). All three of these measures showed a significant improvement over time.

Wellbeing as measured by the average SWEMWBS scores improved on from a mean score of 25.0 to a mean score of 26.8 (out of a maximum of 35), an increase of 7%, which was statistically significant[13]. All questions on the SWEMWBS showed an improvement, with the biggest increase being on people who said they had been dealing with problems well. The proportion of clients with high wellbeing increased and with low wellbeing fell over the time they were followed up (see Figure L7).

Figure L7. Proportion of clients reporting low, moderate and high wellbeing before and after WTC intervention.

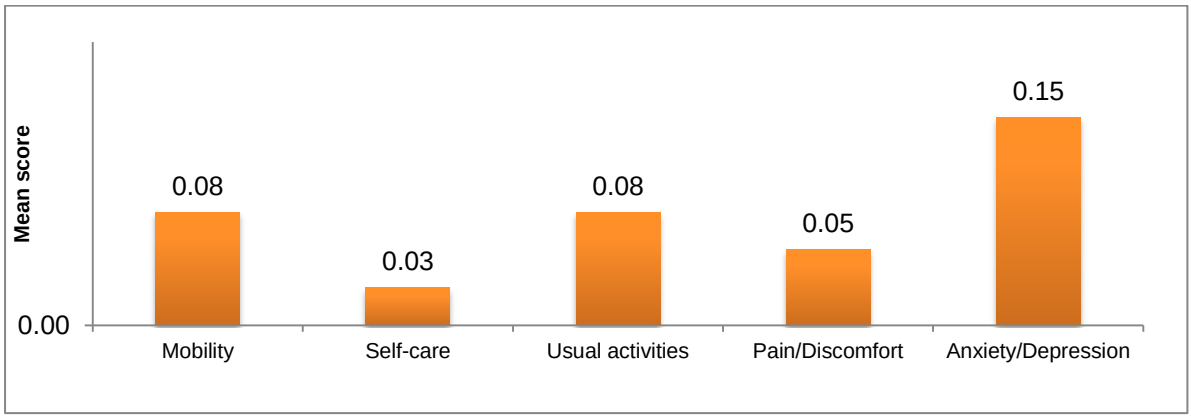


[13] p <0.001 - this means the difference has less than a 1/1000 probability of being by chance. Using Wilcoxon signed ranks test.

For EQ-5D Visual Analogue Scale (VAS), mean scores for self-assessed general health increased by 13%, from 58.5 out of 100 to 71.0 out of 100. This change was statistically significant[14].

For EQ-5D index scores, the mean scores increased from 0.626 to 0.669 out of a maximum score of 1.0, an increase of 6.8%. This change was statistically significant[15]. The five questions on the EQ-5D are around mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. The biggest improvement on the 5 questions of the EQ-5D was in reduced levels of anxiety and depression, followed by increased mobility and increased capacity to carry out usual activities (Figure L8).

Figure L8. Average increase in scores on EQ-5D questions after WTC Intervention.



There was a weak level of correlation between baseline SWEMWBS and VAS score, SWEMWBS and utility score, and VAS and utility score, with all having an r^2 value (an indicator of how well values are related) of less than 0.2. It is not unusual for SWEMWBS and EQ-5D to have a weak correlation because functional health and psychological wellbeing are only loosely related, but there is usually a stronger correlation between the EQ-5D VAS score and the EQ-5D index score, which both measure self-assessed health. This may indicate that the two measures have not been recorded at exactly the same time as each other, or may indicate some other issue in terms of people reporting on or assessing their own general health-related quality of life.

The fact that these indicators of health and wellbeing have shown significant increases shows that services improve people's health and wellbeing as well as helping them to lose weight. Other weight management services should consider collecting these measures as well.

[14] p <0.001 - this means the difference has less than a 1/1000 probability of happening by chance. Using Wilcoxon signed ranks test.
[15] p<0.05 - this means the difference has less than a 1/20 probability of happening by chance. Using a one-tailed paired sample t test, with a 95% confidence level.

13. ‘Measure Up’ Adult Weight Management Service

13.1 Description of Intervention[16]

‘Measure Up’ is an intermediate community weight management service that aims to reduce the prevalence of overweight and obese adults within the Wirral. The service aims to improve the health and lives of its adult population. ‘Measure-Up’ works with overweight and obese adults (BMI <34.9kg/m^2) and carers, to support them in making long-term lifestyle changes, including diet, increased physical activity and behavioural changes, in order to increase self-esteem, quality of life and longevity. ‘Measure Up’ is provided by the Knowsley Nutrition and Dietetic service as part of Integrated Community Services (ICS), which transferred to 5 Borough Partnership Foundation Trust in April 2011. The service began in May 2011 and has taken referrals for clients continuously since then. Clients are either triaged from the Lifestyle and Weight Management Service (LWMS) which is provided by Wirral CT, or self-refer. The time period we are looking at for this evaluation is September 2011-August 2012 which was chosen because the service should have been up and running a bit more by this date.

‘Measure-up’ is a free programme that provides clients with 12 weeks of weight management groups and individual support with a qualified Lifestyle Adviser. The group sessions include 60 minutes of weight management advice covering: making healthier food choices; planning and budgeting healthy meals; interpreting food labels. The service aims to support clients to achieve a 5-10% weight loss by the end of the programme. After completion of groups the clients have the option to attend a further 9 x 15 minute one to one sessions. Clients who do not wish to opt into group programmes have access to 6 x 15 minute one to one sessions, followed by an additional 9 x 15 minute follow up. Follow up sessions support clients monthly throughout the 12 month service. The service is delivered in a variety of locations across Wirral and is accessible 8am to 8pm, including weekends. The service has tried having men-only sessions and has approached employers. No incentives or travel are provided with the intervention. The theoretical rationale for the basis is following NICE Guidance CG43 on Obesity. The service fits in with the weight related targets in the Public Health Outcomes Framework outlined earlier in this report.

Marketing for the service included marketing on local radio and newspapers, and at local events, and promotion to GP and nurse forums. The service was promoted in local supermarkets and shopping centres.

13.2 Demographics

The data we looked at was for referrals for September 2011 - August 2012.

[16] Note: a lot of this description has been lifted from the service’s annual report

Age and Gender

The age & gender distribution of clients is shown in Table A1. Around a third of clients were women aged 60 and over. Men and young men in particular made up a smaller proportion of clients.

Table A1. Age and gender distribution of clients for Measure Up.

Age Group	Female	Male	Total
Under 18	0.2%	0.0%	0.2%
18-24	3.9%	0.5%	4.4%
25-44	19.5%	2.6%	22.2%
45-59	24.6%	7.4%	32.0%
60 and over	32.7%	8.5%	41.2%
Grand Total	**81.0%**	**19.0%**	**100.0%**

The average referral BMI was 30.6 for females and 32.2 for males, so on average clients were in the obese category.

Table A2. Average referral BMI of clients for Measure Up.

Age Group	Female	Male	Total
Under 18	33.26		33.26
18-24	30.24	33.90	30.55
25-44	30.43	32.00	30.61
45-59	30.66	32.46	31.08
60 and over	30.62	31.92	30.88
Grand Total	**30.57**	**32.18**	**30.87**

Table A3. Average referral BMI category of clients for Measure Up.

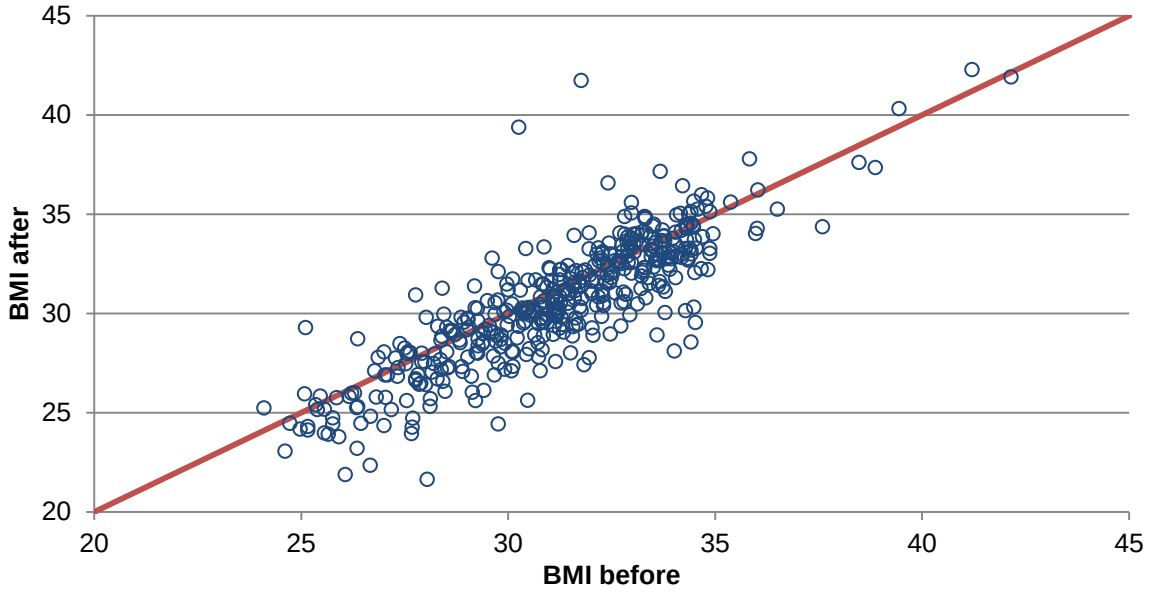
Referral weight category (based on BMI)	Female	Male	Total
Normal weight	5	0	5
Overweight	150	17	167
Obese	294	87	381
Unknown	11	4	15
Grand Total	**460**	**108**	**568**

Men generally lost more weight than women, while the age group who lost the most weight were people aged 60 and over (Table A4). Men aged 25-44 fared worst, gaining weight on average, although they only made up a very small proportion of clients so any predictions based on this figure would be subject to a lot of uncertainty. Figure A4 shows a before and after scatter plot showing baseline BMI against follow up BMI. It looks like the majority of clients are below the line, indicating that their BMI has fallen.

Table A4. Average BMI change by age and gender, Measure Up.

Age Group	Female	Male	Total
Under 18			
18-24	-2.2%	-0.5%	-2.0%
25-44	-1.8%	0.2%	-1.6%
45-59	-1.4%	-2.5%	-1.7%
60 and over	-2.3%	-3.7%	-2.5%
Grand Total	**-1.9%**	**-2.8%**	**-2.1%**

Figure A4. Before and after BMI scatter, Measure Up.



Ethnicity

Most clients did not have ethnicity recorded. This means it is not possible to determine whether people from minority ethnic groups are well represented in the service, or whether people from minority ethnic groups are more or less successful than other groups in terms of losing weight.

Table A5. Attendees by ethnicity, Measure Up.

Ethnicity	N
[Blank]	559
Not Known	3
White - British	5
White - Irish	1
Grand Total	**568**

Disability

Disability was not recorded in the data we were provided with.

Socio-economic status

Socioeconomic status, employment status or similar was not recorded in the data we were provided with. Nor was educational attainment or housing tenure recorded. Full postcode was recorded for most clients so clients could be matched up to the Index of Multiple Deprivation 2010 (IMD) Score for the Lower Layer Super Output Area (LSOA- a geography level used by ONS where each LSOA contains c. 1,500 people) where they resided. 34% of Measure Up clients were from the most deprived quintile nationally, which is slightly higher than the proportion of the whole Wirral population (31%). Overall the spread of clients across deprivation groups showed a similar pattern to Wirral but did not seem to reflect targeting interventions particularly to the most deprived groups, which is what is needed to reduce health inequalities. Average BMI change did not show any pattern with regards to deprivation quintile.

Table A6. Number of attendees and average BMI change by deprivation quintile, Measure Up.

National deprivation quintile	N Clients	% of total	Average BMI change
1 – most deprived	194	34%	-2.13%
2	106	19%	-0.97%
3 – average	85	15%	-2.60%
4	86	15%	-2.36%
5 – least deprived	82	14%	-2.44%
Unknown	15	3%	-3.05%
Grand Total	**568**	**100%**	**-2.07%**

13.3 Cost of service

The budget for the service in 2011/12 financial year was £79,074. The average cost per client based on 437 completers was £181 per completer. This instinctively feels like quite a reasonable cost per client, as long as a good proportion of them lose weight.

13.4 Economic modelling results

The impact of 286 clients whose BMI decreased over the course of the intervention was modelled using the NSMC Value for Money tool. Overall the intervention results in a net gain of 7 QALYs, with 0.57 deaths avoided. The cost per QALY before cost savings is £11,287 per QALY gained before cost savings are taken into account, which compares favourably with NICE's willingness to pay threshold of £20,000 - £30,000 per QALY gained. The intervention is estimated to add 2.35 years of life expectancy. The service is more cost effective than the adult lifestyle and weight management service with a lower cost effectiveness ratio, but does not have as big an impact across the population.

Table A7. Costs and estimated cost savings and QALYs from Measure Up intervention. Shown with lower and upper limits (sensitivity analysis).

Results	Health Impact QALY	Public Sector Services Cost Savings £	Net Cost to Public sector £	Net cost Per Health Gain £/QALY	Sensitivity Analysis		
Outcomes	7.01		£79,074	£11,287	Value for money before savings high and low estimates	£6,295	£25,420
Cost Savings to NHS from Health Gain £		£52,233.00	£26,841	£3,831	Value for money net of NHS cost savings high and low estimates	£1,701	£6,870
Cost Savings to Local Authority services arising from Social care & adult Wellbeing Services		£11,857.00	£14,984	£2,139	Value for money net of NHS and LA savings high and low estimates	£950	£3,835
Deaths Avoided	0.57				Low and High estimates	0.25	1.02
Years of Life Added	2.35				Low and High estimates	1.04	4.21

14. Child & Family Lifestyle and Weight Management Service 'Weigh 2 Grow'

14.1 Description of Intervention

This intervention is provided by Wirral Community NHS Trust who also provide 'Weigh to Change' the adult service. The service was funded from April 2011-March 2014 at an estimated cost of around £100,000 per annum. The aim of the service is to manage and deliver a programme of activities across Wirral for overweight and obese children and young people in line with the Clinical NICE Obesity Guidance 43 (National Institute for Health and Clinical Excellence (2006) *Obesity: The Prevention, Identification, Assessment and Management of Overweight and Obesity in Adults and Children*. Clinical Guidance). The intervention aims to provide an intensive face to face programme for 10 weeks to support overweight and obese children to either maintain or lose weight within 10 weeks, and to continue to support these children for up to 12 months towards achieving a healthy weight. There is a mixture of group and one to one sessions.

Services include family members or carers and each child in the service has at least one nominated family member or carer who is encouraged to attend sessions. Services are set out to be flexible and adaptable to meet the needs of more vulnerable children such as those with learning disabilities or looked after children and to include children with mild to moderate disabilities. Recruitment to the programme is continuous. The National Child Measurement Programme (NCMP) measures children's height and weights in schools at age 4-5 and 9-10 so this is a key potential route for recruitment into weight management services for children identified as being overweight or obese.

The service addresses issues such as healthy eating, physical activity and emotional wellbeing. Bullying is one issue that is associated particularly with being overweight and obese in children. For many children and their families, preventing bullying and increasing self-esteem and body confidence is a bigger factor in getting them into services than worrying about the long term health consequences of being obese or overweight, whereas for adults it might be a health shock that brings them into services like having high cholesterol or early signs of type 2 diabetes.

14.2 Demographics

The data we looked at was for completers for September 2011 - August 2012. Based on a 10 week programme these would have been referred roughly from May 2011-April 2012. There were 166 referrals in this time. There were 40 twelve week completers, of whom 35 were from groups and five were from one to ones. 60% of clients were recorded as having their mother as their carer who came with them, 25% were not recorded, and the other 15% were father, grandmother or 'other'.

Age and Gender

The age & gender distribution of clients is shown in Table G1. Girls made up a higher proportion of clients than boys with a 3:1 ratio. The main age groups were 7-11 years.

School year was also recorded for 45% of clients. The clients were fairly evenly spread from year 1 to year 9.

Table G1. Age and gender distribution of clients for Weigh To Grow.

Age Group	Female	Male	Total
4-7	1	0	1
8-11	16	3	19
12-16	14	6	20
Grand Total	**31**	**9**	**40**

Baseline BMI was recorded for all completers. Average baseline BMI for clients by age and gender is shown in Table G2. The relationship between BMI and weight category varies by age and gender in children. The average BMIs were much higher than for the other child and family weight management service (MEND). Three quarters were obese, while one quarter were overweight, based on International Obesity Task Force (IOTF) cut-offs (Table G3). The children were categorised using the LMS Growth add-in to Excel.[17] Around 50% children also had their waist measurements recorded in a free text field in the database.

Table G2. Average referral BMI of clients for Weigh to Grow.

Age Group	Female	Male	Total
4-7	28.8		28.8
8-11	26.1	27.5	26.3
12-16	31.1	28.7	30.4
Grand Total	**28.4**	**28.3**	**28.4**

Table G3. Average referral BMI category of clients for Weigh to Grow.

Referral weight category (based on BMI)	Female	Male	Total
Overweight	8	2	10
Obese	23	7	30
Total	**31**	**9**	**40**

BMI change was available for 40 completers. Table G4 shows average BMI change. Most clients had a reduction in BMI. BMI reductions were greater in boys than in girls. As with the other child and family service it is worth bearing in mind that for children maintaining their weight while they grow taller rather than losing weight can be enough to reduce their risk of

[17] Pan H, Cole TJ. LMSgrowth, a Microsoft Excel add-in to access growth references based on the LMS method. Version 2.77. http://www.healthforallchildren.co.uk/; 2012.

weight related health problems. Table G5 shows where clients have moved between weight categories. There is little change, with no obese clients moving to being overweight.

Table G4. Average BMI change by age and gender, Weigh to Grow.

Age	Female	Male	Total
4-7	2.1%		2.1%
8-11	0.3%	-1.8%	0.0%
12-16	-1.1%	-3.5%	-1.8%
Total	-0.3%	-2.9%	-0.9%

Figure G4. BMI before and after scatter, Weigh to Grow.

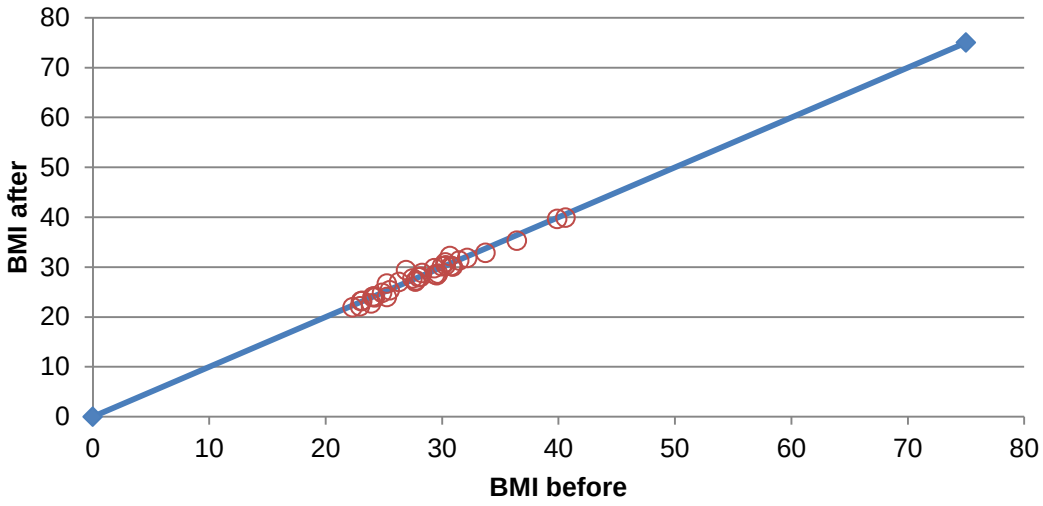


Table G5. BMI category before and after intervention, Weigh to Grow.

Initial category	Final category		
	overweight	obese	Total
overweight	11	1	12
obese		28	28
Total	11	29	40

Six and Twelve month follow up

Data was available for 8 clients at six month follow up, of whom 6 out of 8 had maintained or lower BMI, while 2 out 8 had a higher BMI. One client had moved from being obese to being classed as thin under IOTF cut offs. The other 7 were all still classed as obese. There was 12 months follow up data for 5 clients; these all showed an increase in BMI, of 3% on average. With such small numbers it is hard to draw firm conclusions; it may be that these represent clients who are still in the programme because they have not lost weight, while other more successful clients have left the programme.

Ethnicity

Ethnicity was recorded for 63% of clients. They were all White British or White Irish.

Disability

No clients were recorded as having a disability. In terms of health problems, a small percentage were recorded as being asthmatic.

Socio-economic status

The service is successful in recruiting clients from the most deprived areas, as can be seen in Table G5.

Table G5. Percentage of families in Weigh to Grow in each IMD decile, 2011/12.

Deprivation group	N clients	% of clients	Average baseline BMI	Average BMI change
Most deprived 3% nationally	7	17.5%	29.6	-0.65%
Most deprived 3-5% nationally	3	7.5%	29.4	1.22%
Most deprived 5-10% nationally	4	10.0%	31.4	-2.20%
Most deprived 10-20% nationally	4	10.0%	28.0	-0.24%
Rest of Wirral	22	55.0%	27.0	-1.10%
Total*	40	100.0%	28.1	-0.87%

Adherence Rate

The average adherence rate is around 80% of clients completing the programme.

14.3 Cost of service

The cost per client/family is £100,000 divided by 40 completers which is around £2,500. This seems quite high, but will be partly because the programme has not met its target number of clients. There will be added value to families as well as to the children having the intervention.

14.4 Economic Modelling Results

The impact of 'Weigh to Grow' was modelled for 40 clients who had before and after data, of whom 20 had a lower BMI at 12 weeks, and 5 had maintained the same BMI. The total number of quality adjusted life years (QALYs) gained was 2.8, with a cost per QALY after cost savings of £28,303 per QALY gained, which would not be considered to be cost effective using the NICE threshold for public health interventions. NICE regard public health interventions to be cost effective if they cost less than £20,000 per QALY gained. If there was data for more children who had completed the programme then this cost per QALY value would be lower. Also there may be added value from family members who have lost weight as a result of the programme, but this is not currently measured in the data we have.

Table G7. Costs and estimated cost savings and QALYs from 'Weigh to Grow' intervention. Shown with lower and upper limits (sensitivity analysis).

Results	Health Impact QALY	Public Sector Services Cost Savings £	Net Cost to Public sector £	Net cost Per Health Gain £/QALY	Sensitivity Analysis		
Outcomes	2.8		£100,000	£35,758	Value for money before savings high and low estimates	£18,599	£78,441
Cost Savings to NHS from Health Gain £		£20,850	£79,150	£28,303	Value for money net of NHS cost savings high and low estimates	£12,902	£54,415
Cost Savings to Local Authority services arising from Social care & adult Wellbeing Services		£4,733	£74,417	£26,610	Value for money net of NHS and LA savings high and low estimates	£51,160	£12,131
Deaths Avoided	0.23				Low and High estimates	0.1	0.44
Years of Life Added	0.94				Low and High estimates	0.43	1.8

15. MEND (Mind, Exercise, Nutrition, Do it!) Child Weight Management Service

15.1 Description of Intervention

MEND offers an 8-12 week programme combining nutrition, physical activity and behaviour change in local communities. It was funded for 2011/12 by NHS Wirral at a cost of £184,300. The service does not provide transport so these costs and other incidental costs are met by the families. The service was commissioned for 2 financial years from April 2011 to March 2013. It incorporated 'All Fired Up' a previous service for 14-19 year olds, as well as interventions for 5-7 and 7-13 year olds and their families. The intervention was recruited to continuously through 2011/12 and is delivered after school in non-health community settings – mostly in schools, and also community centres and children centres. MEND also provides a programme for children and young people age 5-19 years with mild to moderate disabilities, who are above a healthy weight, delivered in special schools. The MEND interventions are mainly delivered in groups and are delivered by trained staff, many of whom are qualified teachers. The All Fired Up interventions are delivered by health trainers and exercise leaders. MEND carry out quality assurance of their programmes. The

theoretical basis of the service is to manage and deliver a programme of activities or service across Wirral for overweight and obese children and young people in line with the Clinical NICE Obesity Guidance 43. There is some debate over whether child weight management programmes should promote weight loss or promote weight maintenance which will result in a decrease in BMI when children get taller.

The key service outcomes are

- To contribute to a reduction in the health inequalities gap across Wirral
- To contribute to the reduction of obesity levels in children, particularly among school age children in Reception and Year 6 [BMI in these school years is measured as part of the National Child Measurement Programme]
- An increased awareness of families accessing the weight management service of the importance of a healthy weight
- A high quality weight management programme for children and young people and their families who live in Wirral that is delivered in a safe and effective manner by staff that are appropriately trained in regard to the welfare of children

The data for MEND is collected on an online database which Wirral have access to.

Participants are eligible in general if their BMI is above the 91st percentile. Children above the 99.6th percentile are referred to a GP or paediatrician before beginning a programme in case of an undiagnosed health problem. Participants are recruited through self-referral or referral from other agencies. 85% of referrals are from children's mothers, with only a very small number of referrals coming from NCMP or health professionals. Almost all clients said they heard about MEND through school, school nurse, or NCMP. The numbers recruited to the programme are much lower than the targets so there are issues either with recruitment or with the number of families who are willing to use services.

15.2 Demographics

The data we looked at was for starters for April 2011-March 2012. 74% of clients had their mother as the relative who came along with them to the first session. 28% of clients had a single parent. 43 clients were recorded as having the main earner in the household unemployed, compared to 55 clients having the main earner in employment.

Age and Gender

The age & gender distribution of clients is shown in Table M1. Girls made up a higher proportion of clients than boys. The main age groups were 7-11 years. School year was also recorded for 45% of clients. The clients were pretty evenly spread from year 1 to year 9.

Table M1. Age and gender distribution of clients for MEND.

Age Group	Female	Male	Total
Less than 5/unknown	4	4	8
5	8	10	18
6	12	4	16
7	15	6	21
8	13	9	22
9	12	7	19
10	13	12	25
11	9	10	19
12	3	9	12
13-14	5	8	13
Total	94	79	173

Baseline BMI was recorded for 30.6% of clients. Average baseline BMI for clients by age and gender is shown in Table M2. The relationship between BMI and weight category varies by age and gender in children. Of those clients with BMI recorded, around a third were normal weight, a third overweight and a third obese, based on International Obesity Task Force (IOTF) cut-offs (Table M3). The children were categorised using the LMS Growth add-in to Excel.[18]

Table M2. Average referral BMI of clients for MEND.

Age	Female	Male	Total
5	17.4	16.9	17.0
6	20.4	19.7	20.2
7	20.6	17.3	20.3
8	20.9	28.2	24.0
9	27.1	15.9	23.4
Total (includes all ages)	20.5	19.4	20.0

Table M3. Average referral BMI category of clients for MEND.

Referral weight category (based on BMI)	Female	Male	Total
Normal weight	10	9	19
Overweight	11	5	16
Obese	11	5	16
Unknown	62	60	122
Total	**94**	**79**	**173**

[18] Pan H, Cole TJ. LMSgrowth, a Microsoft Excel add-in to access growth references based on the LMS method. Version 2.77. http://www.healthforallchildren.co.uk/; 2012.

BMI change was available for 39 out of 173 clients. Table M4 shows average BMI change. Most clients had an increase in BMI. Unlike adults whose height is quite consistent, for children maintaining their weight while they grow taller rather than losing weight can be enough to move them from being obese to overweight or overweight to normal weight, so a BMI reduction is not always needed. Table M5 shows where clients have moved between weight categories. It is hard to say much about this data because the numbers are so small but it does indicate some children moving from obese to overweight, and overweight to normal weight, and does not show any children moving in the wrong direction.

Table M4. Average BMI change by age and gender, MEND.

Age	Female	Male	Total
5	2.7%	1.2%	1.8%
6	1.7%	5.9%	2.1%
7	0.9%		0.9%
8	4.3%	3.3%	3.9%
9	1.3%	-3.0%	-0.9%
Total (includes all ages)	2.0%	1.8%	1.9%

Figure M4. Before and after BMI scatter, MEND.

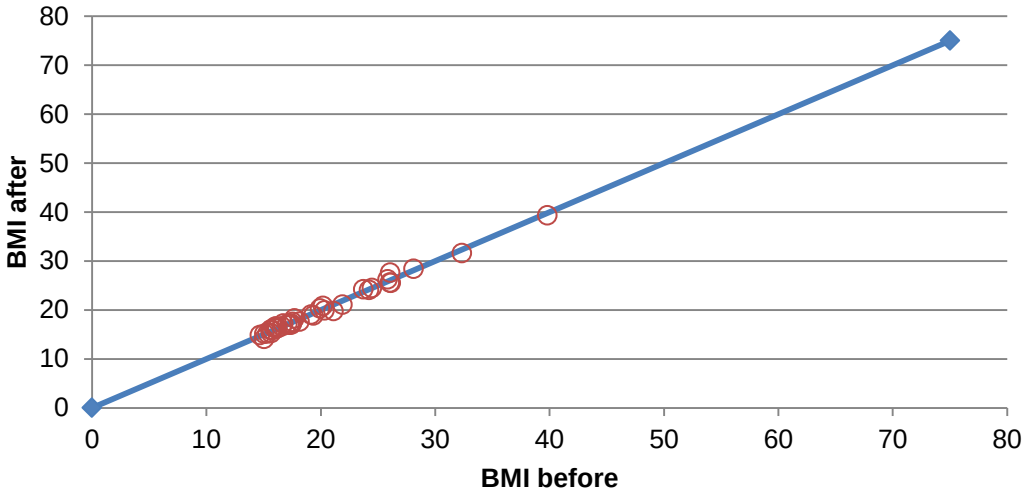


Table M5. BMI category before and after intervention, MEND.

	Final category				
Initial category	Normal weight	Overweight	Obese	Unknown	Total
Normal weight	15			4	19
Overweight	3	9		4	16
Obese		1	11	4	16
Unknown				122	122
Grand Total	18	10	11	134	173

Ethnicity

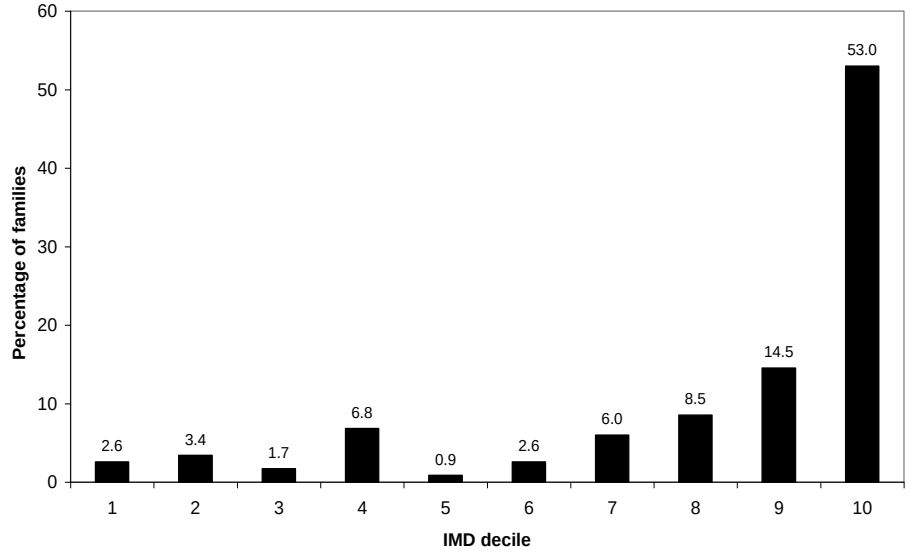
Ethnicity was recorded for 66% of clients. They were almost all recorded as White British. This suggests either that the MEND service is not used by any minority ethnic groups, or that ethnicity is not reliably recorded.

Disability was not recorded in the data we were provided.

Socio-economic status

The service is successful in recruiting clients from the most deprived areas, as can be seen in Figure M1.

Figure M1. Percentage of families in MEND in each IMD decile, 2011/12.



Attendance Rate

The average attendance rate where recorded was 74%.

15.3 Cost of service

The cost per family starting the intervention is £184,300 divided by 110 families who attended the first session which is £1,675.46. Or the cost per completer is £4,725. This seems high, but will be partly because the programme has taken time to roll out and has not met its target number of clients. The added value to families as well as the children having the intervention is also hard to quantify.

15.4 Economic Modelling Results

The results were modelled for the 39 clients who had before and after BMI data. Of these 18 had lower BMI and 5 had maintained their BMI. The cost per QALY after cost savings are taken into account is £63,924 which would not be considered to be cost effective using the current threshold recommended by NICE of less than £20,000 per QALY gained. The main reason these results do not suggest the service is cost effective is because there is only follow up data for around 22% of clients. If these results in terms of BMI change were

replicated for all 173 clients then the cost per QALY before any savings would be £16,473, and after savings would be £7,325 which would be considered a lot more cost effective. So the lack of cost effectiveness could be partly down to a lack of follow up data to demonstrate that clients have actually lost weight or maintained their body mass index. There may also be additional effects in terms of family members becoming more healthy by eating a better diet or being more active, but this data is not really captured at the moment.

Table M5. Costs and estimated cost savings and QALYs from MEND intervention. Shown with lower and upper limits (sensitivity analysis).

Results	Health Impact QALY	Public Sector Services Cost Savings £	Net Cost to Public sector £	Net cost Per Health Gain £/QALY	Sensitivity Analysis		
Outcomes	2.52		£184,300	£73,072	Value for money before savings high and low estimates	£37,868	£160,690
Cost Savings to NHS from Health Gain £		£18,804	£165,496	£65,616	Value for money net of NHS cost savings high and low estimates	£29,838	£126,616
Cost Savings to Local Authority services arising from Social care & adult Wellbeing Services		£4,269	£161,227	£63,924	Value for money net of NHS and LA savings high and low estimates	£29,069	£123,350
Deaths Avoided	0.2				Low and High estimates	0.09	0.39
Years of Life Added	0.85				Low and High estimates	0.38	1.63

16. Appendix 1. About WEMWBS (Warwick-Edinburgh Mental Wellbeing Scale)

The Warwick Edinburgh Mental Wellbeing Scale is a 14-item scale that measures subjective wellbeing. There is also a shorter 7-item version (Short WEMWBS) which has been shown to approximate well to the longer version and to scale better than the longer version; (so for instance a score of 30 would be twice as good as a score of 15).

The WEMWBS is said to measure (1) the subjective experience of happiness (affect) and life satisfaction (the hedonic perspective); and (2) positive psychological functioning, good relationships with others and self-realisation (the eudaimonic perspective). The latter includes the capacity for self-development, positive relations with others, autonomy, self-acceptance and competence. These are not always measured with general health questionnaires which focus more on symptoms of poor health or how people function.

WEMWBS aims to measure mental well-being itself and not the determinants of mental well-being, which include resilience, skills in relationship, conflict management and problem solving, as well as socioeconomic factors such as poverty, domestic violence, bullying, unemployment, stigma, racism and other forms of social exclusion. Mental wellbeing is related to, but not the same as, sense of coherence, capability, and mental health as regarded in terms of the spectrum of mental illness.

WEMWBS has a list of 14 (or 7 for SWEMWBS) positively worded items that relate to an individual's state of mental well-being (thoughts and feelings) in the previous two weeks. Respondents rate themselves against items with answers that range from "none of the time"(scored as 1) to "all of the time" (scored as 5). Total score can range from 14 to 70 for the WEMBWS or 7 to 35 for SWEMWBS where a higher score indicates a higher level of wellbeing. There are no set rules for how many questions need to be answered but generally a questionnaire is rejected if someone has answered less than 12 out of 14 items on the WEMWBS, or 6 out of 7 on the SWEMWBS.

WEMWBS is included in the national Scottish Health Survey and is widely used in the UK and beyond. Population scores on WEMWBS approximate to a normal distribution with no ceiling or floor effects, making the scale suitable for monitoring mental well-being in population samples. WEMWBS has been validated on a student and representative population sample.

WEMWBS was included as part of the north west wellbeing survey which was carried out in Wirral in 2008 and will be repeated over the next year, so there is local Wirral data to compare to. This means that even in the absence of a 'control group' for evaluation, the change in WEMWBS can be compared to the general population scores.

WEMWBS is validated for age 13+. For younger children there is the Stirling children's wellbeing scale (SCWBS) but this is less widely used and has not been validated.

http://www.friendsforlifescotland.org/site/The%20Stirling%20Children's%20Wellbeing%20Scale.pdf

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the last 2 weeks

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
*I've been feeling optimistic about the future	1	2	3	4	5
*I've been feeling useful	1	2	3	4	5
*I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
*I've been dealing with problems well	1	2	3	4	5
*I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
*I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
*I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)

*** denotes questions used in the short WEMWBS scale**

17. Appendix 2. About the EQ-5D (Euroqol 5 dimension) Questionnaire

The EQ-5D-3L is a validated, widely used self-reported general health survey with 5 questions on mobility, self-care, usual activities, pain/discomfort, and anxiety/depression with 3 potential level of answers to each question. In total this can produce 243 possible combinations of answers which can be matched to population health index scores which are generally between -0.594 (worst health) and 1 (perfect health). These index scores were calculated based on asking a sample of the UK population how many years they would trade off in a given health state to spend a shorter amount of time in perfect health. These index or utility scores are the gold standard (recommended by NICE) for calculating quality adjusted life years (QALYs) which are a summary measure of length and quality of life, where 1 QALY equals one year lived in perfect health.

The EQ-5D also has a visual analogue scale (VAS) where individuals mark off between zero and 100 how they consider their own health state that day with 100 being best possible health, and zero being worst.

The EQ-5D was included as part of the north west wellbeing survey which was carried out in Wirral in 2008 and will be repeated over the next year, so there is local Wirral data to compare to. This means that even in the absence of a 'control group' for evaluation, changes in EQ-5D can be compared to the general population scores for Wirral. EQ-5D is also included in the Health Survey for England. EQ-5D does produce some ceiling effects when used in relatively healthy populations (where many people have an index score of 1); a 5 level version is currently in development which should be more sensitive than the current version to subtle changes in health status.

There is a child version of the EQ-5D, the EQ-5D-Y, which is validated for 7-12 year olds.

EQ-5D Health Questionnaire

Client ID ☐ New User ☐ Existing User ☐

Date ☐

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.

1. Mobility

I have no problems in walking about ☐ 1

I have some problems in walking about ☐ 2

I am confined to bed ☐ 3

2. Self-Care

I have no problems with self-care ☐ 1

I have some problems with washing or dressing myself ☐ 2

I am unable to wash or dress myself ☐ 3

3. **Usual Activities** (*e.g. work, study, housework, family or leisure activities*)

I have no problems with performing my usual activities ☐ 1

I have some problems with performing my usual activities ☐ 2

I am unable to perform my usual activities ☐ 3

4. Pain / Discomfort

I have no pain or discomfort ☐ 1

I have moderate pain or discomfort ☐ 2

I have extreme pain or discomfort ☐ 3

5. Anxiety / Depression

I am not anxious or depressed ☐ 1

I am moderately anxious or depressed ☐ 2

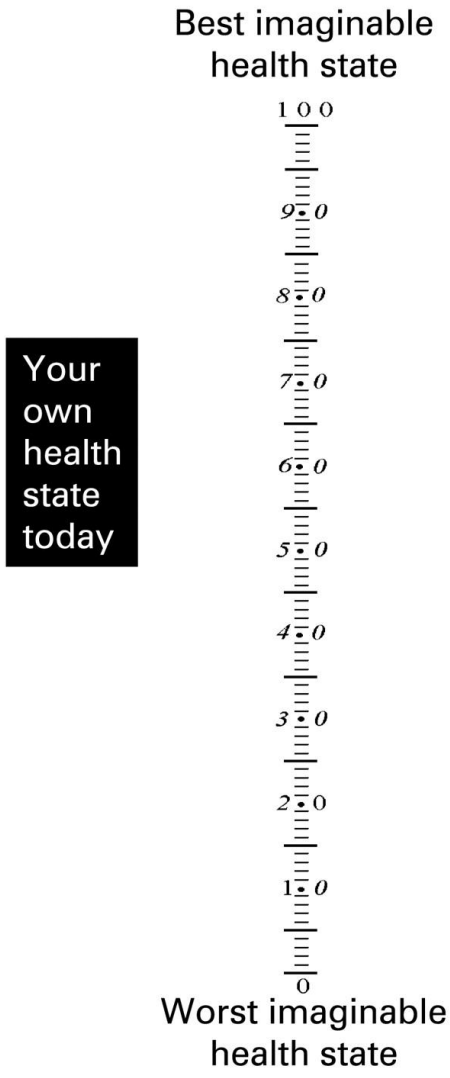
I am extremely anxious or depressed ☐ 3

Visual Analogue Scale

Please indicate on this scale how good or bad your own health state is today.

The best health state you can imagine is marked 100 and the worst health state you can imagine is marked 0.

Please draw a line from the box to the point on the scale that indicates how good or bad your health state is today.



Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY = ☐