The feasibility of the 'Play and Skills at Teatime Activities' programme to generate positive outcomes in 5–8-year-old children and their families in Lancashire.

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ABSTRACT

Background: The Play and Skills at Teatime Activities (PASTA) programme has been developed as a contribution to Lancashire's system wide approach to reducing obesity and empowering families to make choices to live a healthier life. The 6-week after-school club aims to promote healthier eating and physical activity in families with children aged 5-to-8-years, living in wards with the highest prevalence of obesity. The purpose of this feasibility study was to evaluate the PASTA programme, across 3 districts of Lancashire-12, within the context of the RE-AIM framework.

Method: 26 families with 31 children (6.7 ± 1.8 years) provided consent to participate in the project. Measures included parent/carer questionnaires around child diet, physical activity, and family behaviours, at baseline (week 1), programme end (week 6), and at follow-up data collection (~2mo.). Baseline child anthropometric measurements and family engagement data described programme reach. Qualitative measures consisted of 2 parent focus groups, to explore course acceptability, and any changes to perceptions, or attitudes. PASTA facilitators were interviewed to ascertain programme feasibility.

Results: PASTA is reaching the target age-group within designated wards, but most of the children engaged were in the healthy weight range, and not living with overweight or obesity as the programme intended. Very small improvements were reported (week 1 – 6) in children's dietary intake, and physical activity, with some changes suggestive of healthier family attitudes and behaviours. PASTA provided families with the opportunity, and capability to increase motivation in changing perceptions and attitudes towards a healthier diet. The study identified stakeholder engagement challenges as a key programme barrier, and programme enablers would be implementation of a longer intervention and a wider reaching programme (i.e., inclusion of further wards with the highest prevalence of obesity/ deprivation). PASTA adoption varied across the districts, but the programme was well-received by the families involved.

Conclusion: Whilst this study was not designed to detect changes, data suggested some improvements to family behaviours at programme end. Overall, PASTA is acceptable and feasible, but most children recruited were not overweight and this was potentially due to marketing and recruitment focusing on healthy lifestyle focus rather than healthy weight. The findings suggest that PASTA could align more effectively with an approach targeting obesity prevention. Findings raised several considerations and recommendations for programme Reach, Adoption, Implementation and Maintenance, which may have a positive impact on future PASTA delivery.

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I would also like to thank all the PASTA facilitators, coordinators and families for their time and patience- I thoroughly enjoyed meeting everyone who took part in the study. Without their involvement, it would not be possible to demonstrate the benefits and ways to refine the PASTA programme for further families in Lancashire.

Finally, a special thank you to my husband and two young children for their encouragement and support throughout.

THE AUTHORS DECLARATION

This thesis is submitted to Lancaster University for the Master of Science by Research Degree in Medical Sciences (MSc by Research).

I declare that this thesis is my own work and has not been submitted in any form for the award of a higher degree elsewhere.

Signature of candidate

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ABBREVIATIONS

BMI - Body Mass Index

CDQ - Children's Dietary Questionnaire

FNPA - Nutrition and Physical Activity Screening Tool

FSM - Free School Meals

HAF - Holiday, Activity and Food programme

IDACI - Income Deprivation Affecting Children Index

LCC - Lancashire County Council

NCMP - National Child Measurement Programme

NHS – National Health Service

MVPA – Moderate-to-Vigorous Physical Activity

PAQ-YC - Physical Activity Questionnaire for Young Children

PASTA - Play and Skills at Teatime Activities programme

PA - Physical Activity

SACN – Scientific Advisory Committee on Nutrition

ST – Sedentary Time

RCT - Randomised Controlled Trial

RTA - Reflective Thematic Analysis

UK – United Kingdom

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CHAPTER 1: INTRODUCTION

1.1 Childhood obesity – the national and local picture

Childhood obesity is one of the greatest public health challenges of the 21st century at a global, national, and local level within Lancashire. In just 40 years, there has been a 10-fold increase in the number of school-age children and adolescents living with obesity worldwide (World Health Organisation, 2018). In England, 22% of 4–5-year-olds starting school are affected by overweight or obesity, rising to 38% by the age of 10-11 years old (NHS Digital, 2022). In the last year of primary school, children living with overweight, or obesity has more than doubled compared to thirty years ago (DHSC, 2019a; OHID, 2023c). Recent predictions suggest that if the current trajectory continues, the number of children with overweight or obesity who are leaving primary school in the UK may reach 40.2% by 2040 (Local Government Association, 2022).

One of the greatest concerns is obesity and its associated behaviours often persists into adulthood (Reilly et al., 2003; Chang et al., 2021), increasing risk of later diabetes, stroke, coronary heart disease, hypertension, certain cancers, and premature mortality (Reilly and Kelly, 2011; Lanigan, 2018). Children with obesity have been reported to be almost four times more likely to have type 2 diabetes than those with a normal weight (Abbasi *et al.*, 2017); 4.4 times more likely to have high blood pressure, compared to healthy-weight children (Sharma *et al.*, 2019); and asthma incidence increases by 2-fold (Chen *et al.*, 2012). Obesity can be difficult to reverse (Lanigan, 2018), so public health funding to develop and implement interventions and approaches to prevent this potential health decline is paramount. Not only do these health consequences need early action, but there are also increasing economic implications. A 2020 projection reported that halving childhood obesity by 2030 could save the NHS £37 billion (Hochlaf and Thomas, 2020), providing a key driver for prevention and treatment of childhood obesity to be a public health priority (DHSC, 2019a).

The National Child Measurement Programme (NCMP) is a mandated public health programme initiated in 2006/07 as part of the UK Government's strategy for tacking obesity (OHID, 2023b). It tracks the weight status of primary school children in England, measuring the height and weight (and subsequent standardised BMI) of over one-million children in Reception (4-5 years) and Year 6 (age 10-11 years) each year. The NCMP provides an excellent source of surveillance data to monitor patterns and trends in weight status among the child population, but specifically the indicators of excess weight gain (OHID, 2023).

At a local level, the 2021/22 data identified that in Lancashire, 23.8% of reception-age children and 37.6% of year 6 children are living with overweight or obesity (OHID, 2023a). Although these are not dissimilar to the England levels of 22.3% and 37.8% respectively, there is significant variation across the 12 Districts with some Council Wards reporting up to 43% of reception children and 48% of year 6 children so already exceeding the 2040 projection (OHID, 2023c; Hochlaf and Thomas, 2020). This appears to be strongly associated with health and social inequalities. The 2021/22 NCMP report (NHS Digital, 2022) has reported that childhood obesity in the most deprived areas is double the prevalence of the least deprived areas, with rates of severe obesity approximately 4-fold greater in areas of higher deprivation. Nearly one in three children (31%) in the UK are currently living in poverty, which is inextricably linked to poor quality nutrition - an established determinant of obesity (Chang et al., 2021; Moore, 2022; End Child Poverty, 2021). It is also evident that children from low affluence families are 10% less active across all school age groups compared to more affluent counterparts (Sport England, 2022a), reinforcing both diet and physical activity (PA) to be considered in weight management programmes and healthy lifestyle campaigns and interventions.

Inequalities, inclusive of significantly higher child poverty, also exists amongst ethnic minority groups (NHSA, 2023). Edmiston et al. (2022) reported that people from minority ethnic groups are 2.5 times more likely to live in relative poverty than their white counterparts. This is particularly relevant to Lancashire as it is an ethnically diverse county with Asian ethnic groups comprising up to 26.7% of residents within some districts (35.7% in Lancashire-14) (ONS, 2023), and there is a trend toward more ethnic groups living in more deprived areas (Hyndburn and Burnley). At a national level, obesity prevalence in reception aged children is highest among children from black African and other ethnic groups, but greatest differences were seen in Year 6 children with rates almost 12% higher than white British children (Public Health England, 2019a; OHID, 2023). Although the NCMP data does not account for area level deprivation, it should be acknowledged that ethnicity has an independent effect on obesity prevalence (Public Health England, 2019).

There is a public health need for local authorities to address policy to narrow the inequalities gap, avoid a *one sizes fits all* approach, develop interventions that can be modified for their targeted communities and target local-level interventions in the early years to reduce the likelihood of overweight and obesity. This specifically aligns to a key World Health Organisation strategy (WHO, 2016) recommendation to implement programmes which promote PA and healthy eating for school-age children. To tackle growing obesity rates, Lancashire County

Council (LCC) have developed a flexible intervention – PASTA: Play and Skills at Teatime Activities - targeting children and families in areas of high obesity prevalence and deprivation.

1.2 PASTA (Play and Skills at Teatime Activities) Programme

PASTA is a Lancashire-wide intervention which has been developed as an extension of the national Holiday Activity and Food (HAF) programme (Appendix A), to be delivered across all 12 districts of LCC (Lancashire-12; Appendix B). In Lancashire, there is a commitment to ensure that children have the Best Start in Life, and PASTA is a contribution to Lancashire's system wide approach to reducing obesity and empowering families to make choices to live a healthier life (LCC, 2021). The targeted locations for PASTA were identified as the 3-4 wards within each district with the highest prevalence (over the last 3-years) of children living with overweight/obesity, based on 2016/17 – 2018/19 NCMP data (Appendix C). The programme is a children's healthy weight programme; however, it is promoted to families as a healthy lifestyles programme and is based on the following service aims:

- Empowering families with skills and awareness so that healthier lifestyle choices are achievable and centre around the family needs and community environments.
- Engaging families in basic and healthier cooking methods to encourage increased healthy cooking skills and knowledge in families.
- Empowering families and children to engage in active play and encourage integrated active play within daily activities, to reduce sedentary behaviours.
- Increasing child and family awareness of how healthy eating and PA can have positive effects on wellbeing, school attainment, emotional wellbeing and general health compared to unhealthier choices which can affect longer term health.

The PASTA programme is a 6-week after-school club delivered during each school half-term that is designed to include educational and practical components. PASTA targets local families with children aged 5 to 8 years with the aim of promoting healthier eating and PA in a fun, interactive and safe environment. The service specification suggests topics including basic cooking skills, food budgeting and meal planning, reading food labels and snacking choices. Upon completion, families are signposted to local services to provide opportunities for the community to continue to lead healthier lives. Each PASTA session should include preparing a nutritious hot meal with the families, and active play, ensuring that skills are promoted to families to increase awareness and understanding of the importance of good nutrition and PA. To address social inequities all programmes are tailored to recognise constraints such as budget, home cooking facilities, food

culture, accessibility of food and drink within the local community and practical cooking skill levels (LCC, 2021).

At this initial phase of implementation, there was no set education programme or set training for facilitators to deliver the programme. This is to primarily allow the separate wards to modify their programme to best suit their local community demographic, wants and needs and demonstrate that this is not a *one size fits all* programme, whilst offering a term-time programme that potentially extends provision of the national Holiday Activity and Food (HAF) programme. Secondly, to allow a variety of approaches and activities that can be evaluated as part of a feasibility study, which will thirdly initiate the development of a Sharing Good Practice resource that can support effective ongoing and new programme delivery.

1.3 Study aims

This feasibility study is an initial small-scale evaluation of the PASTA programme, across 3 districts of Lancashire-12 including Hyndburn, Chorley, and West Lancashire, with the addition of Burnley for the quantitative aspects. The study will inform a wider evaluation and continuation of PASTA beyond 2021/22, which could have a positive impact on the healthy lifestyles of children and families across deprived areas of Lancashire.

In line with the RE-AIM evaluation framework (Glasgow *et al.*, 1999) the aims for this feasibility study were to:

1. **Reach:** Identify whether PASTA recruited its intended target population from within each district/ward.
2. **Effectiveness:** Explore any influences of the PASTA programme on raising awareness, changing perceptions and/or initiating actions of children and families towards healthier eating and PA.
3. **Adoption:** Outline how the PASTA programme was delivered across the selected locations. And, to explore if the PASTA programme was deemed acceptable by participants.
4. **Implementation:** Explore if the programme was delivered as intended. And, to identify the barriers and enablers to programme delivery by facilitators, and engagement by the target families.
5. **Maintenance:** Identify any enablers for facilitators and participants to support future healthy lifestyle choices upon completion of the programme.

6. Initiate the development of a Sharing Good Practice resource to support future delivery of PASTA across Lancashire-12.

Specific objectives are outlined in Appendix D

CHAPTER 2: LITERATURE REVIEW

The prevention and management of childhood obesity is a key public health priority, but the health-related consequences are a major added concern in both youth and adulthood. The need to address obesity early in the life course is critical and this is a key focus for the Children and Young People public health team within LCC. It is fundamental that to develop effective approaches, public health teams need an understanding of the determinants of obesity, especially those specific to their target communities, obesity-related behaviours, and an appreciation of the current evidence around interventions and approaches to best inform the structure, delivery and reach of PASTA.

2.1 Determinants of childhood obesity

Pearce et al. (2019) adapted previously developed models (Bronfenbrenner, 1979; Dahlgren and Whitehead, 1991) to produce an updated model and schematic of the social determinants of child health (Figure 1). The child is at the centre of the model, with potential influences from six surrounding layers that represent the inter-relational social determinants of health, providing a useful framework to explore the relative influence of the potentially modifiable determinants on childhood obesity.

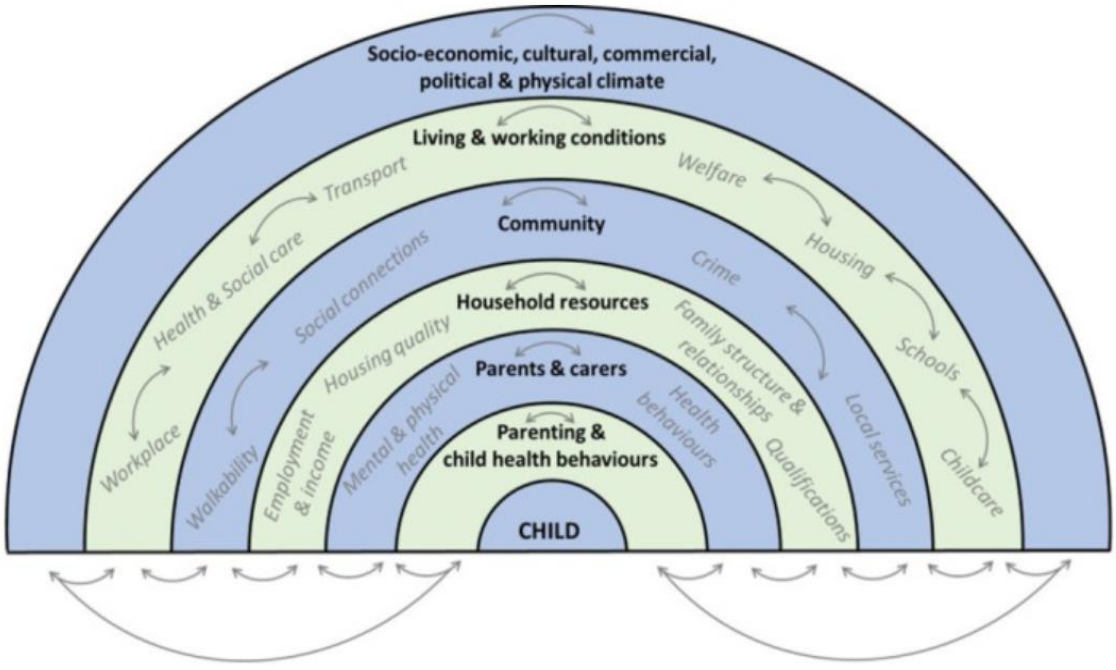


Figure 1. Social determinants of child health (Pearce *et al.*, 2019) Adapted from Bronfenbrenner, 1979 and Dahlgren and Whitehead, 1991.

At a simplistic level obesity is caused by consuming more calories than calories expended through PA, resulting in an imbalance between energy uptake and utilisation, which leads to elevated adipose tissue and excess weight gain (Littleton et al., 2020; WHO, 2020). Energy imbalance has resulted from the changes in food type, availability, affordability, and marketing, as well as a decline in PA, with more time being spent on screen based and sedentary leisure activities (World Health Organisation, 2016). However, obesity results from complex gene-environmental interactions, alongside influences from socioeconomic and cultural factors and individual behaviours (Dahlgren and Whitehead, 1991; Butland et al., 2007; DHSC, 2019a).

It is increasingly clear that genetics contribute to an increased risk among individuals, but WHO (2016a) stated that many children are now growing up in an obesogenic environment that is shaping behaviours which promote weight gain and obesity. The current obesogenic environment (often characterised by increased screen time and availability of high energy foods) accentuates the risk of obesity, particularly in genetically susceptible individuals (Tyrrell *et al.*, 2017), and leads to a greater difficulty for individuals, families, and populations to be a healthy weight (DHSC, 2019a). It has been reported that a physically active lifestyle in adults is associated with a 40% reduction in the genetic predisposition to common obesity (Li *et al.*, 2010), and higher PA is also associated with a reduction in the genetic predisposition to obesity in adolescents (Todendi *et al.*, 2021). Together, this highlights a need for prevention strategies to be developed and implemented so healthier lifestyle behaviours are instilled among school age children.

2.2 Health and Lifestyle Behaviours

The PASTA programme has been developed in response to the growing prevalence of childhood obesity in Lancashire. It was initially intended as a healthy weight programme, but the public-facing focus was placed on healthy lifestyles and awareness-building to encourage a wider reach, and minimise the complexities, resource and challenges associated with running a weight management programme.

2.2.1 Diet

Environmental exposure to energy-dense foods that are high in fat and sugar, and excess calorie consumption increase a child's risk of being overweight and obese (WHO, 2018a; WHO, 2020; UK Parliament, 2021). To prevent future health consequences, national dietary intake recommendations exist for children (SACN, 2023).

The UK National Diet and Nutrition survey (PHE, 2020) showed children's average intake of free sugars exceeded the government recommendation of ≤5% of total energy for those aged 2 years and over. Girls aged 11 to 18 years and boys aged 4 to 10 years had the highest free sugars intake (12.5% and 12.4% of total energy respectively) (PHE, 2020). For children aged 5 years and older, saturated fat intake should be ≤10% of total dietary energy, but average intake was reported at 13.1% in 4- to 10-year-olds (PHE, 2020). Another key target is to encourage consumption of 5 portions of fruit and vegetables per day, but the 2018 Health Survey for England reported only 18% of children (5-15-years-old) were meeting this recommendation (NHS Digital, 2019).

However, these current dietary patterns are influenced by the structural and macro-level environment in which we live (Figure 1). An imbalance exists between the production, supply, marketing, and sale of foods, with unhealthy options dominating and pushing out the healthy options (DoHSC, 2019a).

A key contributing factor to increased calorie consumption is portion sizes of packaged foods, which have increased substantially since the 1990's (Benton, 2015), particularly high energy dense foods and those targeted at children (Hetherington and Blundell-Birtill, 2018; Blundell-Birtill and Hetherington, 2019). In a study of 2 – 9-year-olds served an age-appropriate or double sized meal, 29% more food was eaten when the larger serving was provided, across all age groups (Fisher, 2007). In a time-series analysis (2007 – 2012) of portion sizes consumed by Australian children aged 2-16 years, it was found that portions of some energy-dense, nutrient-poor foods had increased but those of fruit and vegetables decreased over time and were below recommendations (van der Bend *et al.*, 2017). This appears to align with the current UK picture of children's dietary intakes highlighted above and could be an area to address within the educational component of PASTA.

Price and affordability are major determinants of the food people choose to purchase, particularly for people on low incomes, and in many cases a healthy and sustainable diet is financially out of reach for many people (Goudie and Hughes, 2022). Obesity risk is further increased by obesogenic food environments in the most deprived communities, which often have the highest density of fast-food outlets and less access to healthy affordable foods (Moore, 2022). This applies to the areas of deprivation and childhood obesity in Lancashire that have been targeted as locations for PASTA delivery.

One of the greatest challenges is children are the leading consumers of ultra-processed food, which is often cheaper, more convenient, more energy-dense and nutritionally poorer compared with less processed alternatives (Chang *et al.*, 2021). Nutrition in early life has been found to have more profound effects on body weight status than other periods in life; children experiencing rapid weight gain during the first 2 years of life had 3.66 times greater odds of being overweight/obese later in life than those who did not experience rapid weight gain (Zheng *et al.*, 2018). Chang *et al.* (2021) supported this, reporting higher ultra-processed food consumption in 7-year-old children was associated with 0.2kg weight gain per year through to adulthood (24-year-olds) therefore reducing intake of such foods is a key component to public health programmes. Early childhood is a critical time for establishing food preferences and dietary habits (Mura Paroche *et al.*, 2017), with the 5 – 8-year-old age range bring an important period for influencing healthy eating patterns via interactive initiatives such as hands-on cooking programmes (DeCosta *et al.*, 2017).

The PASTA programme aims to raise awareness and provide skills to promote healthier eating, with a specific focus on affordable and accessible foods.

2.2.2 Physical Activity

A physically active lifestyle starts to develop very early in childhood and PA levels are believed to track from childhood into adulthood (Telama *et al.*, 2014). Habitual PA established during the early years may provide the greatest positive impact on mortality and longevity (Hills *et al.*, 2007). Therefore, developing initiatives and interventions that support children to retain their activity levels as they approach older childhood, particularly those who are affected by overweight/obesity, could improve public health outcomes (Jago *et al.*, 2020).

The 2019 UK PA guidelines advise that children and young people (aged 5-18 years) should engage in PA for an average of at least 60 minutes per day across the week (DoHSC, 2019). Activities should include a variety of types and intensities to develop movement skills, muscular fitness, and bone strength, and aim to minimise the amount of time spent being sedentary (DoHSC, 2019).

Despite these clear guidelines it was reported that less than half of children in the UK (47%) were meeting the recommended 60 minutes per day, and PA levels are lowest in UK children aged 7-9 years old (Sport England, 2022a). A recent systematic review and meta-analysis examined the longitudinal changes in moderate-to-vigorous PA (MVPA) in children and adolescents globally and found a significant annual decline across all age groups, from age 6

years and onwards in girls and from age 9 years among boys (Farooq *et al.*, 2020), which aligns with the target age group of PASTA. A UK longitudinal study also demonstrated that MVPA declines, and sedentary time (ST) increases for all children aged between 6 and 11 years (Jago *et al.*, 2020), which demonstrates a need to adopt preventive approaches within primary school aged children.

The opportunity for children to be physically active has decreased over time, due to a range of environmental factors (Hills *et al.*, 2007), including less active transport such as walking to school, and an increase in passive entertainment, which have contributed to the childhood obesity epidemic (Jebeile *et al.*, 2022). Children from low affluence families were identified as less active (Sport England, 2022), and suggested mechanisms underlying this association include accessibility, such as unsafe neighbourhoods (Eyre *et al.*, 2014; Schalkwijk *et al.*, 2018), lack of garden access and less green space (Schalkwijk *et al.*, 2018), lack of resources and parents' own beliefs and engagement in PA (Chang and Kim, 2017).

It is worth noting that there has been a growing body of evidence establishing a link between screen time and childhood obesity, documented through cross-sectional and longitudinal studies of television viewing (Jebeile *et al.*, 2022), which is helping to generate a strong evidence base that helps to inform guidelines, recommendations, and interventions in childhood and adolescence. For example, one early study (Dietz and Gortmaker, 1985) reported significant associations between television viewing time and obesity in adolescent children, even when controlled for prior obesity and socioeconomic status. An early RCT found that reducing screen time in community settings also led to reduced weight gain in children (Robinson, 1999). Following these studies there has been an exponential rise in related papers, and this likely coincides with the increase of mobile and gaming devices (Jebeile *et al.*, 2022). A 2019 meta-analysis in children concluded that total screen time of ≥2 hr/day was 1.67 times more likely to be associated with greater risk of overweight/obesity than screen time of <2 hr/day (Fang *et al.*, 2019). Several possible mechanisms are thought to explain the effects of screen media exposure on obesity. These include displacing habitual and structured PA, reinforcement of sedentary behaviours, increasing energy intake from eating while viewing and/or the effects of advertising and shortened sleep duration (Robinson *et al.*, 2017).

This evidence further rationalises the locations selected for PASTA delivery, and the emphasis placed on getting children active and reducing sedentary behaviours, whilst engaging families in the programme to help raise awareness and build a supportive environment to encourage a change in perceptions.

2.3 The role and influence of family behaviours

Parents substantially influence children's diet and PA behaviours, which consequently impact childhood obesity risk (Savage et al., 2007; Zecevic et al., 2010; Tomayko et al., 2021). Parents play a powerful role in children's eating behaviour (Savage *et al.*, 2007), for example, caregivers influence the development of children's preferences and eating behaviours by making some foods available rather than others, and by acting as models of eating behaviour (Savage *et al.*, 2007; Yee *et al.*, 2017). A systematic review of obesity-related behaviours led by Craigie et al. (2011) demonstrated that PA behaviours and dietary choices in children, including unhealthy food preferences and sedentary behaviours, can track into adulthood. The review highlighted the importance of interventions aiming to prevent the development of obesity in childhood, such as PASTA, to reduce risk of obesity and of obesity-related disease.

Parenting styles and approaches to managing children's diets can influence a child's weight status. A 2017 review supported the idea that authoritative parenting (characterized by a family context of expressing warmth and emotional support, and clear, bidirectional communication) may be protective against later overweight and obesity, although findings were mixed (Sokol *et al.*, 2017). The other styles of parenting are permissive (more responsive than demanding), neglectful (low in responsiveness and demandingness) and finally, authoritarian style (demanding and directive, but not responsive) (Baumrind, 1967; Sokol *et al.*, 2017). Research has shown that parents with lower socio-economic status (SES) are more likely to use 'authoritarian' parenting styles than those in higher SES groups (Hoffman LW, 2002; Joseph Rowntree Foundation, 2007; Roubinov and Boyce, 2017). Marmot et al. (2020) emphasised that parenting approaches are often heralded as key to children's early years development, but there is a need to recognise that family socio-economic circumstances can and will influence parenting. When families have greater socio-economic challenges as experienced in more deprived communities, this can lead to less favourable parenting which can continue to have long-term negative impacts on the lives of affected children and their families (Marmot *et al.*, 2020).

In addition to diet, parental behaviour may have a considerable influence on children's PA levels and their weight status (Sleddens *et al.*, 2011; Liszewska *et al.*, 2018), specifically identifying parenting style (Lohaus *et al.*, 2008; Sleddens *et al.*, 2011), parental modelling, parental support, encouragement or provision of PA opportunities can have a significant impact on children's PA levels (Yao and Rhodes, 2015; Liszewska *et al.*, 2018; Wilk *et al.*, 2018; Wyszyńska *et al.*, 2020). Although impacting parenting style is not an aim of PASTA, the programme has a family focus

and aims to motivate healthy behaviours in families, in a supportive environment which aligns with the authoritative parenting style and encourages parental modelling and support.

2.4 An evaluation of childhood obesity prevention and treatment interventions

Behaviour change interventions are fundamental to the effective practice of public health (Michie *et al.*, 2011), but within the area of obesity are particularly difficult to lead to long-term change. The COM-B model of behaviour change (Michie *et al.*, 2011) is widely used to identify what needs to change in order for a behaviour change intervention to be effective, identifying three factors that need to be present for any behaviour to occur: Capability, Opportunity, and Motivation (Michie et al., 2011; West and Michie, 2020). In the case of PASTA, the aims are not directly aligned to monitoring a behaviour change, but instead designed to raise awareness and influence perceptions whilst considering the COM-B components, that is to provide children and families with an opportunity to build their awareness (knowledge) and skills (capabilities) associated with healthier lifestyles.

COM-B Model

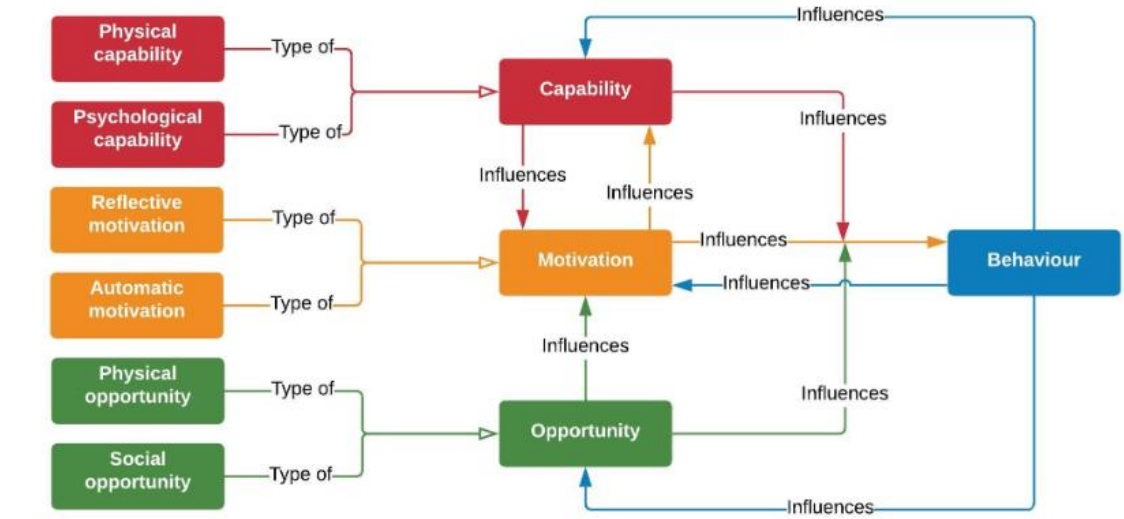


Figure 2. The COM-B model of behaviour (Michie *et al.*, 2011; West and Michie, 2020).

The focus of this study was to determine the feasibility of PASTA so the evidence from existing interventions will be acknowledging the components of the RE-AIM framework throughout – Reach, Effectiveness, Adoption, Implementation and Maintenance (Glasgow *et al.*, 1999). Many feasibility studies are designed to test the intervention in a limited way, with intermediate rather than final outcomes, a shorter follow-up period, smaller sample size and limited statistical power (Bowen et al., 2009); and to answer the overarching question: Can it work? (Orsmond and Cohn, 2015).

2.4.1 Reach

Although the early years has been identified as a crucial period for obesity prevention (Woo Baidal *et al.*, 2016), the need for obesity management is important beyond the early years with children aged 6 to 11 years considered a key group when capturing an important timeframe for effective treatment of overweight and obesity (Mead *et al.*, 2017). Most programmes targeting children with obesity have focused on primary school age, with some also addressing the need in adolescents. A Cochrane review analysed 85 interventions (56%) in primary school children but only 29 (19%) for 13-18-year-olds; the majority (75.3%) of these interventions with 6-12-year-olds took place in schools (Brown *et al.*, 2019), with most treatment-focused interventions (35.7%) delivered in secondary care (Mead *et al.*, 2017).

Socioeconomic inequalities and wider determinants of health at both individual and neighbourhood levels should be addressed in childhood obesity interventions (Anderson *et al.*, 2022). Many studies have targeted the areas of highest deprivation (Bryant et al., 2011; Elinder et al., 2018; Norman et al., 2019; Homs et al., 2021) as people living in deprived areas are more likely to be overweight or obese and have poorer health outcomes (Wu et al., 2015; Goisis et al., 2016; Anderson et al., 2022). Findings from a UK qualitative study concluded that tailoring interventions for low socio-economic populations is necessary (Coupe *et al.*, 2018). They can be tailored to consider cost, cultural diversity, and language and literacy barriers, as well as potential for disengaging these harder-to-reach groups (Coupe *et al.*, 2018), which aligns with the PASTA recommendations (LCC, 2021).

Ethnicity is often a key consideration and focus of studies, with the BEACHeS study as an example targeting south Asian communities in the UK (Adab et al., 2014). In many cases interventions target both ethnic groups and areas of higher deprivation to demonstrate consideration of the wider determinants of health (Adab et al., 2014; Gatto et al., 2017; Lek et al., 2021). Data from the UK Millennium Cohort study highlighted the need for understanding

local populations when developing and delivering interventions, as poorer white children are at higher risk of overweight/obesity than higher income white children. However, socioeconomic disparities are reversed for black African/Caribbean children and non-existent for children of Indian and Pakistani/Bangladeshi origin (Goisis *et al.*, 2019). Therefore, caution should be taken when assuming that higher socioeconomic position is protective against child overweight/obesity for all groups of the population (Goisis *et al.*, 2019). The different wards within Lancashire, especially those selected for PASTA include varying demographics and LCC encourage flexibility in delivery to align best with the communities.

The PASTA programme is delivered in schools and community venues, by a range of providers, including school sports organisations and leisure trusts. Details of the effectiveness of interventions across some of these different settings are reviewed in section 2.4.2.

2.4.2 Effectiveness

The need to intervene to reduce the high prevalence of childhood overweight and obesity has prompted policy makers and researchers to identify effective options for its treatment (Bryant *et al.*, 2011), including multi-component lifestyle interventions (Mead *et al.*, 2017). Upstream (e.g., infrastructure, environmental, policy) interventions and strategies can be problematic to evaluate, as they focus on macro and structural level factors, highlighted in figure 1., such as income, housing, or marketing and policies to reduce childhood obesity (Shah, 2021). Macro level interventions can be complex to assess the direct links to health outcomes and results often won't be seen until years after the initial investment (Shah, 2021). This literature review has identified that studies evaluating obesity prevention or treatment are mostly downstream interventions, targeting individual and family behaviours. It's important to note that, although PASTA aims to provide the knowledge and skills for a healthy lifestyle, the vast majority of the evidence to inform this intervention mainly focuses on weight reduction and BMI, often with secondary healthy lifestyle measures relating to diet and PA.

A 2019 Cochrane review of 153 studies focused on the effectiveness of interventions within schools, the wider community and the home that included diet and/or PA components, designed to prevent obesity in children (Brown *et al.*, 2019). The meta-analysis was grouped by 0-5-year-olds and 6–12-year-olds, with BMI and BMI z-scores as the primary outcome of interventions that reported outcomes at a minimum of 12 weeks from baseline. The 6–12-year age group aligned most closely to the 5–8-year-old target group for PASTA, reporting that dietary interventions alone do not reduce weight status, whilst PA interventions appeared to

reduce BMI, but not BMI z-score and the opposite for combined diet and PA interventions with reduced BMI z-score but not BMI. Although there was insufficient evidence to determine that any one particular programme could prevent children living with obesity, the evidence suggested that comprehensive strategies to increase the healthiness of children's diets and their PA levels, coupled with psycho-social support and environmental change were most promising. Based on 49 multi-component trials, Mead et al. (2017) also concluded that interventions with a combination of diet, PA and behaviour change may be beneficial in achieving small, short-term reductions in BMI, BMI z score and weight in 6–11-year-old children with overweight or obesity. Despite these findings there is a varied certainty around the results making it difficult to know which approach is most effective to implement in children.

This uncertainty is amplified further with Nally et al. (2021) only reporting small reductions in BMI/ BMI z-score from primary school-based interventions. An update to the Cochrane review also suggested that school-based obesity prevention interventions have a very small beneficial impact on child weight (equivalent to a 0.11 improvement in BMI) (Hodder *et al.*, 2022). This raises the question that interventions could take place outside of the school environment. However, Hodder *et al.* (2022) noted no overall positive effects in weight status were reported for after-school programs, community, or home-based interventions. This review of 195 studies, collectively represented low quality evidence, due to risk of bias and multiple inconsistencies across studies. Alongside low-quality evidence in both prevention and treatment interventions, lack of any standardised approaches reduces confidence in and utility of the findings to help inform programmes like PASTA.

Despite these very small effects, there are still implications for practice as the potential cumulative effect of small but sustainable changes towards a healthier diet and more physically active lifestyle could lead to small improvements in weight status (Brown *et al.*, 2019). But importantly, there are multiple health benefits beyond the promotion of a healthy weight and the outcome measure/marker of success may need to move away from the standard 5% weight loss and focus on indicators that could lead to future weight loss. Improving knowledge through related education has a role to play but Ijaz et al. (2021) reported education alone had limited impact on behaviour or weight status, corroborating with Cochrane review findings (Brown et al., 2019; Mead et al., 2017). PASTA intended not to focus on weight loss as an outcome, partly as a reflection of the evidence but any weight loss within the 6 weeks would be negligible. Instead, the novelty of PASTA is the emphasis placed on changes in perceptions, knowledge and skills associated with a healthy lifestyle, which may help to scaffold the building blocks for future

behaviour change. One additional issue is despite the plethora of interventions that have been implemented there is a lack of evaluation in the implementation of such programmes, and this is the principal reason for the completion of this feasibility study to determine how PASTA works utilising the RE-AIM framework.

2.4.3 Adoption and Implementation

Cooking interventions with children and families is a strategy adopted to improve diet and potentially help address childhood obesity. Hasan et al. (2019) examined the effect of cooking classes on dietary intake and behaviour change across 30 studies, over an average of 21 weeks (2 weeks – 2 years) and reported no significant change in BMI. However, to support the importance of monitoring outcomes beyond weight, this review found that cooking classes were associated with improved attitudes, self-efficacy and healthy dietary intake in adults and children, supporting its inclusion in PASTA. The sole focus on cooking is a possible limitation but authors emphasised that interventions with additional components such as education on nutrition, PA or gardening were particularly effective in terms of reducing BMI (Flynn et al., 2013; Gatto et al., 2017; Hasan et al., 2019). Nutrition education in conjunction with a cooking class may provide individuals with a more expansive knowledge base of how to replicate meals at home, while focusing on healthy nutrition patterns that incorporate more nutrient-dense foods, such as fruits and vegetables (Chen et al., 2014; Hasan et al., 2019; Saxe-Custack et al., 2021), which has potential for longer-term impact.

For example, Gatto *et al.* (2017) measured the dietary and anthropometric outcomes of a 12-week interactive nutrition, cooking, and gardening programme, attended by a wide range of 8–18-year-olds with ≥75% from a Latino population and ≥75% receiving Free School Meals (FSM), with bi-monthly classes for parents. In comparison to control group, participants had significantly greater reductions in BMI z-scores (-0.1 vs. -0.04 respectively), waist circumference (-1.2 vs. 0.1 cm) and increased their fibre consumption (+3.4% vs. -16.5%) but there was no follow-up to report any sustained improvements.

This however does support the evidence from systematic reviews that states interventions designed to treat or prevent overweight and obesity in children appear to obtain stronger effects when parents are involved (Luttikhuis et al., 2009; Safron et al., 2011; Oosterhoff et al., 2016; Tomayko et al., 2021). One meta-analysis compared family treatment with minimal/standard care controls and revealed a significantly greater decrease in child BMI-z score of −0.06 for the family behavioural treatments at six-month follow-up (Luttikhuis *et al.*,

2009). Family-based interventions combining dietary, PA, and behavioural components are shown to be effective and are considered the current best practice in the treatment of childhood obesity in children under 12 years of age (Luttikhuis et al., 2009; NICE, 2013; Mead et al., 2017). More specifically to the PASTA target age group of 5-8 years, a recent umbrella review synthesized the evidence on effects of parent involvement in diet and PA interventions among children aged 3–12 years old (Tomayko *et al.*, 2021). The findings support the inclusion of a parent component in both treatment and prevention interventions to improve child weight/weight status outcomes.

PASTA also encourages PA through fun play, providing positive experiences for children to motivate actions towards physically active behaviours. According to Sport England (2022b), positive experiences at an early age help build the foundations for an active life. If children and young people have experiences that feel fun, positive and give them a sense of confidence, they're more likely to want to be active in the future (Wyszyńska et al., 2020; Sport England, 2022b). This is particularly important, as some evidence suggests that children with higher weight may lack motivation in school PA and in sports in general (Sánchez-López *et al.*, 2020; Bevan *et al.*, 2021). When intrinsically motivated, people engage in an activity because they find it enjoyable, interesting, and inherently satisfying (Di Domenico and Ryan, 2017), and therefore it is more likely that an individual will be motivated to continue participation (Verloigne *et al.*, 2011). Few studies have implemented a play-based emphasis within their multi-component interventions.

Sánchez-López *et al.* (2020) conducted a 9-month (full academic year) school-based intervention focused on play as a method for reducing weight in 8-12-year-old children with obesity. It consisted of nutritional education, parental involvement and play sessions (four 90-minute sessions per week) with the play element of the study focused on structured exercise sessions, games, and sport, so did not appear to differ much from other childhood prevention or treatment programmes, although sessions were intended to be enjoyable and non-competitive. Outcomes reported a reduction in body fat, which was not seen in the control group, but similar to other studies there is a missed opportunity to report changes in non-weight related outcomes.

BEACHeS was a one-year multicomponent childhood obesity prevention programme that considered both structural and environmental components of the wider determinants, and targeted diet and PA behaviours in children aged 6-8 years, with inclusion of a family members (Adab *et al.*, 2014). The intervention consisted of two main strands. Firstly, to increase children's

PA levels and promote healthy eating through schools, and secondly to increase skills among family members through family educational and cooking activities. BEACHeS was developed using a co-design approach with key stakeholders in the community, including parents, teachers and school nurses, plus consultation with the National childhood obesity prevention policy. Its review of local facilities, resources and opportunities related to healthy eating and the promotion of PA targeting children was also used to inform the design and encourage longer term sustainability of the intervention. The feasibility study focused on eight UK primary schools in inner city Birmingham where the population is predominantly South Asian (85.9%). Schools were selected based on schools with ≥50% of pupils from South Asian background and highest FSM eligibility.

The 2-year follow up demonstrated that children in intervention schools had BMI z-scores on average 0.15 kg/m^2 lower than children in control schools. Applicable to this study, parental and child questionnaires and staff interviews were conducted, with BEACHeS reporting a successful increase in school PA opportunities and family cooking skills workshops were found to influence confidence and cooking practices. Signposting to leisure facilities and events in the local area was popular among parents and school staff, but there was low child attendance at free organised taster sessions in the leisure centres. Other components such as local walking groups were found not to be acceptable and/or feasible. PASTA aligns well with the approach adopted by BEACHeS with the aim of addressing obesity in deprived areas.

Acceptability has become a key consideration in the evaluation of health interventions, and although not an outcome of an intervention, it is necessary for an effective intervention outcome; in other words, participants are more likely to engage in the programme and to benefit from the effects as intended, if the programme is considered acceptable (Sekhon *et al.*, 2017). From a participant's perspective, the content, context, and quality of the intervention may all have implications for acceptability (Proctor *et al.*, 2011; Sekhon *et al.*, 2017).

One RCT used a mixed methods approach to evaluate the feasibility and acceptability of a 17-month primary school-based intervention, which aimed to promote healthy nutrition and PA knowledge and behaviours in 6–9-year-olds and encourage parental support at home (Sahota *et al.*, 2019). Process measures included a (web-based) 24-hour recall diet and PA tool assessment to assess any changes in behaviour, and a healthy food knowledge questionnaire to evaluate any changes in knowledge. School staff were interviewed to explore acceptability of the intervention, capacity of schools to deliver, and programme fidelity and sustainability. Pupils engaged in focus groups at the end of the intervention to evaluate their awareness,

acceptability, and impact of the programme on pupils' knowledge, and attitudes towards healthy eating and exercise.

Findings were suggestive of a trend to increase knowledge of healthy lifestyle and dietary behaviours and dietary behaviours of pupils. For example, at 18 months, Year 4 intervention pupils had significantly higher healthy balanced diet knowledge scores compared to control pupils (mean difference 5.1) and intervention pupils liked on average 53.9% of vegetables compared to only 43% in the control group. The programme was concluded to be feasible and acceptable to teachers and pupils (Sahota *et al.*, 2019), and demonstrates that the integration of quantitative and qualitative data can generate greater insights resulting in enriched understanding of complex, multifaceted issues (Tariq and Woodman, 2013), specifically in childhood obesity related work (Pallan et al., 2018; O'Cathain et al., 2007; Bryant et al., 2011; Elinder et al., 2018).

2.4.4 Maintenance of intervention outcomes

A key consideration of public health programmes is to develop approaches that can promote sustainable changes by children, families, and communities, especially when exposed to the obesogenic environment. As most interventions targeting overweight and obesity are primarily focused on weight loss, there is less emphasis in the literature about sustaining changed perceptions and improved knowledge and skills. Many challenges are related to the difficulty of changing lifestyle behaviours beyond the short-term intervention (Weiland *et al.*, 2022). Also, there is a lack of follow-up consistency across children's studies with limited data available to compare longer term changes and potential benefits (Martin *et al.*, 2019; Norman *et al.*, 2019). This adds to the public health dilemma of where they should invest resources to have the most favourable health outcomes for their communities, but also heightens the importance of alternative outcomes that are not all weight focused.

Although the focus is on behaviour change and reducing BMI, which is beyond the remit of PASTA, O'Connor et al. (2017) reported children receiving at least 52 hours of contact time in behaviour-based weight loss interventions showed greater reductions in weight status when compared to 26-51 hours (still effective but less beneficial), and less than 25 hours, which was deemed ineffective. These timings far exceed the intended delivery of PASTA and do appear to suggest a large resource and staffing demand would be required and this is therefore potentially unsustainable in the reality of the UK public health sector.

One example that presents some similarities with PASTA was a 6-month school-based cluster-randomised trial in disadvantaged areas of Sweden (Nyberg *et al.*, 2016), which provided child health promotion through parental support, including classroom activities, motivational interviewing with parents and healthy lifestyles information handouts for families. The intervention had no apparent effect on BMI for the whole sample, but the intervention group had a significantly lower intake of unhealthy foods and drinks compared to the control group. This was later followed up 4 years post-intervention with some indication that the intervention group were still adopting a healthier diet, but it was unlikely any changes were clinically meaningful and integration into school routine practice may lead to greater long-term effectiveness (Norman et al., 2019).

In Crete, a 6-year-long health and nutrition programme was applied in primary schools and was also followed up 4 years post-intervention, reporting a maintenance of the favourable changes observed in serum lipids, BMI, and PA (Manios and Kafatos, 2006). Over the 10-year period from baseline to post-intervention follow-up examination, the study revealed a significantly greater reduction in total cholesterol for intervention (-13.8%) compared to control (-5.7%). Furthermore, the intervention pupils significantly increased the time they devoted to MVPA (55.4%) (minutes/ week) compared with the control children, in whom a decrease was observed (-19.5%). This study highlights that longer-term interventions and/or ongoing post-intervention support is needed for programmes aiming to reduce the prevalence of children living with overweight or obesity, such as PASTA.

The AVall study (Llargués *et al.*, 2017) was a school-based health education programme that promoted healthy eating habits and PA in the school setting during the first two years of primary school (5-6-year-old children) with the intention to combat childhood obesity in Spain. The intervention involved children's participation, by exploring how environmental and societal conditions affect healthy lifestyles and practical ways to overcome any associated barriers. Teachers developed activities related to healthy habits, which were integrated into regular lessons and through mechanisms such as cooking workshops or games on the school playground. During the second year of delivery, families were sent healthy lifestyles information, newsletters, and healthy recipes. At 4-year follow-up the prevalence of overweight (-1.4%) and obesity (-3.7%) had decreased, whereas in the control group, prevalence of overweight increased (9.4%), although obesity decreased slightly (-1.6%). Significantly more children in the control group (34.8%) than in the intervention group also spent >2 h each day in sedentary activities (Llargués *et al.*, 2017).

Therefore, intervention duration appears to be a crucial determinant of maintenance (Llargués *et al.*, 2017; O'Connor *et al.*, 2017), in terms of initiating healthy behaviours and reducing BMI. Although PASTA is a 6-week programme, it aims to increase healthy lifestyle awareness and community-level signposting to encourage maintenance of healthier lifestyles for the longer term.

2.4.5 Research gap

Despite the vast amount of attention on childhood obesity prevention and treatment in both practice and research, and the annual £61.7m allocated from government funds (NAO, 2020), how to effectively tackle the problem is still unresolved. This literature review has identified that studies evaluating obesity prevention or treatment are mostly downstream interventions (targeting individual and family behaviours), of insufficient quality and have only resulted in small effects.

However, Ells et al. (2018) emphasise that further research is required to understand which specific intervention components are most effective and in whom, and how any intervention effects could be maintained, and this is a primary reason for the completion of this feasibility study to determine how PASTA works considering the RE-AIM framework. Furthermore, most RCTs lack ecological validity, an important consideration in public health programmes. This study will provide contextual research, evaluating an intervention targeting families living in higher obesity prevalent wards across Lancashire and will inform future public health practice in Lancashire.

Brown et al. (2019) highlighted that a shortcoming of the previous research is that only ~15% of interventions were conducted in the wider community. They suggested that to effectively reduce childhood obesity, the implementation of wider community-level interventions such as PASTA is necessary, together with upstream and policy interventions. Furthermore, Mead et al. (2017) suggest that a limitation of previous obesity programmes is the sole focus on BMI. A healthy diet and physically active lifestyle have many health benefits, beyond the focus on weight loss (Brown *et al.*, 2019), and PASTA aims to facilitate the knowledge, awareness, and skills to empower families towards a healthier lifestyle.

To prevent life-long health consequences for children and address the widening gap in inequalities (Coupe *et al.*, 2018; Anderson *et al.*, 2022), it has been suggested that there is a need for more evidence on interventions that target low socio-economic families (Mead et al., 2017; Homs et al., 2021; Ijaz et al., 2021). Although PASTA targets highest areas of obesity, this

appears to correlate with areas of higher deprivation, as outlined in Chapter 1, and this study will contribute to the evidence of what works and for whom.

CHAPTER 3: METHODOLOGY

This chapter will present information on the site selection, study recruitment and the research design, including the data collection and data analysis methods used.

3.1 Ethics

Ethical approval was obtained from Lancaster University Faculty of Health and Medicine Ethics Committee, in line with the Declaration of Helsinki. Prior to data collection all participating families provided written informed consent and were able to withdraw at any time.

3.2 A mixed method approach

This study implemented a mixed methods approach, drawing on pragmatism research principles, to address the RE-AIM questions. Quantitative measures were used to help identify programme reach and explore effectiveness, i.e., if the programme influenced awareness, perceptions or initiated actions of children and families towards healthier eating and PA. Qualitative approaches were used to understand programme adoption, implementation, and maintenance and to provide a more in-depth exploration of feasibility, acceptability, experiences, attitudes, and behaviours.

3.3 Research paradigm

Deciding on a methodology begins with selecting the research paradigm that informs the study. According to Kaushik and Walsh (2019), the term paradigm is used to refer to the philosophical assumptions or "the basic set of beliefs that guide the actions and define the worldview of the researcher" (Denzin and Lincoln, 2000). These philosophical beliefs are used to guide the methodology and research approach.

In terms of ontology and epistemology, pragmatism is not committed to any single system of philosophy and reality (Weaver, 2018). The paradigm focuses on "what works" rather than what might be considered absolutely and objectively "true" or "real". Reality is actively created as individuals act in the world, and is therefore ever-changing, based on experiences, and oriented toward the outcomes of action (Patton, 2015; Weaver, 2018). Instead, it is the research questions that are the focus for the research philosophy (Kaushik and Walsh, 2019). Pragmatism rejects the either/ or choices associated with positivist and interpretivism positions and embraces the use of mixed methods to answer the research questions (Teddlie and Tashakkori, 2009).

A pragmatic research philosophy and methodology was selected for this study, to understand aspects of behaviour, experiences, and views relating to the programme. This study utilises both quantitative and qualitative approaches to answer the research questions. The strength of this approach is that mixed methods can offset the disadvantages that certain methods have by themselves and provide stronger inferences (Teddlie and Tashakkori, 2009). For example, using semi-structured interviews and questionnaires can provide a greater depth and breadth within a single study, and therefore, potentially more accurate inferences. Furthermore, a pragmatic inquiry is useful for this study, as it is concerned with evaluating and transforming features of real-world phenomena (Weaver, 2018).

The main aim of pragmatism is to approach research from a practical point of view, where knowledge is not fixed, but instead is constantly questioned and interpreted; for this reason, pragmatism entails an element of researcher involvement and subjectivity, notably when drawing conclusions based on participants' responses (Phair and Warren, 2021). Therefore, pragmatism acknowledges that the values of the researcher play a large role in interpretation of results (Teddlie and Tashakkori, 2009). This is explored further in the qualitative analysis, in terms of the research approach used in this study.

3.4 Site Selection

The programme evaluation sites were chosen in conjunction with LCC and focused on three districts that had established delivery of the programme (Hyndburn, Chorley, and West Lancashire). Burnley was an addition district included in the quantitative data collection, to increase participant numbers. The site selection also considered the inclusion of wards with a higher ethnic diversity and deprivation scores, to ensure a fair representation of participants from Lancashire. Appendix E (table 2) shows an overview of the demographics of the sites selected, at district and ward level.

3.5 Participants

A total of 26 families with 31 children participated across four districts including Chorley, Hyndburn, West Lancashire, and Burnley. Across those districts, participants were resident across 5 wards as shown in Table 1.

There were 19 families consisting of 22 children that completed the baseline questionnaires and anthropometric measures, with 7 caregivers taking part in the focus groups. It should be noted that the focus groups took place with one cohort in Rishton and one in Digmoor to provide insights from two distinct demographical areas, whilst the other wards only completed the

series of questionnaires and surveys. A further programme in Chorley (Coppull ward) was due to take part in the questionnaires, but this did not go ahead due to no families being recruited to the programme.

Table 1. Overview of data collection location and participating families

District	Ward	Number of families at week 1 (week 6)	Number of families completing follow up (weeks post-programme)	Research activity
Chorley	Clayton le Woods N	7 (7)	3[a] (8wks)	Baseline questionnaires and surveys
Hyndburn	Rishton	4 (4)	2[a], 1[b] (12wks) [c]	
West Lancashire	Tanhouse	3 (2)	1[a] (7wks 5d)	
Burnley	Daneshouse with Stoneyholme	5 (5)	1[b]	
Hyndburn	Rishton	4		Focus group*
West Lancashire	Digmoor	3		Focus group*

[a] In person follow up
[b] Postal follow ups, both received at 13wks.
[c] In Hyndburn, the follow-up evaluation was scheduled for 8wks, but this was cancelled the day before, as the families could no longer attend the session. The follow up was rescheduled during the summer holidays when the families could attend (12wks post-programme).

3.6 Characteristics of families in the study

Demographic information was collected about the families who engaged data collection. There were more participating girls (n=17, 55%) than boys (n=14, 45%). There were 34% of families attending with one child, 58% with two children and 8% with three children. There were an additional 13 siblings attending the sessions that were not within the target age group, 62% (n=8) were <1 - 4 years old, 23% (n=3) were 9 years old and 15% (n=2) were 10 years old.

Of the adults attending PASTA, 88% were female, 77% of all adults were mothers (11% fathers, 4% grandparent; 4% aunt, and 4% foster carer) and 46% were married. The mean age of adults attending the programme was 35.6 ± 10.2 years with 50% in the 30–34-year age group. There were 42% of adults in employment or education, 50% unemployed and 8% either retired or on long-term sick leave. It was also identified that across the 26 families, 50% had two dependents under the age of 18 living within their household, but there was a range of 0 – 6 dependents. 65% of attendees were white British. 8% of attendees identified as other white background; 4% Chinese and 4% mixed- white and black African. 19% of adults identified as Asian (either Pakistani, other, mixed), and all were from the district of Burnley.

3.7 Study Recruitment

Figure 3 highlights the study recruitment process and inclusion criteria. Families that were recruited to the Hyndburn, Chorley, West Lancashire, and Burnley programmes were invited to take part in the study. A letter, participant information sheet and consent form [Appendix F(i) - F(iii)] were included within information packs distributed to families by the PASTA providers in each area. This was provided in advance to inform families about the research taking place prior to the introduction week (or prior to week 6 for the two focus groups), giving reasonable time for them to consider involvement whilst emphasising it was optional and they could withdraw at any time, without having to give a reason. Parents and carers had the opportunity to ask questions during week 1 (or week 6 for the focus groups), and consent was then obtained from parents/ carers if they wished to be involved. At the final week and follow-up, families involved in the quantitative surveys were asked if they were happy to continue with the research participation. A follow-up letter was sent out to the families, 2 weeks prior to the follow up evaluation [Appendix F(iv)]. Written consent was also obtained prior to the facilitator interviews which took place via MS Teams.

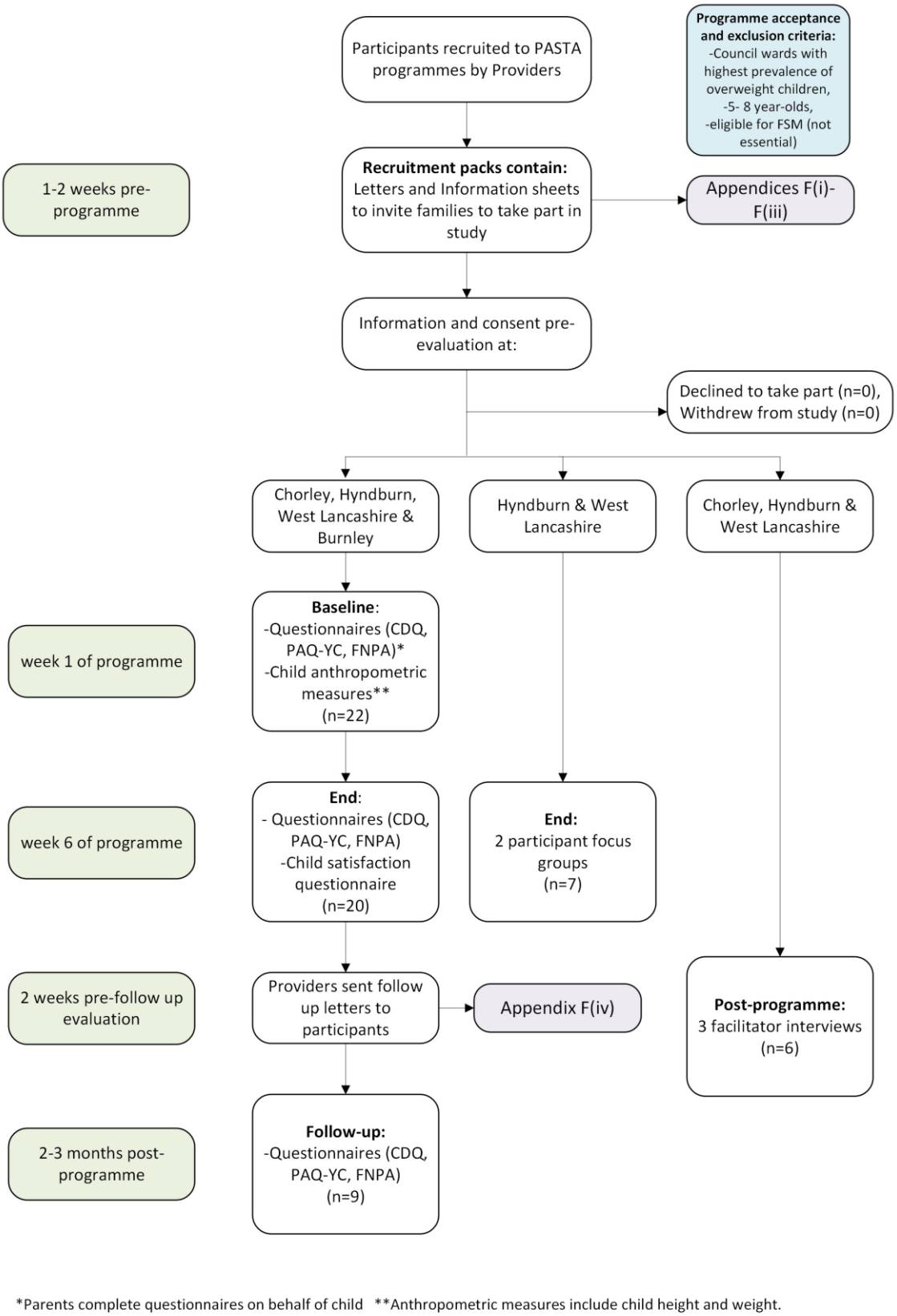


Figure 3. Study design, including participant recruitment, acceptance criteria, quantitative and qualitative aspects of the study conducted in the 4 districts.

3.8 Quantitative research design

Figure 3 illustrates the programme study design with the children's outcome measures collected at baseline and end of the programme, and a follow up data collection with participants at 2-3 months. Measures included parent/carer questionnaires around child diet, eating behaviours, PA, and sedentary behaviours.

During the study design and consultation with the providers, the quantitative data collection was to be conducted at baseline or 'week 0' prior to the start of the intervention, however, this was not feasible therefore the baseline data was collected at week one. Similarly, the post-course evaluation was to take place at 'week 7', a planned additional week following completion of the PASTA programme, but as this was not practical the post-course measurements consequently took place at week 6, or the final week.

The follow-up data was collected 2-3 months after completion (see section 3.3). Ideally this would have taken place at 6 and 12 months after the programme to show if there had been any sustained knowledge, skills, or actions towards healthier lifestyles, but due to the time limitations of the study a 2–3-month timeframe was realistic and would give some understanding of any sustained actions. Additionally, the follow-up session had to be completed the week prior to the school holidays to be included the 2–3-month target, as well as being dependent on the venue, participant, and provider availability. Ten-pound shopping vouchers, for a supermarket local to each evaluation site, were provided as an incentive for the families to return to the follow-up session. This was communicated at the final session, and in letters to parents and carers closer to the follow-up evaluation date. Pre-evaluation meetings took place in each district; the research team and the programme facilitators were briefed regarding the processes, questionnaires, and anthropometric measurements.

3.9 Pilot-testing

To ascertain if the planned conduct and flow of data collection was both suitable and manageable, a pilot session was delivered with four families at a primary school in Upholland (West Lancashire), which was not a site included in this evaluation. The pilot session involved 'stations' in a school classroom, for local School Nurses to complete anthropometric measurements, and questionnaires for parents/carers to be facilitated by the lead researcher and members of the LCC Public Health team. The pilot session provided an opportunity to gather participant feedback on the structure and content of the data collection methods. This was used to inform logistical and pragmatic considerations for data collection i.e., for collecting

baseline, completion and follow up data, and checking that timings are achievable during the PASTA delivery sessions. The data collection procedures followed the same format as the pilot session, with awareness of timings and session conduct for the research team.

A Distress Protocol adapted from Haigh and Witham (2013) and Draucker et al. (2009) was devised primarily for use with families during the focus groups, but this was also shared with the research team due to the sensitive nature of the measurements and the discussion around child weight, lifestyle, and behaviours. The purpose of the protocol was to identify when a parent or carer may be in distress and have a plan in place to support the participant(s) (Appendix G).

3.10 Quantitative measures

A series of parent-reported questionnaires were administered pre- and post-PASTA to address the Effectiveness component of RE-AIM, in terms of key health behaviour including child diet, eating behaviours, PA and Sedentary time (ST), and family environmental and behaviour factors that may predispose children to overweight (3.10.1 – 3.10.3). This enabled an insight of health behaviours at the start of the course, upon completion, and at follow-up to gauge any reported actions towards healthier lifestyles. Anthropometric and demographic data collection was measured at week one (3.10.4 – 3.10.5) to ascertain programme Reach. Family engagement data and a child satisfaction questionnaire to be completed by the child were used to measure acceptability (3.10.6- 3.10.7) as part of the Implementation aims. A survey targeting all other providers in Lancashire-12 (delivering in the 9 districts not included in the study) aimed to provide further insight to the programme Implementation and Adoption (3.10.8). The process measures are outlined in figure 1.

3.10.1 Children's Dietary Questionnaire (CDQ)

The CDQ assesses children's food patterns rather than energy or nutrient intake by gathering information about the frequency and variety of intake of foods of relevance to children in the context of overweight, which aligns to the target group for PASTA. The CDQ is a validated measure for children aged 4-16 years old and its use is recommended by the National Obesity Observatory (2011a). Four diet quality scores are determined from 28 items; (1) estimation of fruit and vegetables consumed, (2) frequency of intake of non-milk sweetened beverages (fruit juice/fruit drink and non-diet soft drink/cordial), (3) fat from dairy products and (4) discretionary foods (high fat/high sugar) (Magarey *et al.*, 2009). Its inclusion was to monitor any potential

reported changes in dietary behaviours following attendance at the PASTA programme and was designed to be self-completed by parent or caregiver, with or without researcher assistance.

Development of the CDQ was based on Australian guidelines, and the most recent national survey on the dietary intake of Australian children. The four diet quality categories within the questionnaire are applicable to the diets of UK children, as they reflect the UK dietary recommendations (National Health and Medical Research Council Australia, 2013; NHS, 2022b; SACN, 2023) and findings from the 2018/19 UK National Diet and Nutrition Survey (PHE, 2020). Some of the food names or brands were amended to be recognisable to the local population, e.g., zucchini to courgette, eggplant to aubergine, capsicum to pepper, Fruit Loops to Cheerio's. In addition, to ensure that the fruit and vegetables were relevant to the groups, the 10 most popular fruit and vegetables from sales in the UK were included (Kantar, 2021 cited in White, 2021). These were swapped with the unfamiliar fruit and vegetables. For example, pawpaw was swapped with raspberries, from the top ten most purchased fruit in the UK.

Additionally, the diets of any ethnic minority groups in the four areas of Lancashire were taken into consideration, notably the proportion of the Asian population in Hyndburn and Burnley. The CDQ was amended using the findings of a briefing paper on the diets of minority ethnic groups in the UK (Leung and Stanner, 2011). Many of the popular Asian fruit and vegetables were already included in the survey, but other popular foods that may be consumed were included in the four key categories. This included okra (fruit and vegetable category) and paneer (dairy category). Other UK studies have also previously amended the CDQ for use (Aljafari *et al.*, 2015; Pallan *et al.*, 2018), or recommended using and amending, to make it applicable to the local UK population (Sahota *et al.*, 2019). Other researchers also advocate dietary questionnaires to reflect the specific population (Kolodziejczyk et al., 2012; Mahoney et al., 2018; Bailey, 2021). The CDQ amendments were tested in the pilot session and the questionnaire was found to be acceptable for use by the group.

The CDQ data collection focused on food consumed with the family, rather than in school, as the objective was to measure dietary changes implemented as a family. This was communicated to the research team at the pre-evaluation meetings, to guide the participants. Additionally, evidence shows that parents are not reliable reporters of their children's food intake out-of-home (Baranowski et al., 1991; Livingstone and Robson, 2000). The questionnaire is relatively quick and easy for parents to complete (approximately 5-6 minutes), particularly in comparison with other dietary measures, such as food frequency questionnaires (FFQ), which were considered impractical for use during a PASTA delivery session. Completing a FFQ can take 30-

60 minutes (Subar *et al.*, 2001), can create participant burden, and can be difficult or confusing for participants (Bailey, 2021).

The CDQ recommends scoring of each of the four separate food groups. Scores reflected food group intake in the previous 24 hours by dividing items that measured intake in the past week by seven before summing. *Fruit and vegetable* score was calculated by summing items measuring fruit variety per day (number of varieties in the last seven days divided by seven), vegetable variety per day as for fruit, the number of different fruits and vegetables on the previous day, the number of occasions on the previous day that either fruit and/or vegetables were consumed and the number of days in the last week divided by 7 that either fruit and/or vegetables were eaten. *Fat from dairy products* score was calculated by summing items measuring the frequency of full fat milk, full fat yoghurt/custard and full fat cheese consumed in the previous 24 hours. *Sweetened beverages* score was calculated by summing items measuring the frequency of fruit juice/fruit drink consumed in the previous 24 hours and frequency of fizzy drink/cordial (non—diet varieties) in the previous week divided by seven. A *non-core foods* score was calculated by summing the frequency in the previous week of the 12 food items in section C divided by seven (Magarey *et al.*, 2009). The CDQ recommended score was determined for each sub-scale based on Australian dietary guidelines, which corresponded to UK dietary guidelines (National Health and Medical Research Council Australia, 2013; NHS, 2022b; SACN, 2023). In addition to the CDQ scoring, it was also useful to analyse each question of the CDQ, in order understand exactly what and how eating patterns had changed within each of the subscales.

3.10.2 Physical Activity Questionnaire – Younger Children (PAQ-YC)

To measure any reported short-term changes in PA or sedentary behaviour resulting from children attending PASTA, the validated PAQ-YC (Amor-Barbosa *et al.*, 2021) was used in this study.

The PAQ-YC aims to measure the total level of PA of a child aged 5–7 years old, in a typical week during the school term. It includes PA at school (Physical Education or other similar activities and break times), any active transport and leisure time (after-school activities, active games at home and indoor equipment, and outdoor PA) during the last 7 days. Additionally, two questions relating to sedentary behaviour during leisure time were included (screen time and other sedentary activities).

Most PA questionnaires are aimed at younger or older children (Kowalski et al., 2004; Bingham et al., 2016), but the PAQ-YC is developed for the 5-7-year-old age group, and therefore was the most age-appropriate validated PA questionnaire suitable for this study. As the questionnaire was parent-reported, it could also be completed on behalf of 8-year-old children in the study. Research by Coombes et al., (2021) found that children < 8 years old cannot accurately recall beyond the past 48 hours. The PAQ-YC involves more complex 7-day recall matrix tables and time estimation categories and therefore, it was deemed more suitable for the caregiver to complete the questionnaire on the behalf of all children in the 5–8 age range. The last question about PA in school was designed to be answered by the child, due to the difficulty of parents reporting PA when they are not there. The question consisted of two- or three-option responses, and children were supported by a School Nurse to read and fill out this section. The questionnaire was developed in Spanish, so google translate was used to translate to English and this was verified for accuracy by a person whose first language is Spanish.

The PAQ-YC did not include any scoring guidance, however, the Early Years Physical Activity Questionnaire [PAQ-EY] (Bingham *et al.*, 2016), was similar in terms of parent-reporting, activity duration options, ST and MVPA themes. The PAQ-EY used a pragmatic approach with regards to the duration component, as parents tend to over-report PA and under-report ST (Dwyer et al., 2011; Bingham et al., 2016). Therefore, unless free-text responses exceeding 60 min/day were reported, for the calculation of MVPA, minimum reported durations were used (i.e., 1 min, 16 min, or 31 min), whereas, for ST, the higher values were used (i.e., 15 min, 30 min, and 60 min). The calculated duration of each activity was summed and divided by seven to estimate daily minutes of MVPA and ST, for each data collection point (Bingham *et al.*, 2016).

3.10.3 Family Nutrition and Physical Activity (FNPA) Screening Tool: To measure family and child environmental and behavioural factors that may predispose a child to becoming overweight, the FNPA (Ihmels *et al.*, 2009; Peyer and Welk, 2017; Peyer *et al.*, 2021) was selected for this study, as it was suitable for the target age-group and relatively quick and easy to administer with parents. It contains 20 items reflecting ten constructs or topic areas that have been identified as risk factors for overweight/obesity. The constructs include Family Meals, Family Eating Practices, Food Choices, Beverage Choices, Restriction/Reward, Screen Time, Healthy Environment, Family Activity, Child Activity, and Sleep Routine.

The FNPA assesses the frequency with which each behaviour is performed using a four-point Likert scale with options “Never/Almost Never,” “Sometimes,” “Often,” and “Very Often/Always.” For the majority of the screening items, Almost Always/Always is the preferred

response and is scored as a 4 while the lowest scoring response (1) is Never/Almost Never. Six items are reverse scored with Never/Almost Never being the preferred response. The total FNPA score is calculated by summing scores. In addition to the total FNPA score, scores for each of the ten constructs are created by summing the scores for the two items within that construct. Higher scores after reverse scoring indicate healthier behaviours. No cut points or threshold have been established for determining Healthy vs Unhealthy home environments. However, an increase in healthy behaviours from attending the programme is desirable.

3.10.4 Anthropometric measurement of children

Body Mass Index (BMI) – Based on the PASTA programme being targeted at areas of high obesity prevalence; it was a requirement by the commissioner to measure BMI to assess if the programme was targeting overweight children. Body stature and mass were measured in each child, without shoes. Stature was measured to the nearest 0.1cm using a Tanita HR 001 Leicester Stadiometer (Tanita, Tokyo, Japan). Mass was measured using calibrated digital scales (877, Seca, Hamburg, Germany) and recorded to the nearest 0.1kg. BMI was calculated using the formula weight[kg]/height[m]^2, and BMI percentiles were calculated to take age and sex into account. Child BMI percentiles can be calculated by plotting onto a BMI percentile chart (UK90) or by using a percentile calculator (National Obesity Observatory, 2011b), which was used for this study (NHS, 2023). It should be noted however that assessing for BMI change is only recommended at 6 months and 12 months (NICE, 2013) so this was only measured at baseline to describe the sample.

3.10.5 Demographic data collection- A short demographic questionnaire was completed by caregivers, as a self-reported measure to describe the sample (Appendix H). Information collected included details of the children attending PASTA (names and ages of children attending, and relationship to child[ren]), parent or carer age, number of dependents (under the age of 18) living in household, postcode, gender, relationship status, employment status, and ethnic group. The demographic information was collected at week-one, or prior to the focus group.

3.10.6 A child satisfaction questionnaire was designed to be completed by each child at the end of the programme, to provide acceptability insights from participating children, as they were not involved in the focus group and no suitable, validated tools were available for this study. A five-point face scale was incorporated into the questionnaire, based on research by Hall et al., (2016) and Mellor and Moore (2014), as face scales demonstrate better psychometric properties

than visual analogue or Likert scales (Coombes *et al.*, 2021). The questionnaire consisted of three questions with a face scale response, including whether children enjoyed the play session, the food session, and other aspects of the course, such as the education. The fourth question asked what the children's favourite aspect of the programme was, with a free-text response. The questionnaire was deliberately short and designed to take a couple of minutes to complete. A School Nurse or researcher read the questions to the children during the data collection sessions and supported the children to fill them out. No cut points or threshold have been established for determining satisfaction levels, although a higher satisfaction score is more desirable (Appendix I). The questionnaire was analysed descriptively using Microsoft Excel, with the free text grouped by themes.

3.10.7 Family engagement. A descriptive analysis of the number of families and children engaged in the programme in each of the three areas studied was collected by the Public Health team. The data was used to assess frequency of use (November 2021- July 2022), including prior to the study commencing. Information on numbers of children from the designated wards (using postcodes) and the number of children who are eligible for FSM was also collected to ascertain if the target families participated. This data was reported by each district provider, following delivery of each six-week programme.

This included information on the:

- Total number of families engaged in the PASTA programme.
- Total number of children engaged in the PASTA programme.
- Total number of families completing the PASTA programme (defined as ≥4 weeks)
- Total number of children attending from the designated wards.
- Total number of children attending who are eligible for FSM.

Any participants that dropped out of the programme, and the perceived reasons for this, were explored in the facilitator interviews, as part of the stakeholder acceptability.

3.10.8 Qualtrics survey - To gain information about how the PASTA programme is delivered across Lancashire, providers completed an online survey, using Qualtrics software (Qualtrics, Provo, USA) version 2022, which was emailed to providers by the LCC Public Health team (September 2022); providers were asked to consider delivery content during the previous school term (the last fully completed course, June- July 2022). Survey questions included who attended the programme (i.e., parents and children, children-only or parents-only); the level of cooking

involved (e.g., whether the participants were involved in cooking skills, assembled ingredients prepared by facilitators, or a meal was provided with no participant involvement); PA duration and who participated; if education was provided, and if so, what this entailed (i.e., Adoption and Implementation). The providers were also asked if families were signposted to further healthy lifestyle opportunities following the programme, where they were signposted to, and if families were followed up with after course completion, to discuss progress, support or further opportunities available (Maintenance). Facilitators were asked to describe why they had adopted the approach specified, if responses deviated from the Service Specification in terms of Adoption (e.g., if children-only courses were delivered, if PA was not always provided, or participants were not involved in any food preparation).

The survey findings were used to capture a broader understanding of the programme, outside the three districts studied. The districts of Hyndburn, Chorley and West Lancashire did not take part in the survey, as a more in-depth analysis was completed following the semi-structured interviews in these areas. Qualtrics survey software, held on a secure encrypted university platform, was used to collect, store, and analyse the data.

3.11 Quantitative data analysis

Based on the CDQ, PAQ-YC, FNPA, demographic and Child Satisfaction questionnaires implemented, data was collated in Microsoft Excel to generate descriptive statistics, which was sufficient for the small sample size used in this feasibility study. For the CDQ, PAQ-YC and FNPA, statistical tests were also conducted using Jamovi Statistical Software (The Jamovi Project, n.d.) between week 1 and week 6 only, due to the similarity in sample size.

3.12 Qualitative research design

Focus groups and semi-structured interviews were conducted between May and July 2022 with parents or carers, and programme facilitators and co-ordinators. Focus groups were chosen as an effective way to explore programme acceptability, enabling participants to share experiences, and to understand nuances of attitudes, beliefs, or opinions (Grant *et al.*, 2013; Patton, 2015). This method provided an in-depth understanding of any perceived actions and programme satisfaction. Interviews are the most common format of data collection in qualitative research (Jamshed, 2014), and this method was chosen to enable a detailed exploration of aspects of feasibility, including barriers and enablers, based on the facilitator experiences of delivering and co-ordinating the programme. The focus group and interview

methodology were grounded in pragmatism, using focused questions to yield practical and useful insights from communities and providers (Patton, 2015 p.436).

3.12.1 Participant focus groups

The study involved two focus groups with parents or carers, after programme completion, and aimed to explore programme acceptability, and any self-reported actions, attitudes, or future intentions. Originally 3 focus groups were planned, but this could not be completed within the timeframe due to the programme structure and limited time within the sessions. Therefore, focus groups took place in in two of the districts studied (Hyndburn and West Lancashire), with parents or carers that opted-in to the focus group.

The RE-AIM framework (Glasgow *et al.*, 1999) was used to guide the focus group questions in terms of perceived Effectiveness and Adoption (acceptability). The COM-B Behaviour Change theory model (Michie *et al.*, 2011) was selected for this evaluation study, due to the model components aligning with the programme aims, to provide families with the skills and awareness (Capability and Opportunity) to influence healthy lifestyle choices (Motivation). The model was the most suitable for this evaluation study, as it enabled an exploration of programme Effectiveness within a formerly established programme; specifically, any aspects of PASTA that influenced participant Capability, Opportunity, Motivation, and potential actions towards Behaviour Change. Understanding any influences on the COM-B components is useful to identify programme strengths, areas for improvement, or how healthy lifestyles could be sustained in future programme Adoption.

Participant acceptability (Adoption)- Focus group questions aimed to determine participant satisfaction, based on experiences of attending the programme, including the cooking or food preparation, PA, and education content. The focus group also aimed to find out if there were any perceived positive or negative effects on child or family wellbeing, to ensure that there were no adverse effects from attending the course.

Self-reported actions towards healthy lifestyles (Effectiveness)- Questions were included using the COM-B framework, to ascertain; if there were any changes to attitudes, any aspects of the programme that motivated or supported any changes, any perceived barriers to achieving a healthier lifestyle, and future intentions.

Child acceptability and motivation (Adoption and Effectiveness)- The focus group questions also included the perceived experiences of the child, including satisfaction levels of the PA and any increased motivation to be active. The parent's reported perceptions of children's

experience were explored, as children were not involved in the focus group, and this would be used to compare with the child satisfaction questionnaire.

Each focus group was facilitated by the lead researcher on the final session of the programme (week 6), in a quiet environment away from the children's activity session. In West Lancashire the focus group took place in a classroom in the school, and in Hyndburn the focus group was held in a room in the community centre. Each session lasted approximately 30 minutes, including discussing the evaluation processes and obtaining consent. Recruitment and consent are covered in section 3.5 and data collection is outlined in 3.13.

3.12.2 Facilitator Interviews

Three semi-structured interviews were conducted via Microsoft Teams, after completion of the quantitatively evaluated courses and during the following school term. The interview questions were open ended, with flexibility to ask additional questions when necessary. Questions were guided by the RE-AIM Framework (Glasgow *et al.*, 1999) to explore Adoption, Implementation and Maintenance. This included any barriers and enablers to support continuation of any actions towards healthier lifestyles, based on the providers knowledge and experience of programme delivery. The facilitator and co-ordinator at each evaluation site (of Hyndburn, West Lancashire, and Chorley) were invited to take part, to understand both the delivery and co-ordination aspects of the programme. Interviews lasted 45 minutes to 1 hour, and an overview of interview content and rationale is outlined below:

Participant acceptability- To explore participant acceptability, facilitators were asked about any known or perceived reasons for any participants that discontinued the course, and perceived reasons for any courses that were cancelled due to insufficient numbers. This method was very subjective but was adopted due to the challenges associated with directly obtaining information from participants who had disengaged from the programme, including disengagement prior to the study commencing. However, this method would contribute to some understanding of any participant dissatisfaction experienced. Facilitators were further asked about any positive or negative participant feedback, to gauge stakeholder acceptability and inform this evaluation.

Programme adoption- The interviews aimed to identify how the food preparation or cooking, PA and education was delivered, as this varied at each site.

Implementation- Programme fidelity was explored, i.e., was the programme delivered as intended. How the provider delivers the programme may consequently affect any outcomes,

and furthermore, knowledge of 'what works' is useful to share as best-practice. Any perceived barriers encountered during delivery were identified, to assess programme feasibility.

Maintenance- The interviews aimed to find out if families were signposted to local opportunities, as intended, or if there was any follow-up support post-programme to potentially continue any actions towards healthy lifestyles. Future enablers were explored by drawing on facilitator experience and views of how the programme could be improved for participants to maintain any reported initial healthy behaviours.

3.13 Qualitative data collection

The study recruitment and consent for the focus groups and interviews is described in section 3.5. Focus groups were audio-recorded using an encrypting and password protected digital voice recorder. Interviews were recorded using Lancaster University's encrypted Microsoft Teams. Recordings were transcribed verbatim by the researcher. In the process of transcription, names of participants were anonymised, and any identifying features removed. Names were coded and details stored separately to the transcriptions, on the encrypted Lancaster University One Drive to which only the researcher and research supervisors have access to. This information was included in the consent forms and discussed with all participants before the focus groups and interviews. All audio files were deleted from the recorder and MS Teams once data analysis was complete.

3.14 Qualitative data analysis

The research approach selected for this study was abductive reasoning. Pragmatism is typically associated with this approach, which can move back and forth between deduction and induction (Kaushik and Walsh, 2019). Abductive research is neither data-driven nor hypothesis-driven but conducts parallel and equal engagement with the data and theoretical understanding (Thompson, 2022; Timmermans and Tavory, 2012). Therefore, rather than engaging with theories at the end of the research project, as inductivist approaches often advocate, abduction assumes extensive familiarity with existing theories at the outset and throughout every research step (Timmermans and Tavory, 2012).

To analyse both the participant focus groups and the facilitator interviews, Braun and Clarke's Reflective Thematic Analysis [RTA] (Braun and Clarke, 2006, 2013, 2021) was followed, using a worked example of RTA (Byrne, 2021) as a guide. RTA is an easily accessible and theoretically flexible interpretative approach to qualitative data analysis that facilitates the identification and analysis of patterns or themes within a data set (Braun and Clarke, 2021). The thematic analysis

approach was selected as it suits questions related to people's experiences, views, or perceptions, and is a commonly used method for identifying, reporting, and interpreting patterns within qualitative data (Braun and Clarke, 2013).

3.14.1 Focus group analysis

Braun and Clarke (2013, 2021) have proposed a six-phase analytical process for the RTA, which can facilitate the analysis and help the researcher identify and attend to the important aspects of a thematic analysis. This is how the six steps were employed in this study, using a worked example by Byrne (2021) as a guide:

1. **Familiarisation with the data**- This phase involved becoming well acquainted with the focus group data, by listening to the recordings, and reading the transcripts numerous times. It was useful to write notes during this phase, which included any notable emerging trends or points of interest.

2. **Generating initial codes**- The process of coding was undertaken to produce brief descriptive or interpretive labels for pieces of information that were of relevance to the research project questions. The initial iteration of coding was conducted by highlighting the quote using the 'comments' function in Microsoft Word 365 (modern comments). Repeated iterations of coding ensured that codes were of relevance to the research questions and this coding process was recorded in an excel spreadsheet (Byrne, 2021).

   The coding was generated both semantically (not examined beyond what a respondent has said), and latently (looking beyond the descriptive level of data to attempt to identify hidden meanings or ideas, including linking to other comments in the transcription for a deeper understanding of meaning during the coding process).

3. **Generating themes**- Once the focus group data had been coded, the data was then reviewed and analysed to form themes or sub-themes, which were meaningful to the research questions. This involved combining codes to form themes and identifying sub-themes. By contrast to the coding process, the themes were generated latently, by going beyond the data and using theory to conceptually explain the findings (Thompson, 2022). This reflects that the researcher plays an active role in interpreting themes, and identifying

which are relevant to the research questions, as opposed to themes 'emerging' from the data set (Braun and Clarke, 2013, 2021).

This phase took an abductive approach to RTA for the focus group data. This was because themes were generated both inductively (to reflect the content of the data), and deductively, as the researcher's own knowledge and theory was involved in the analytical process. Lastly, the COM-B framework (Michie *et al.*, 2011) was cross-referenced with the themes during this phase, where the data reflected the themes of the model, but this was not forced. The COM-B Model themes were added secondary to the formation of the themes, to highlight any participant Capability, Opportunity, Motivation, and actions towards Behaviour change that had emerged. Theme formation was guided, but not determined by existing theoretical understanding, which is reflective of abductive analysis (Thompson, 2022). At this stage of the process, it was useful to construct a thematic map for the focus group findings, which helped to understand the relationship between themes.

4. **Reviewing potential themes**- This phase involved conducting a review of the key themes in relation to the coded data items and the entire dataset (Braun and Clarke, 2013, 2021; Byrne, 2021). This involved a review of the relationships among the data items and codes that inform each theme and sub-theme, to ensure that the items/codes form a coherent and logical pattern. The second review involved assessing themes in relation to the data set, to ensure that the data reflects the themes and the research questions (Byrne, 2021).

5. **Defining and naming a theme**- This phase involved selecting and interpreting quotes from the focus group participants, to present a detailed analysis of the thematic framework. The focus group quotes reflected the themes, dataset, and COM-B themes, to give broader context to the research questions around acceptability and any initial perceived positive benefits or effects.

6. **Producing the report**- The final stage involved presenting the themes in the Results chapter, to present findings relating to the research questions. Findings were aligned with the RE-AIM model (Glasgow *et al.*, 1999) at this stage.

3.14.2 Semi-structured interview analysis

For the facilitator interviews, the six-phase RTA process was employed as above (Braun and Clarke, 2013, 2021; Byrne, 2021), using abductive reasoning. The only difference with the analysis was that the COM-B model was not applied during the analysis process, as the main purpose of the interviews was to focus on components of the RE-AIM Framework (Glasgow *et al.*, 1999), including barriers and enablers. The RE-AIM model was used to structure the interview questions, and findings were only aligned with the framework on completion of the analysis.

CHAPTER 4: RESULTS

This chapter presents the findings of the diet, PA, and family behaviour questionnaires, focus groups, and semi-structured interviews, considering the RE-AIM Framework (Glasgow *et al.*, 1999), to establish the feasibility of the PASTA intervention.

4.0 REACH

PASTA targets 5 – 8-year-olds and 94% of children were within this intended age group, with the average age 6.7 ± 1.8 years. It was noted that three children were outside the target age group, including two children with learning disabilities (9y, Burnley; 14y, Hyndburn cohort 1), and one 4-year-old (Hyndburn cohort 2) but were still allowed to engage. The programme targets were set in 2021/22 to wards with the highest prevalence of overweight children, based on 2016/17 – 2018/19 NCMP data. Hyndburn had the lowest number of participants attending from the target wards (66.7%); it was reported that out of the 30 children attending week 1 of the programme, 20 children were from the target areas. In Chorley, from the 84 children that attended week 1 of PASTA, 100% were reportedly from the designated wards. Similarly in West Lancashire; from 74 children attending week 1, 100% were reported to reside in the target areas. Although eligibility for FSM was not essential, it was unclear if FSM children were prioritised to receive a place on the programme, as recommended in the service specification (LCC, 2021), due to providers needing to focus on the designated wards as a priority. Based on week 1, West Lancashire had the highest number of FSM eligible children attending (87%), followed by 70% in Hyndburn and only 40% in Chorley.

Figure 4 shows that of the 22 children measured as part of the baseline measures, 32% (n=7) were classified as overweight (BMI >91st – 97th centile) or very overweight (BMI >98th centile), with most children classified as a healthy weight (64%, n=14; BMI 2nd – 91st centile) and one child classified as underweight (BMI ≤2nd centile). No child was severely obese (BMI >99.6th centile); only 1 child was above the 99th centile, but their BMI z score was 2.79, falling just below the severe obesity classification.

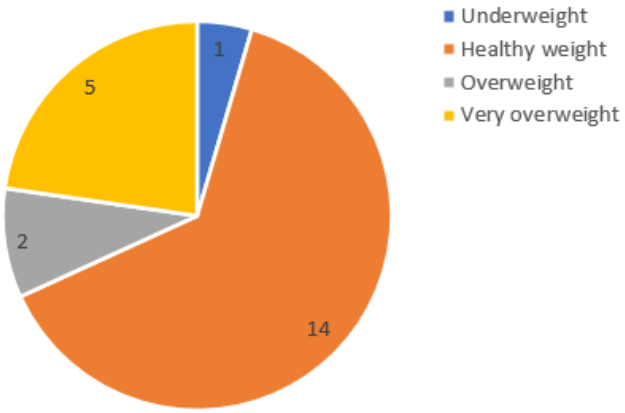


Figure 4: Proportion of children (n=22) classified by age-standardised BMI centiles

The findings of this feasibility study suggest that although PASTA was recruiting the target age group, and mainly families from the designated wards, most children were in the healthy BMI range (64%), and not overweight or obese as the programme intended.

4.1 EFFECTIVENESS

Questionnaires measuring aspects of children's diet, PA, ST and child and family behaviours were measured at week 1 and week 6, across the 3 districts, with the addition of Burnley. Notably, the follow-up scores should be interpreted with caution due to the smaller sample size.

4.1.1 Child diet

Table 2 presents the scoring from the CDQ with focus on food patterns, frequency, and intake of foods. For fruit and vegetable intake, the scores increased by 3.5% from week 1 to 6 (and to follow up when median is reported on a smaller sample), but scores were below the recommended score of 14 across all time-points.

Results based on the other three categories which align more with unhealthy dietary choices showed a mean reduction in fat from dairy and sweetened beverages from week 1 to 6, and to follow-up. Interestingly the non-core foods increased at week 6 but reduced at follow up for the smaller sample. Across these three less healthy categories, none achieved the recommended score, but they were all at the lower end of the possible score range. Due to data not being normally distributed, Wilcoxon-Rank non-parametric tests revealed that there were no statistically significant differences in scores between week 1 and 6 ($P>0.05$).

Table 2: CDQ scores generated from questionnaire completion at three time-points.

CDQ sub categories	CDQ Score range (recommendation)	CDQ Score at PASTA week 1 N=20	CDQ Score at PASTA week 6 N=19	CDQ Score at PASTA follow up N=9
Fruit and Vegetables	0-28 (≥14)	11.27 ± 6.36 10.86 [5.75,13]	12.26 ± 3.58 13.14[9.46,14.29]	11.03 ± 5.29 13.29 [7.86, 15.43]
Fat from dairy	0-15 (0)	4.05 ± 3.88 3.0 [1.75,4]	3.21 ± 2.46 3.0 [1.25,4.5]	2.56 ± 1.57 2.0 [1,3]
Sweetened beverages	0 – 5.9 (≤1)	2.27 ± 1.94 1.94 [1,4]	1.83 ± 1.69 1.14 [0.29,2.14]	1.06 ± 0.63 1.0 [1,1.29]
Non-core foods	0 – 10.3 (≤2)	2.66 ± 1.00 2.43 [2,3.04]	2.73 ± 1.15 2.29 [2.18,3.36]	2.03 ± 1.16 2.14 [1.57,2.71]

Data presented as mean ± SD, and median with lower and upper interquartile range in [brackets]

Each question of the CDQ was analysed to gain a broader insight into changes in eating patterns across each of the subscales (Table 3). For example, table 3 below highlights that there were increases in some healthier beverage choices not included in the scoring, such as reduced fat milk (52.8% at week 6; 75% at follow-up compared to week 1) consumed over 24 hours. Decreases in some unhealthier food and beverage choices are notable, such as fruit juice drinks (-28.8% at week 6; -110% week 1 to follow-up) in the 24h recall. Additionally, crisps (-14.8% at week 6; -86.5% week 1 to follow-up) and chocolate (-48.1% at week 6; -67.7% week 1 to follow-up) consumption over 7 days decreased to programme end.

Table 3. Children's Dietary Questionnaire results based on a pooled sample of the 4 participating districts.

CDQ question	Pre-PASTA Mean (SD) N=20	Post-PASTA Mean (SD) N=19	PASTA follow-up Mean (SD) N=9
A: FRUIT & VEGETABLES (in last 7 days)			
A1. Number of fruit (from list of 20)	5.85 ± 3.26	6.32 ± 2.34	6.44 ± 3.20
A2. Number of vegetables (from list of 25)	7.05 ± 3.76	8.21 ± 3.90	7.11 ± 3.31
B: DAIRY, BEVERAGES, FRUIT, AND VEG (in previous 24 hrs)			
B1. Frequency of fruit juice/ drink	2.1 ± 1.84	1.63 ± 1.60	1.00 ± 0.67
B2. Frequency of water	3.65 ± 1.77	3.68 ± 1.52	3.89 ± 1.37
B3. Frequency of full cream/ full fat milk (including flavoured milk) (as a drink or on cereal)	1.5 ± 1.6	1.16 ± 1.04	1.00 ± 0.94
B4. Frequency of reduced fat milk (including flavoured milk) (as a drink or on cereal)	0.25 ± 0.62	0.53 ± 0.82	1.00 ± 0.94
B5. Frequency of cheese/ paneer/ cheese spreads	1.45 ± 1.43	1.21 ± 1.15	0.89 ± 0.74
B6. Frequency of regular yoghurt/ custard	1.1 ± 1.41	0.84 ± 1.23	0.67 ± 0.82
B7. Frequency of reduced fat/ low fat yoghurt/ custard	0.05 ± 0.22	0.21 ± 0.52	0.00 ± 0.00
B8. Number of occasions consumed vegetables	1.75 ± 1.48	2.00 ± 0.97	1.33 ± 1.05
B9. Number of occasions consumed fruit	2.05 ± 1.43	2.21 ± 1.00	2.00 ± 1.41
B10. Number of different vegetables eaten	1.85 ± 1.56	2.21 ± 1.06	2.22 ± 1.81
B11. Number of different fruit(s) eaten	2.45 ± 1.47	2.21 ± 0.89	1.89 ± 1.20
C: NON-CORE FOODS, SWEETENED BEVERAGES & FRUIT & VEG (in last 7 days)			
C1. Frequency of peanut butter/ Nutella	1.4 ± 1.85	0.84 ± 1.04	0.44 ± 1.26
C2. Frequency of pre-sugared cereals (e.g. Coco pops, Cheerios) or sugar added to cereal	1.85 ± 1.96	2.16 ± 1.76	3.00 ± 1.89
C3. Sweet biscuits, cakes, muffins, doughnuts or fruit pies	2.73 ± 1.51	2.53 ± 1.60	2.33 ± 1.89
C4. Crisps or savoury biscuits	2.48 ± 1.98	2.16 ± 1.98	1.33 ± 2.26
C5. Muesli or fruit bars	0.2 ± 0.6	0.53 ± 1.27	0.11 ± 0.31
C6. Chocolate (bar/block/coated biscuits)	2.8 ± 1.86	1.89 ± 1.37	1.67 ± 1.83
C7. Frizzy drink/cordial (not diet varieties)	1.18 ± 1.91	1.42 ± 1.73	0.44 ± 0.83
C8. Ice-cream/Ice-lollies	2.2 ± 1.89	2.95 ± 2.04	1.33 ± 1.33
C9. Cheese and/or cheese spreads/ paneer	2.45 ± 1.96	2.00 ± 1.56	1.67 ± 1.83
C10. Pie, pasty or sausage roll	0.5 ± 0.67	0.63 ± 0.98	0.44 ± 0.68
C11. Pizza	0.95 ± 0.92	1.05 ± 1.10	0.78 ± 1.03
C12. Chips / French fries / Potato Waffles	1.8 ± 1.47	2.11 ± 1.74	1.56 ± 1.50
C13. Sausages / Burgers / Hot Dogs / Salami / Processed Meats	1.15 ± 1.56	1.42 ± 1.35	1.11 ± 0.87
C14. Takeaway (eg McDonalds, KFC, Fish & Chips, Indian, Chinese)	0.6 ± 0.58	0.84 ± 0.81	0.11 ± 0.31
C15. Number of days in last week had vegetables	4.25 ± 2.23	4.84 ± 1.81	5.78 ± 1.55
C16. Number of days in last week had fruit	5.05 ± 2.18	6.00 ± 1.38	5.78 ± 2.25

Overall findings of the CDQ suggest that although there were positive changes to child dietary behaviours from week 1 to 6, this was not statistically significant. Follow up data illustrated positive outcomes in 3 out of the 4 sub-categories when compared to week 1, but data should be interpreted with caution owing to the smaller sample.

4.1.2 Child Physical Activity

Table 4 shows the Mean results from the PAQ-YC. MVPA appeared to increase by 10% (10.8 minutes) from week 1 to 6 but decreased at follow up. However, follow-up was noted to still be 6% greater than week 1 MVPA, which is suggestive of a very small increase in PA since starting PASTA. Week 1 total MVPA was not normally distributed due to very large variability, but week 6 total MVPA and both week 1 and 6 daily MVPA were normally distributed. Despite the small increase in MVPA across the PASTA programme, there was no statistically significant difference (Paired t-test p=0.199; Wilcoxon Rank p=0.184).

Similarly, ST is 15.6 minutes (11%) lower at week 6 compared to week 1 of PASTA, and although ST increased by 10 minutes from week 6 to follow up (for 9 participants) it remained around 5 minutes less time spent sedentary when compared to week 1, indicating a very small decrease in ST since starting PASTA. Total and daily ST were normally distributed and despite the small reduction in ST across the PASTA programme, there was no statistically significant difference (Paired t-test p=0.970).

School PA was estimated to remain similar in terms of Physical Education/ school activity per week (a decrease of 0.04 minutes at week 6) but a 20-minute increase at follow up. Child estimations of PA levels increased at week 6 (by 10%) but decreased at follow up by 5.7% in comparison to week 1. However, estimated lunch time PA levels were estimated to increase (11.7% at week 6; 11% week 1 to follow-up).

Table 4. Physical Activity Questionnaire for Young Children (PAQ-YC based on a pooled sample of the 4 participating districts)

PAQ-YC Components	PASTA week 1 N=20	PASTA week 6 N=19	PASTA follow up N=9
Leisure time MVPA (minutes/day)	92.74 ± 76.40	103.51 ± 88.30	97.24 ± 92.89
Leisure time sedentary behaviour (minutes/day)	135.87 ± 74.66	120.17 ± 56.66	130.69 ± 64.65
School PA [a]			
Hours of Physical Education or similar activities/week	1.08	1.04	1.21[c]
PA at break time*	2.24	2.60[b]	2.07[c]
PA at lunch time*	1.60	1.95[b]	1.93[c]

[a] Section completed by the child.

[b] One child completed the PA at school section only, as the parent did not attend.

[c] Two families could not complete this section (Hyndburn), as the follow-up was re-arranged to take place during school holidays.

*Exertion level 1 (sitting) to 3 (running and playing intensely until hot and sweaty and out of breath).

Overall findings of the PAQ-YC show that although MVPA increased and ST decreased between week 1 and 6, this was not statistically significant. Very small positive changes in MVPA and ST were demonstrated week 1 to follow up, but no statistical tests were conducted due to the smaller sample at follow-up.

4.1.3 Child and family behaviours

Table 5 presents the mean scores for total FNPA and the individual constructs at the three time-points of data collection. Between week 1 and 6, the total FNPA score increased by 6.5%. The increases refer to positive behaviour outcomes, e.g., 5% less screen time at week 6. The total FNPA score and FNPA constructs were highest at course completion (at 6 weeks), which would be expected. Each construct score also increased when comparing week 1 to week 6, suggestive of a trend toward more healthier behaviours since attending PASTA. The largest increases were to reported child activity (11.1%), followed by healthy environment (8.9%), and food choices (8.1%).

Total FNPA scores were normally distributed, so a paired t-test was performed to compare week 1 and 6 total FNPA scores and the differences was found to be statistically significant ($p<0.001$).

Table 5. Family Nutrition and Physical Activity (FNPA) total and construct scores based on a pooled sample of the 4 participating districts.

FNPA Scores	Week 1 (Mean ± SD) n= 22	Week 6 (Mean ± SD) n=19	Follow-up (Mean ± SD) n=9*
Total FNPA	60.18 ± 6.90	64.39 ± 7.29	63.67 ± 5.72
FNPA Constructs			
Family meals	7.27 ± 1.26	7.63 ± 1.02	7.56 ± 0.96
Family eating practices	5.45 ± 1.78	5.79 ± 1.36	5.56 ± 1.26
Food choices	6.14 ± 1.71	6.68 ± 1.58	7.22 ± 1.50
Beverage choices	5.64 ± 1.62	5.95 ± 1.63	4.89 ± 2.35
Restriction/reward	5.95 ± 1.63	6.42 ± 1.65	6.11 ± 1.38
Screen time	5.55 ± 1.80	5.84 ± 1.85	5.67 ± 1.48
Healthy environment	6.14 ± 1.81	6.74 ± 1.08	6.44 ± 1.38
Family activity	6.23 ± 1.60	6.63 ± 1.31	7.00 ± 1.18
Child activity	5.05 ± 1.49	5.68 ± 1.88	5.44 ± 1.74
Family schedule/sleep routine	6.77 ± 1.80	7.03 ± 1.38	7.78 ± 0.63

*Lower attendance at follow-up

The follow up data was not statistically compared due to the difference in sample sizes. However, for the 9 participants who engaged in follow-up data collection, the total FNPA score decreased slightly but was still above the week 1 scores. Table 5 also highlights that each FNPA construct value decreased from week 6 to follow-up but interpret with caution as the sample was 52% smaller. However, family activity and family sleep routine continued to increase (11.0% and 13.0% respectively; week 1 compared to follow-up). As with total FNPA, it should be noted that all constructs were higher at follow up compared to week 1, apart from beverage choices (fizzy or sugary drinks, or lower fat dairy drinks consumed) which reduced but encouragingly not below baseline scores. This is suggestive of an improvement in most health-related behaviours since starting the PASTA programme.

4.1.4 Effectiveness identified from focus groups

The two focus groups with parents or carers aimed to explore programme acceptability and any perceived changes to attitudes, perceptions, actions, or future intentions, from attending PASTA. Table 6 illustrates example quotes to demonstrate the subthemes identified, and this is explored further in the text below.

Table 6. Effectiveness subthemes identified in the focus groups.

Theme	Subtheme	Example Quotes (Q)
Effectiveness	Physical Activity	**Q1. Hyndburn, Speaker 4:** *I don't think we've made any changes on the physical [activity] side because they're very active anyway… They're always doing some club, they're very fit and healthy children anyway, so we haven't changed anything that way, because we haven't needed to change anything.*
	Capability (diet)	**Q2. West Lancashire, Speaker 3:** *It opened my eyes to different foods though, 'cause I cook the same things all the time and it's realising that whatever you've got in your cupboards you can just throw together and cook.* **Q3. Hyndburn, Speaker 4:** *We really enjoyed the week… when we downloaded the App and learned how much sugar was in things so that learnt us a lot. I tried that when we've been shopping for things. So, it's educated them on a lot. They were quite surprised at what sugar contents were in food. So yeah, we have learned quite a lot…*
	Opportunity (diet)	**Q4. West Lancashire, Speaker 3:** *And it's really like, opened my mind to different, to different things for the kids.* **Q5. West Lancashire, Speaker 4:** *Same as that, 'cause I've tried things on this that I've never, I would never have dreamed of trying.* **Q6. West Lancashire, Speaker 4:** *I've got a food phobia so being, erm at home, I wasn't really cooking at all. I was getting my partner to do it. And now I'm like, getting more involved in the kitchen and cooking more and stuff like that. And like I said, with the kids trying new foods and stuff. And even I'm trying new foods now… It's helped me a lot…I look forward to teatime a lot more now, then I was doing.* **Q7. Hyndburn, Speaker 2**: *…And the different colours, if we make a colourful pattern, then she'll try everything. Just by making it more colourful.*
	Motivation and actions towards a healthier diet	**Q8. West Lancashire, Speaker 4**: *And since then, we've done, what was it, smoothies last week, and I bought frozen fruit and done smoothies, like two or three times throughout the week. So, I've just got constant fruit now in the freezer for smoothies. And I've never done it before.* **Q9. West Lancashire, Speaker 2:** *It was the cola apples that got us all… We make them all the time now. [My child] makes me make them all the time.* **Q10. Hyndburn, Speaker 5:** *Snacks wise, yeah. Again, with the App…we find that snacks wise, she's going more for the healthier snacks. She's always loved fruit and stuff, but like, peppers was one that she didn't touch…and for instance, one day she decided to take a chopped-up bit of pepper instead of some biscuits. Because of the App. So again, it's good that way.*

Physical activity

In West Lancashire and Hyndburn, parents perceived a high level of acceptability of the children's PA sessions, however, there were mixed views around any changes to PA levels in the children. The groups were asked if they perceived that the programme had impacted the children's PA levels; all parents across both groups discussed their perception that the children

had not changed their levels of PA since attending the programme. Rather, there was the perception that children were active anyway, implying that any changes in activity levels were not necessary (e.g., table 6; quote 1).

Although the focus group participants discuss that the PA sessions have had no impact on the children, later in both groups, some of the families describe the benefits or changes. In West Lancashire, one parent discussed that the PA sessions have been extremely beneficial for their child, who cannot normally partake in activities such as football due to a health condition. The Hyndburn group also referenced a Yoga session delivered by a facilitator the previous week. Some of the families discussed their child's high levels of enjoyment of the session, and how their children have been motivated to practice Yoga at home after engaging in the session. One family reported their child has requested Yoga classes post-course and the intention is to carry on with this activity. The findings of the focus groups suggest that there may be changes to PA in only some of the families, potentially resulting in small changes overall, which concurs with the quantitative data.

However, the majority of focus group discussion entailed the perceived effects that PASTA had on the families' attitudes, actions, and intentions towards diet and healthier eating, as demonstrated in table 6.

Capability (diet)

The capability outcomes differed per district, as they directly related to the provider delivery model and programme content (explored further in 4.3 Adoption and Implementation and appendix J). However, in both districts, capability was related to diet, in terms of skills, knowledge and awareness.

In West Lancashire, capability was a strong theme. All the parents frequently referenced many examples of increased capability from participating in the parent cooking sessions, including gaining more knowledge, skills and confidence around cooking and food. The increase in capability relating to food and cooking clearly also influenced motivation, attitudes, and the reported actions at home (e.g., quote 8). In Hyndburn, increased knowledge, and awareness of healthy eating was reported by most parents in relation to a Change for Life Scanner Application [App.] (NHS, 2022a) introduced in a PASTA session. Furthermore, the App. was also reported to be used by the children on PASTA, supporting an increase in child knowledge of healthy eating.

Opportunity (diet)

Although opportunity is connected to lots of the themes identified in the qualitative analysis, an aspect of both focus groups was the exposure to healthy foods on the programme, including foods that were new to the families. The groups highlight that the course facilitators encouraged families to try new foods, and this was associated with changing perceptions of the healthy foods introduced on PASTA.

In West Lancashire, the preparation and tasting session for the children and parents, parent cooking sessions, and facilitator encouragement to try new foods, resulted in all the families reporting that they tried new foods that they would not normally have purchased or eaten. Many quotes about trying new foods were suggestive of favourable changes in perceptions relating to food, which appeared to be associated with an increased motivation and initiating actions in the home. In table 6, this is illustrated for example in quote 6; the effects of engaging in cooking were particularly strong for one parent who had a food phobia and avoided cooking. Since attending PASTA, she reported eating a wider range of foods and cooking at home.

Parents from both sites further described how the programme motivated their children to try new foods. In West Lancashire, parents highlight the initial apprehension by the children to try new foods, but the encouragement from facilitators was perceived to be an effective approach. In Hyndburn, parents discussed that the food preparation sessions involved colourful or patterned foods, which reportedly increased the children's willingness to try new foods. The parents described using this strategy at home to encourage healthy eating.

Motivation and actions towards healthier eating

Both focus groups appeared to demonstrate motivation and actions towards healthier food choices. In West Lancashire, the parent cooking sessions, and parent and child food tasting sessions, were reported to have heavily motivated all the parents to purchase, prepare, cook, and eat healthier food and recipes as a result of attending PASTA. This is suggestive that the opportunity (or PASTA session) and increased capability (knowledge, skills and confidence gained) has influenced the participants motivation to enact actions towards a healthier diet. In Hyndburn, most of the families cited the Change for Life Scanner App. as the biggest influence on increasing knowledge, awareness, and motivating healthier food choices and actions in the families.

Children were perceived by parents to be more motivated in making healthier choices since attending PASTA, in the two districts. For example, in Hyndburn, parents described the

perceived positive impact the programme has had on family mealtimes and fewer arguments over unhealthier food requests, which implies a change in perceptions and increased motivation towards healthier foods in the children, at the end of the programme.

4.3 ADOPTION AND IMPLEMENTATION

Adoption and implementation explore how the PASTA programme was delivered across the 3 sites, and if it was delivered as intended. This section further explores if the programme is acceptable to participants. Any barriers to programme delivery are identified, in addition to any enablers for individuals to sustain any initial actions towards healthier changes.

4.3.1 Programme adoption and implementation in West Lancashire, Hyndburn, and Chorley

The semi-structured interviews included obtaining information on how each provider delivers PASTA, to establish if the programme was delivered as intended, and to understand how any outcomes may have been affected. A full overview of the delivery model adopted in each of the 3 districts is outlined in Appendix J.

All 3 providers included PA for the children and weekly healthy lifestyle education, as intended by the service specification, although content varied by provider. Each district delivered an element of food preparation, although this varied considerably between sites. In Hyndburn, the families prepare food together, but fewer cooking skills were involved, e.g., families added toppings to pizzas, but the facilitators were responsible for any chopping, peeling, or cooking. The West Lancashire programmes involve the children and parents preparing and tasting a snack together. The parents then participate in a full cookery course, with a qualified chef and facilitator, whilst the children partake in PA. The course involves a wide range of cooking skills for parents, and does involve children in some preparation, although the service specification suggests whole-family cooking on the programme. In Chorley, the children participate in a range of cooking skills as recommended, such as peeling and chopping during the sessions, although parents do not attend most courses.

Hyndburn and West Lancashire deliver a whole-family approach, as intended by LCC, whereas in Chorley, the main delivery model is children-only. The providers reported some positive feedback from parents that did not attend the children-only sessions, and expressed that it would be a barrier to insist on parent attendance, although describe that the whole-family course was well-attended:

Chorley, Speaker 2: *…what we said is, that was going to be a massive barrier if we insisted that parents came so, because Clayton was like the first area actually, that we've tried, because of having the, they had to bring them to Clayton Green, that kind of oddly worked, which was good… But St. Greg's, in particular, all of them worked, all of these children would have been in after school care anyway, so it would, then there would be nobody accessing that programme…*

The coordinator perceives that the area the programme is delivered in (e.g., less deprived areas) would affect if parents can attend. However, the providers discuss potential future developments to incorporate parental involvement, such as inviting parents to the week-6 session, or introducing a food diary, for the children to involve parents in aspects of the programme at home; although the co-ordinator surmised that inviting parents to sessions would need to be based on the knowledge of the school staff to ensure attendance.

4.3.2 Adoption and Implementation in Lancashire-12

The other 9 districts in Lancashire-12 reported programme Adoption and Implementation in the Qualtrics survey, and this can be viewed in Appendix K. All providers in the survey delivered the programme to parents and children, as mandated by the service specification, although one provider had recently changed from children-only. Six providers delivered a full cookery course, involving cooking skills (chopping, peeling, cooking), although 1 provider sometimes facilitated food demonstrations during the sessions instead of a hands-on cookery session. Of the organisations facilitating cooking courses, 5 providers involved the whole family in the cooking sessions, and one delivered parent-only cooking.

Three districts did not provide opportunities for cooking skills each week, as intended by LCC. One provider mainly involved families in food preparation only (e.g., assembling ready-prepared ingredients to make meals such as sandwich wraps), citing difficulties in kitchen facilities and time constraints as reasons for adopting this approach. A further provider alternated between a food preparation session one week and PA the following week on the course, with families preparing the ingredients to cook the meal at home, due to no cooking facilities at the school. However, the previous course delivered by this organisation involved providing a meal (e.g., sandwiches) which involved no cooking skills, and was adopted as children-only, so this was an improvement in terms of now aligning closer to the intended delivery model. One organisation did not involve participants in any cooking during the sessions in the term surveyed, but instead provided ingredients for a meal for families to cook at home, reportedly due to no kitchen facilities at the school. However, during the new school year (Autumn 2022), they had now commenced cooking skills sessions with the families.

The majority (88.9%) of providers facilitated PA each week (n=8), with 1 provider alternating the weeks PA was delivered, although from September more staffing allowed the organisation to offer both a food and PA session to families each week. It was also interesting to note that one district included the aspect of harvesting and gardening on the community allotment as their PA session, as opposed to structured PA. Most districts (n=7) offered 20-50 minutes of PA per week, but 2 only delivered 10-20 minutes per week.

All districts offered education alongside the sessions, although how often it was delivered varied; 6 providers facilitated education every week, and 2 often delivered education, whereas one provider only offered education sometimes. The education tended to focus on healthy eating themes, including the Eatwell Plate, fats, sugars, and healthy lunchboxes, but also included practical elements around food hygiene, cooking skills, healthy recipes, and food labels. One provider offered leaflets/ handouts as the education element of the programme, as opposed to education during the sessions.

The overall PASTA Adoption and Implementation varied widely in terms of course content and delivery, across the districts in Lancashire.

4.4 Acceptability

4.4.1 Family engagement. Table 7 shows a descriptive analysis of the number of families and children engaged in the programme in each of the three areas studied. PASTA attendance was generally good overall, in terms of participants attending the programme for 4-weeks or more; Hyndburn (87%); Chorley (81%); West Lancashire (90%). However, the attendance log was difficult to interpret in one district, as all attending children and adults were reported together (including siblings and other adults attending). The data was more comprehensible in the districts that reported the number of families engaged each week.

Significantly, there were differences in the number of courses delivered in each district. Hyndburn had delivered 4 courses (November 2021 – July 2022), with 13 families completing 4 weeks or more. Chorley had delivered 6 courses between February and July 2022. Chorley appeared to have the highest numbers of participants completing (n= 55), but notably, 4 of the 6 courses were children-only, as opposed to full families. West Lancashire had delivered a significantly higher number of courses; between November 2021 and July 2022, 12 courses had been delivered in the district, with 36 families completing 4 or more weeks of the programme.

4.4.2 Participants that dropped out and the known/ perceived reasons for discontinuation.

The facilitator interviews explored the known or perceived motives for any participant discontinuation. Table 7 shows that in Hyndburn, 2 families were reported to have dropped out of the 4 courses delivered. In West Lancashire, 3 families were reported to have dropped out of the 12 courses delivered. Reasons were perceived to be mainly unrelated to the programme. One parent that discontinued a West Lancashire course was reported to have expressed dissatisfaction for the first session. The school staff reportedly perceived the parent to be difficult to engage with and had signposted her to the course. The parent had informed the school staff that she perceived tasks such as the knife safety check to be authoritarian in nature, but this represents <1% of the families that engaged. In Chorley, 6 courses had been delivered and the attendance of one course reduced significantly when a group of families did not engage in the programme at week 3 or 4; instead of arriving at the session, they went to the pub which was next to the school. The reasons were perceived to be that the families were difficult to engage, and a shorter course on an alternative day of the week was perceived to be more suitable for this cohort.

4.4.3 Courses cancelled due to insufficient numbers.

There were no courses cancelled in Hyndburn and West Lancashire due to insufficient numbers or no families engaging in the programme. In Chorley, one course was booked and due to be evaluated as part of this study but did not go ahead due to no families being recruited to the programme. The facilitators reported that engagement with this school was more difficult, as the provider had not worked with this school before. Further perceived reasons for no attendance were that the venue was a distance from the school, and there was another course running at the same time in the school. The facilitator describes ways to overcome these barriers, which include delivering the course in the school, and building stakeholder relationships with the school and parents, to enable successful programme recruitment.

Table 7. A descriptive analysis of family engagement, and facilitator interview quotes exploring participant discontinuation and any course cancellations.

	School half-terms 2021-22					Facilitator Interview evidence		
Hyndburn	Nov-Dec	Jan-Feb	Feb-Apr	Apr-May	June-July	**Courses cancelled**	**Reasons for discontinuation**	**Facilitator quotes**
Number of courses delivered	**1**			**1**	**2**	No courses cancelled due to insufficient numbers. Jan-Apr no courses were delivered in Hyndburn due to Adventure City's planned refurbishment.	Nov-Dec: 1 parent reported struggling with 3 young children, including 1 child with learning disabilities. June-July: 1 family discontinued; reporting that the children were tired after school	S3: *She had 3 children, and she did need that extra support. When she signed up to the program, her husband was going to come along…he was unable to...* S2: *Yeah, there's the [venue] lady…she's saying that her children were really tired.*
Number of families engaged in PASTA	4			4	7			
Number of children engaged in PASTA	7			10	13			
Number of children attending from the designated wards (%)	5 (71%)			10 (100%)	5 (38%)			
Number of FSM eligible children attending (%)	7 (100%)			7 (100%)	7 (54%)			
Number of families engaging in PASTA (4 weeks or more) (%)	3 (75%)			4 (100%)	6 (86%)			
Chorley								S2: *I think, new head teacher, very small school… it's just going to take a while to build confidence…it was on a Friday and the venue was like 1.5 mile away…*
Number of courses			**2**	**2**	**2**	One course in Coppull St Johns (April-May) was cancelled due to no families engaging in the programme.	Feb-Apr: 1 child reported to drop-out due to an external activity. Feb-Apr: The attendance of one course in Coppull dropped significantly after 3-4 weeks. The facilitators perceived that this was a hard-to -reach group.	S2: *…the biggest drop off was the Coppull one, wasn't it towards the end, which was just that, again, very hard to reach families. It was on a Friday night, and they went the pub instead… They did well for about 3-4 weeks, didn't they? …3-4 weeks was probably enough for them.*
Number of families engaged in PASTA			30	16	22			
Number of children engaged in PASTA			39	23	22			
Number of children attending from the designated wards (%)			39 (100%)	23 (100%)	22 (100%)			
Number of FSM eligible children attending (%)			10 (26%)	9 (39%)	15 (68%)			
Number of families engaging in PASTA (4 weeks or more) (%)*			22* (56%)	14 (87.5%)	19 (86%)			
West Lancs								
Number of courses	**2**	**2**	**3**	**2**	**3**	No courses were cancelled due to insufficient numbers.	From the 12 courses delivered, 4 families were reported to drop-out for personal reasons not related to the course. Apr-May: One parent was reported to be dissatisfied with week 1 of the programme.	S2: … *We showed her how to hold the knife…to try to work with her, the best way we could…and then she never showed up the second week. So, I contacted the school …the feedback was that she doesn't want to be bossed around the kitchen… school did say that they had asked her to go because she's a challenging parent in school and …[it] might be good for her.*
Number of families engaged in PASTA	6	8	10	6	10			
Number of children engaged in PASTA	12	17	23	11	11			
Number of children attending from the designated wards	12 (100%)	17 (100%)	23 (100%)	11 (100%)	11 (100%)			
Number of FSM eligible children attending (%)	10 (83%)	15 (88%)	17 (74%)	11 (100%)	11 (100%)			
Number of families engaging in PASTA (4 weeks or more) (%)	5 (83%)	8 (100%)	9 (90%)	4 (80%)	10 (100%)			

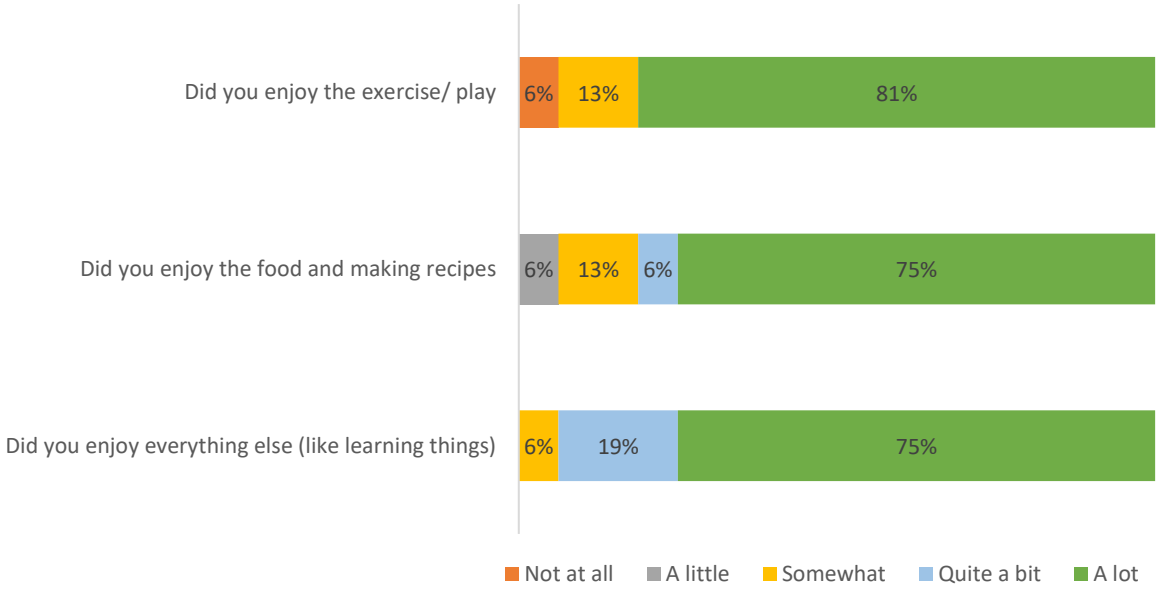
*The Chorley attendance log submitted for Feb-Apr was not clear, due to adults and children reported together.

Orange quotes refer to reported motives for participant discontinuation; the **blue quote** refers to reported reasons for a course cancellation.

4.4.4 Child satisfaction questionnaire

The child satisfaction questionnaire was the only tool that was completed by the attending children rather than their parent/carer. Due to limited time available in the week 6 session this was not completed by all participating children from the Burnley district, meaning only 16 children completed the questionnaire. Results for the three Likert scale-based questions are presented in Figure 5.

The free text, provided from when children were asked to identify their favourite part of PASTA, included 10 comments made about the food session (62.5% of the sample), such as eating various foods or making recipes, followed by 8 comments (50%) referring to playing games and PA, 3 reported playing with other children as their favourite part, and 1 identified colouring activities.



Note: answers were based on a pictorial Likert scale 1-5

Figure 5. Child satisfaction questionnaire results based on pooled data from the 4 participating districts.

Overall, the children demonstrated good levels of programme satisfaction across the 4 districts, with the food tasting and PA listed as the most frequently favourable elements.

4.4.5 Stakeholder acceptability (qualitative findings)

The focus groups and facilitator interviews explored stakeholder acceptability, and figure 6 shows example quotes relating to the acceptability theme.

The focus groups demonstrated a high level of programme acceptability, which was illustrated in the parental satisfaction of the programme, perceived child satisfaction of the PA sessions, and positive feedback about the facilitators. Acceptability in West Lancashire was strongly associated with the parental cooking sessions and the impact on the parents and families, which was discussed throughout the focus group, including the children's acceptability of the food and recipes. In Hyndburn, families reported satisfaction for the Change for Life App, introduced in an education session, and the child(ren)'s satisfaction of a Yoga session delivered as part of the course.

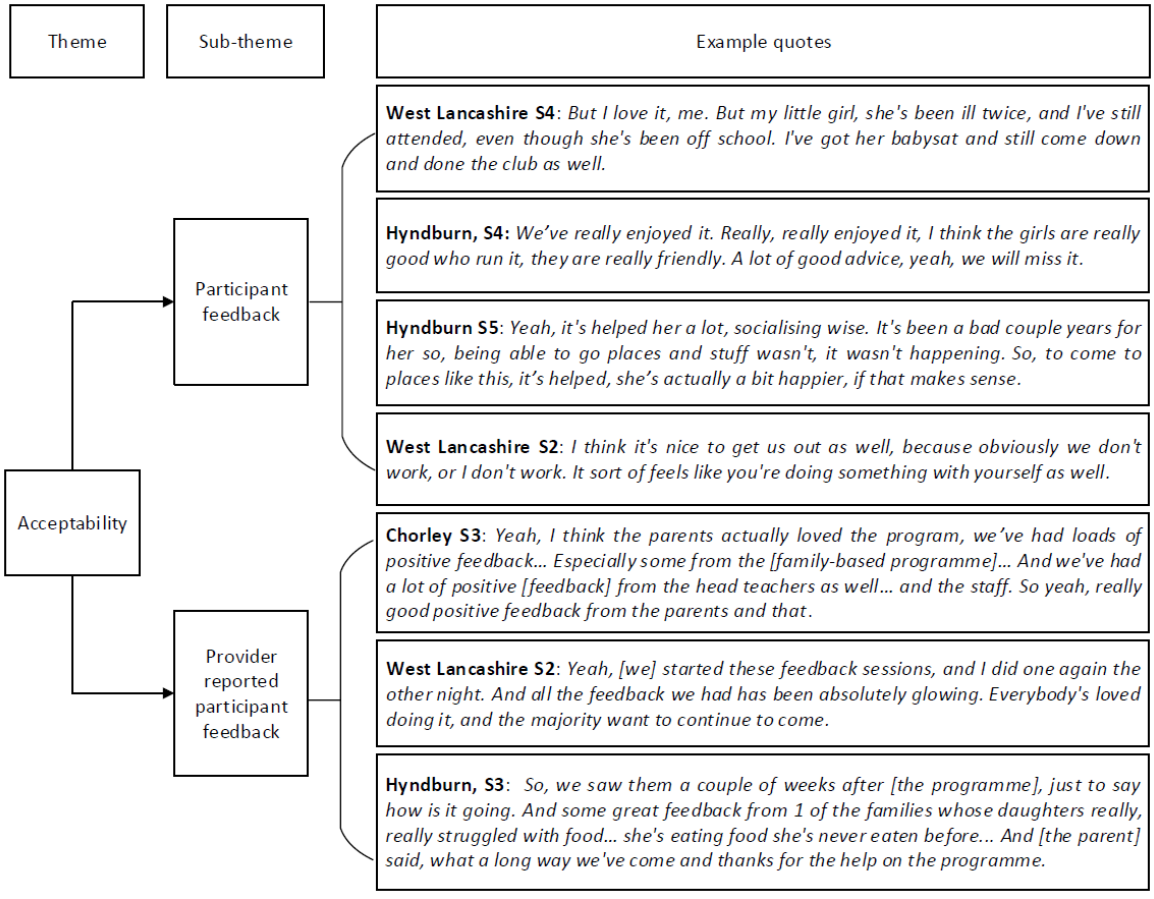


Figure 6. Example quotes to illustrate stakeholder acceptability identified from the Hyndburn and West Lancashire focus groups; and facilitator interviews across the 3 sites.

In both focus groups the course satisfaction clearly impacted the motivation of parents and children to attend and participate in the programme, as illustrated for example, in figure 6, quote 1. A further observation from the families was that the perceived social and wellbeing aspects of the programme appeared to positively impact the acceptability of the course for participants. In West Lancashire, the social and wellbeing benefits were mainly expressed in relation to the parents, which was linked to the parent cooking sessions, and by contrast, in Hyndburn the parents described the wellbeing benefits mainly related to the children.

Furthermore, the facilitator interviews highlighted stakeholder programme acceptability, mainly from the families (figure 6). Facilitators across all districts conveyed that there were high levels of programme acceptability described by the families. In Hyndburn, the facilitators suggested that there was positive evaluation feedback from parents, including increased knowledge and actions towards healthier lifestyles, as a result of attending PASTA. In Chorley, the facilitators reported acceptability from various stakeholders, including children, parents, headteachers and school staff. In particular, the facilitators describe the perceived satisfaction and enthusiasm of the children taking part in the cooking skills, such as involvement in peeling and chopping, in addition to positive parental feedback, including for the children-only programmes. In West Lancashire, the course was reported to be well received, with families implying that they are continuing to cook the recipes introduced on the programme at the follow-up sessions which take place the following school half-term.

4.5 Programme barriers

Figure 7 below highlights the barriers to programme delivery, identified in the facilitator interviews.

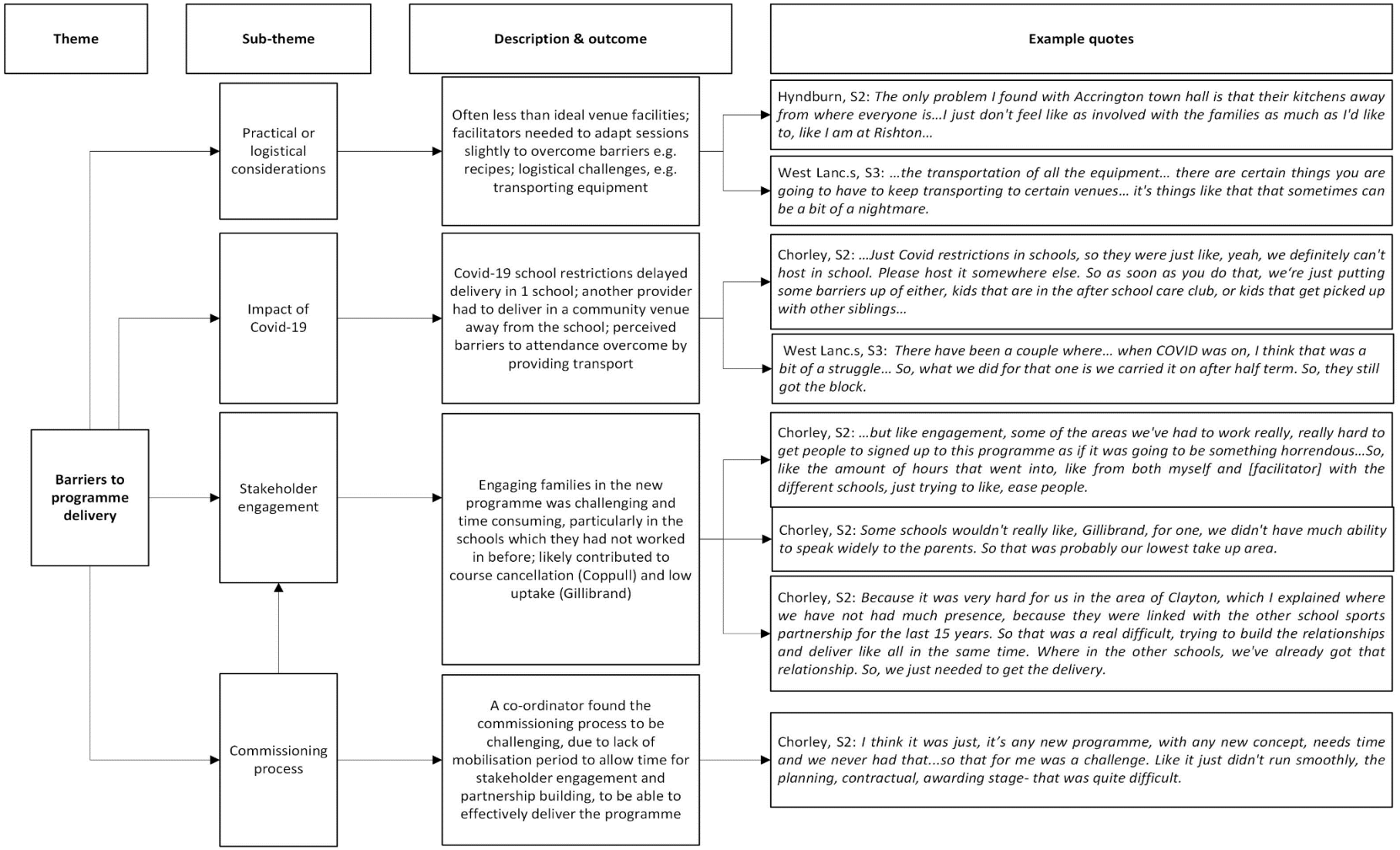


Figure 7. Barriers to programme delivery across the 3 sites

In relation to the **practical or logistical considerations** sub-theme, all providers reported that venues were often less than ideal, such as lack of suitable kitchen facilities for the families or facilitators to use, but essentially all facilitators discussed overcoming these barriers by adapting sessions. For example, adapting to recipes that could be demonstrated in the school hall, or adapting PA sessions to the different age-groups. In West Lancashire the facilitators referenced the transportation of all the equipment for the parent-cooking sessions to be a challenge, but this was managed through co-ordination between the team. In Hyndburn, the venue facilities were the only barriers to delivery identified in the district.

The impact of Covid-19 was identified by two providers and related to Covid-19 delivery issues (Jan-Feb 2022), although both Districts implemented strategies to overcome the associated barriers. In Chorley, the team sickness absence levels were high, and school Covid-19 restrictions meant that PASTA needed to be run from alternative community venues. The coordinator perceived that children would not engage unless transport was provided, so the providers transported the children each week. In West Lancashire, the delivery plan was changed in one school due to Covid restrictions; whereby the 6 sessions were delivered over 2 half-terms to accommodate the course.

Stakeholder engagement and partnership building emerged as a further subtheme. Engaging with stakeholders about the new programme was highlighted as challenging, particularly in the schools where the providers had not previously worked. The facilitators needed to spend a lot of time engaging with school staff, parents, and children, to build relationships and successfully recruit participants to the courses. This may have impacted the programme delivery in a number of ways. As outlined in figure 7, one of the quotes describes a school where the providers did not have the opportunity to speak to the parents about the PASTA programme, which may have resulted in the low uptake of children on one course. Furthermore, one course was cancelled in the district, due to no families being recruited (section 4.4.3), and it was perceived that more partnership building was needed with the school, although there were other logistical considerations that may have also led to lack of engagement, such as the programme venue not being close to the school. The co-ordinator further highlights that it was challenging to build relationships with new schools and deliver at the same time, due to the amount of time needed to engage with stakeholders. One further district also reported the difficulty to engage families at some schools, resulting in lower numbers recruited, potentially due to the introduction of a new programme.

In relation to the stakeholder engagement theme, a coordinator found the **commissioning process** to be challenging, as there was no mobilisation period pre-delivery. The provider discusses starting to build relationships with the schools before being awarded the contract and funding, and then gaining feedback from the Council to not proceed any further prior to receiving the funding. The coordinator highlights that a new programme needs time to allow for stakeholder engagement and partnership building, to enable effective programme delivery.

4.6 Programme enablers

In all interviews, providers were also asked how the programme could be improved, to enable participants to maintain any initial healthy actions. The findings relate to both programme implementation and maintenance. Figure 8 shows the sub-themes identified, a brief description and example quotes.

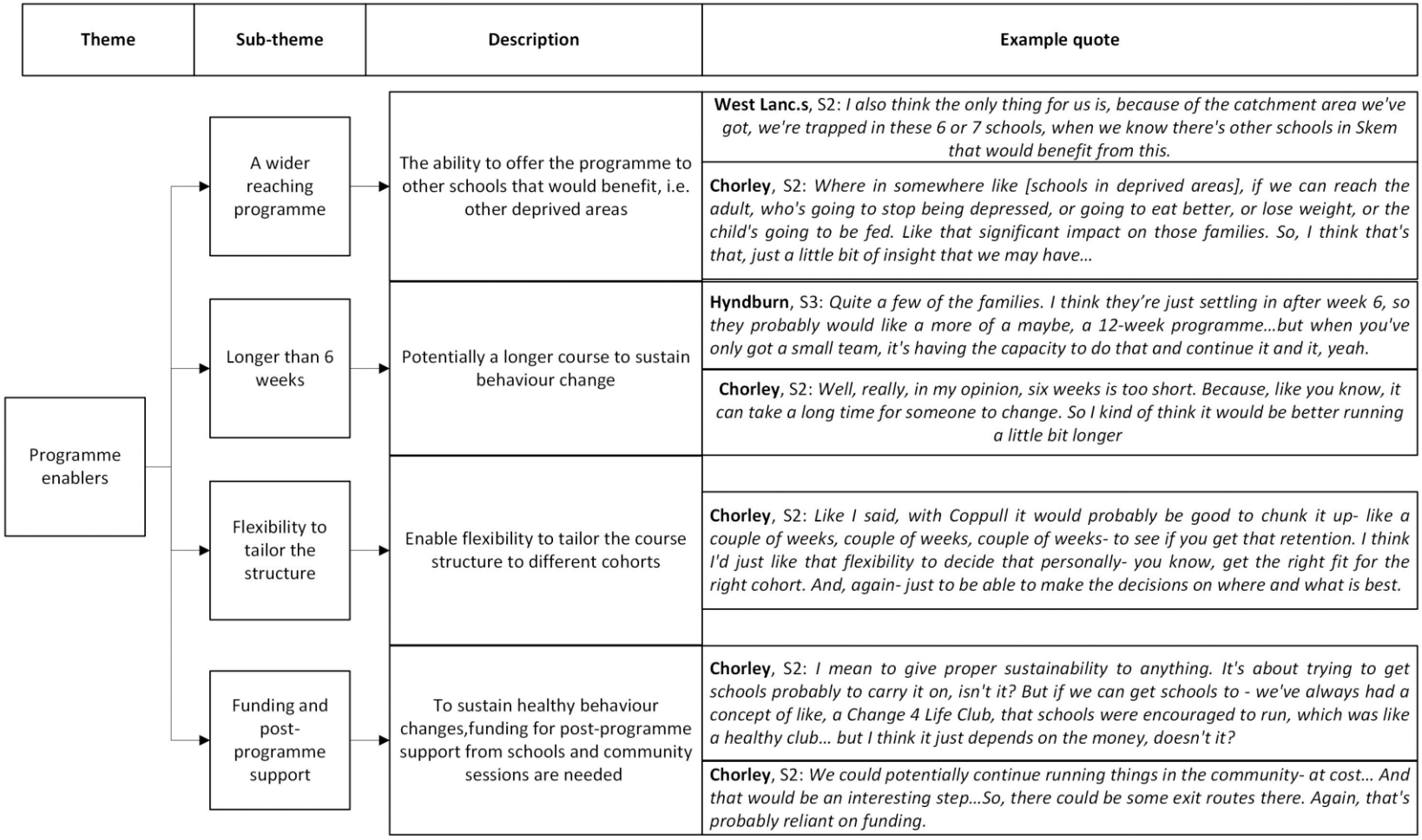


Figure 8. Facilitator perceived enablers

In relation to sub-theme '**a wider reaching programme**', the providers are only commissioned to offer the programme to a limited number of schools in each district (e.g., 6-7 schools in West Lancashire); based on the 3 wards with the highest prevalence of overweight children. However, the facilitators highlighted offering the programme to other schools, within other areas of high deprivation, as they perceive that other families would also benefit from PASTA. An additional provider discussed offering the programme to further deprived areas, as the perception was that these families would benefit the most.

The **'Longer than 6-weeks'** sub theme highlighted that the facilitators perceived that a 6-week course was too short, as establishing actions towards a healthier lifestyle can take longer than this and therefore, it was suggested that a longer programme would be beneficial. A further coordinator reported that the families would potentially like a longer programme to support changes, according to their programme evaluation (e.g., 12-weeks instead of 6-weeks). However, the provider didn't necessarily agree with this view, citing team capacity as a potential issue to cover a longer course. Additionally, the facilitators discussed that it was hard to gauge the reasons for participants requesting a longer course; whether this was due to the levels of satisfaction, or if they feel that more support to make healthier changes is needed. This was suggested as useful to be explored in future provider course evaluations.

'Flexibility to tailor the course structure' was the third sub-theme identified. One provider perceived that the flexibility to decide how to deliver the programme would overcome barriers relating to retention in some areas, where families are hard to engage. For example, a proportion of families from one programme only attended 3-4 weeks of the programme. The perception was that the ability to tailor the courses to different cohorts, based on the coordinator's knowledge and experience, would improve family engagement; and therefore, provide a more effective intervention outcome.

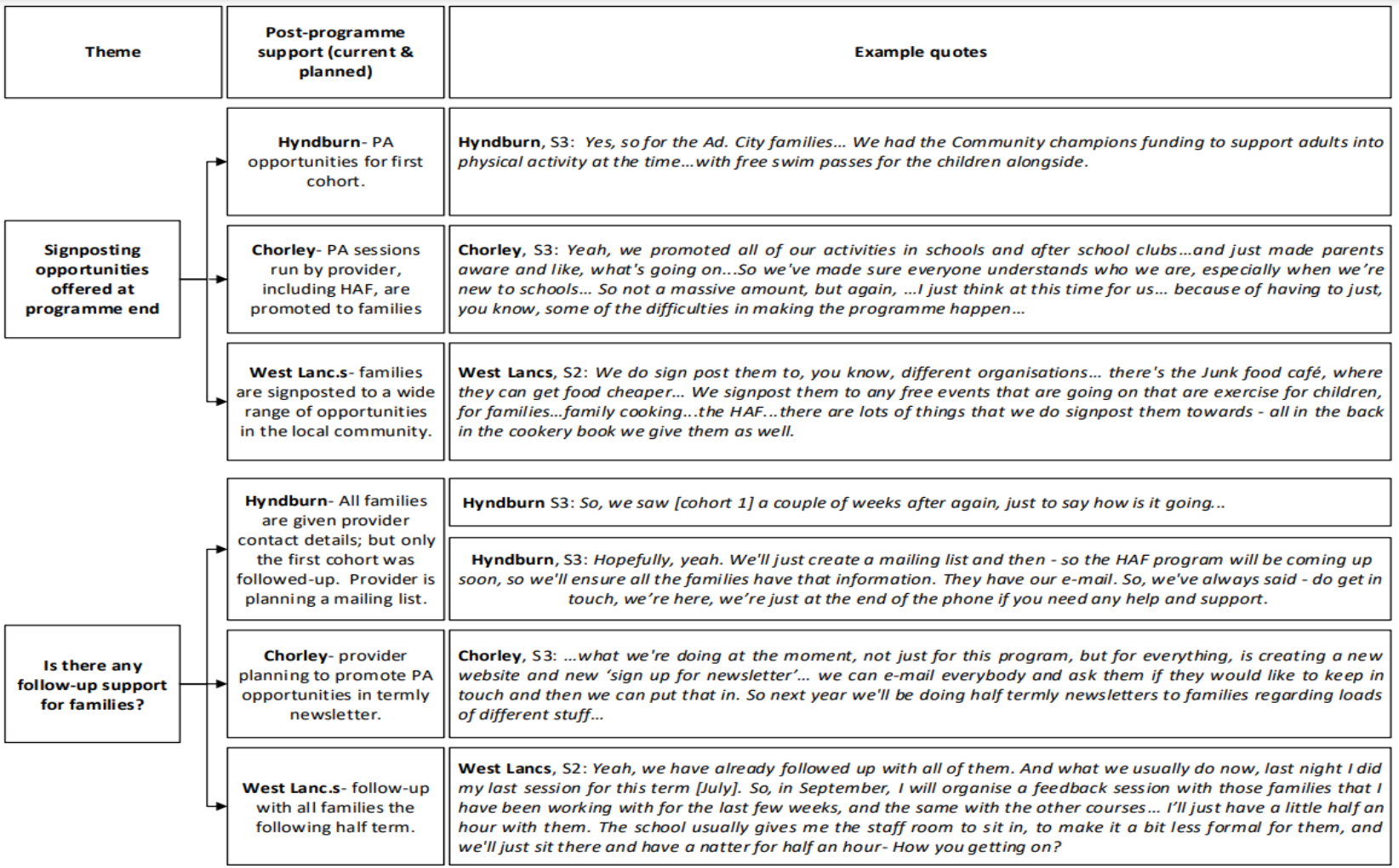
The sub-theme **'Funding for post-programme support'** was highlighted as an enabler for participants to sustain any initial actions towards healthy lifestyles. Facilitators expressed the importance of schools continuing to support the families post-programme; in addition to the availability of community-based opportunities. One suggestion was schools running a Change 4 Life healthy lifestyles course following PASTA (e.g., 13-weeks), similar to an initiative a provider has previously supported. It was highlighted that funding and training for staff would be needed to initiate this, although with motivated staff it could be sustainable. Furthermore, offering community sessions at cost, such as PA, was a recommendation. Therefore, the participants

could be signposted to further local opportunities at the end of the PASTA programme, to sustain healthy lifestyles in families.

4.7 MAINTENANCE

4.7.2 Post-programme support in Chorley, Hyndburn and West Lancashire

As the course is only 6 weeks, the interviews aimed to find out if families were signposted to any further local opportunities, such as PA, at the end of the programme; and secondly, if there was any follow-up support offered to families (e.g., meeting up with families after the course has ended to check progress and offer support). The interviews identified current and planned practice to enable sustained healthy behaviours. Figure 9 illustrates the current and planned post-programme support offered in each of the 3 districts, including example quotes.



Theme	Post-programme support (current & planned)	Example quotes
Signposting opportunities offered at programme end	**Hyndburn**- PA opportunities for first cohort.	**Hyndburn**, S3: *Yes, so for the Ad. City families… We had the Community champions funding to support adults into physical activity at the time…with free swim passes for the children alongside.*
	Chorley- PA sessions run by provider, including HAF, are promoted to families	**Chorley**, S3: *Yeah, we promoted all of our activities in schools and after school clubs…and just made parents aware and like, what's going on…So we've made sure everyone understands who we are, especially when we're new to schools… So not a massive amount, but again, …I just think at this time for us… because of having to just, you know, some of the difficulties in making the programme happen…*
	West Lanc.s- families are signposted to a wide range of opportunities in the local community.	**West Lancs**, S2: *We do sign post them to, you know, different organisations… there's the Junk food café, where they can get food cheaper… We signpost them to any free events that are going on that are exercise for children, for families…family cooking…the HAF…there are lots of things that we do signpost them towards - all in the back in the cookery book we give them as well.*
Is there any follow-up support for families?	**Hyndburn**- All families are given provider contact details; but only the first cohort was followed-up. Provider is planning a mailing list.	**Hyndburn** S3: *So, we saw [cohort 1] a couple of weeks after again, just to say how is it going…*
		Hyndburn, S3: *Hopefully, yeah. We'll just create a mailing list and then - so the HAF program will be coming up soon, so we'll ensure all the families have that information. They have our e-mail. So, we've always said - do get in touch, we're here, we're just at the end of the phone if you need any help and support.*
	Chorley- provider planning to promote PA opportunities in termly newsletter.	**Chorley**, S3: *…what we're doing at the moment, not just for this program, but for everything, is creating a new website and new 'sign up for newsletter'… we can e-mail everybody and ask them if they would like to keep in touch and then we can put that in. So next year we'll be doing half termly newsletters to families regarding loads of different stuff…*
	West Lanc.s- follow-up with all families the following half term.	**West Lancs**, S2: *Yeah, we have already followed up with all of them. And what we usually do now, last night I did my last session for this term [July]. So, in September, I will organise a feedback session with those families that I have been working with for the last few weeks, and the same with the other courses… I'll just have a little half an hour with them. The school usually gives me the staff room to sit in, to make it a bit less formal for them, and we'll just sit there and have a natter for half an hour- How you getting on?*

Figure 9. Post-programme support offered in each of the 3 districts.

There were varying levels of post-programme support offered in the 3 districts. In Hyndburn, the coordinator described support for the first cohort that they delivered to (November-December 2021), which included funding for adult PA sessions and children's swimming vouchers, as part of the programme. The provider also intended to distribute swim passes during the Rishton follow-up data collection session, as part of this study. However, it was not clear whether all families are signposted to any opportunities at the end of the course. Apart from the first cohort, the Hyndburn providers do not follow-up with the families, although families are encouraged to contact the provider if they need any support. The co-ordinator described the idea of creating a mailing list for families, to communicate relevant information, such as the local HAF programme.

In Chorley, most of the sessions were children-only, so families were not followed-up post-programme. However, the provider-led activities (the HAF programme, an adult course and PA opportunities) are already promoted in all the schools. Parents are asked to keep up to date by following on social media, but team capacity was reported as preventing further signposting. A half-termly newsletter is already planned for September to communicate further opportunities to the families. Furthermore, there was available funding to focus on potential follow-on sessions for adults or families, during the next term (September).

In West Lancashire, families are signposted to a wide range of further opportunities, including support with food (e.g., Junk Food café- a charity providing affordable healthy meals from food that would otherwise be wasted, and information on the local food bank); free local PA events and opportunities; the family learning festival (which includes free family PA, cookery sessions, drama etc), and the West Lancashire HAF programme. The links to further opportunities are listed in the back of a recipe book given to families at the final week, as recommended in the service specification (LCC, 2021). The facilitators in West Lancashire follow-up with all the families after course completion, during the following school term. The families are invited back to find out how they are progressing, and to complete follow-up evaluations.

4.7.3 Post-programme support in other Lancashire-12 districts

The online survey included post-programme support offered in the other 9 districts in Lancashire-12 (Appendix K). Only 22% of providers always signposted to further healthy lifestyles opportunities following PASTA, as intended; 33% often provided signposting, whereas 33% only signposted sometimes and 11% never signposted. The further opportunities promoted

included programmes within the providers own organisation and activities in the local area, such as the HAF programme, local gyms, adult weight management and children's PA sessions.

Only 1 provider (11%) always followed up with families after the programme, which was via email; a further provider (11%) often followed up with families, to capture case-studies as part of an evaluation during the last programme delivered. Half of the providers (55.5%) sometimes followed up with the families, but all of these appeared to be on an ad hoc basis, i.e., if the family attended another activity or they saw the family in passing in a school, as opposed to any planned follow-up sessions. Two districts (22%) never follow-up with the families after PASTA.

Overall, post-programme support in terms of signposting was inconsistent across the 3 districts studied and Lancashire-12, and few areas offered any additional follow-up.

CHAPTER 5: DISCUSSION

The purpose of this feasibility study was to evaluate the PASTA programme, across 3 districts of Lancashire-12, within the context of the RE-AIM framework (Glasgow *et al.*, 1999). The key findings of this study are summarised in Table 8, with the following sections addressing this in further detail, in addition to study limitations, recommendations, and implications for future research.

Table 8. Feasibility of the PASTA programme, considering the RE-AIM framework.

Reach
• PASTA is reaching the target age group within designated wards, particularly in the districts working with schools. • Although PASTA aims to reduce childhood obesity in Lancashire, most of the children engaged were in the healthy weight range, and not overweight or obese.
Effectiveness
• From week 1 to 6 very small improvements were reported in children's dietary intake, PA, and ST, with some changes suggestive of healthier family attitudes and behaviours. • The PASTA programme provided families with the opportunity, and capability to increase motivation towards changing perceptions and attitudes towards a healthier diet at programme end.
Adoption
• All providers in the 3 Districts offered PA or active play and healthy lifestyle education. • Each site offered food preparation or cooking-based activities but there was variation in the delivery and content. • The sites adopted different delivery models including whole-family, school, community, and child-only programmes. • In terms of acceptability, the PASTA programme was well-received by the families across the evaluated sites. • Overall programme completion (defined as ≥4 weeks) was acceptable at 86% (>80% at provider level) across the 3 districts. • Reported motives for participant drop-out suggest that discontinuation was mainly unrelated to the programme, such as commitments or activities external to PASTA.

Implementation
• Flexibility in PASTA delivery was encouraged across wards to align with the needs of communities so multiple variations were observed. • However, the variation to programme content made cross-programme evaluation difficult and may result in different outcomes, according to the district. • Stakeholder engagement and building partnerships were highlighted as a key challenge for the new programme and new partnerships, potentially contributing to lower recruitment. • Use of pre-existing partnerships (such as schools) had fewer issues. • The commissioning process did not allow sufficient time for engaging with new stakeholders.
Maintenance
• Variation in post-programme support was demonstrated across the 3 districts with inconsistent signposting to local opportunities and follow-up. • To improve programme delivery and sustain any motivation towards healthy lifestyle changes, facilitators identified enablers, including: o a wider reaching programme (i.e., inclusion of further wards with the highest prevalence of obesity/ deprivation) and longer than 6-week delivery. o Inclusion of post-programme support with a follow-up plan. o continued flexibility to tailor the programme structure to the community.

5.1 Reach:

Although PASTA was initially developed to target 5-8-year-old children living with overweight or obesity, a key finding from this evaluation is that PASTA mostly recruited children in the healthy BMI range, with 68.2% not affected by overweight or obesity. As the locations for PASTA delivery were specifically selected based on high childhood obesity rates an assumption was potentially made that given the demographic, there would be intended reach without specific targeting. According to the 2019/20 - 21/22 NCMP data, the proportion of children with overweight attending PASTA (31.8%) was approximately representative of the prevalence of children living with overweight in the 3 districts, plus Burnley (14.7% – 30.3% Reception-aged children living with overweight or obesity per ward, rising to 33.3% - 45.5% overweight by Year 6 [OHID, 2023]).

One potential reason for the unintended reach could be a consequence of LCC opting to promote PASTA to families as a healthy lifestyle programme, and not a healthy weight programme.

However, it has been reported that when programmes specifically target children with a higher BMI, there are often high attrition rates. Approximately 50% of paediatric attendees do not complete weight management programmes (Skelton and Beech, 2011; Nobles et al., 2016), which compromises both programme effectiveness (Miller and Brennan, 2015) and cost-efficiency (Nobles *et al.*, 2016), which public health providers such as LCC need to avoid to ensure longer-term funding and resources.

With weight management and general health programmes, there is a risk of introducing weight stigma, defined as discrimination towards individuals because of their weight and size (World Obesity Federation, 2022), which can act as a barrier for the target group to engage (Sánchez-Carracedo, 2022). Weight stigma can result in a variety of adverse emotional responses such as depression, low self-esteem, and anxiety, in addition to social and physical consequences (Puhl and Heuer, 2010; Tomiyama, 2014; Pearl et al., 2019, 2020). It is pervasive, affecting children and adolescents, as well as adults with obesity, and is experienced from many sources, including healthcare providers (Haqq *et al.*, 2021; Braddock *et al.*, 2023). By avoiding specific reference to children with higher BMI and removing weight management or healthy weight from the PASTA programme marketing, this has potentially removed a barrier, reduced the risk of stigma and to some extent, PASTA seems to have adopted a weight-neutral framework. This non-targeted approach by LCC could have had a beneficial impact on course completion (86%). Despite not reaching the intended group as part of this feasibility study, this approach supports inclusivity and helps to place emphasis on healthy lifestyle behaviours rather than weight loss directly. Studies have reported that health interventions based on a weight-neutral model provided a means of reducing peoples' experiences of weight stigma, and were associated with positive psychological, PA and eating behaviour outcomes (Ulian *et al.*, 2018; Salvia *et al.*, 2023).

PASTA may not be effectively targeting or recruiting children living with overweight or obesity using its current approach, but it has been able to recruit families from within areas of high deprivation, which are ultimately at a heightened risk of obesity and its associated co-morbidities. Deprivation was a key consideration for PASTA and this outcome shows that the programme has successfully met an essential requirement by recruiting families from the designated wards. PASTA is a term-time extension of the HAF programme with FSM eligibility as a programme key performance indicator, but FSM was a non-essential inclusion criterion. The Government, public health teams and researchers often use FSM eligibility as an indicator of

socio-economic deprivation, but it does not capture the multidimensional nature of socioeconomic disadvantage and is an unreliable measure of poverty as not all children from low-income families are identified as FSM eligible (Montemaggi et al., 2017; Taylor, 2018). For example, analysis showed that 4.2 million children (29%) were in poverty in 2021-22 (Child Poverty Action Group, 2022); yet only 1.89 million (22.5%) were identified as FSM eligible (Office of National Statistics, 2022). Taylor, (2018) suggests that parents do not always apply, or know how to apply for FSM, with some suggesting that this may be more likely in ethnic minority groups living in deprived areas (Montemaggi et al., 2017; NHSA, 2023). It is a positive that FSM eligibility did not dictate inclusion in PASTA, but the aforementioned limitations could reflect target families within the districts evaluated, and the wider Lancashire-12 so LCC could consider the use of an alternative measure. The Income Deprivation Affecting Children Index [IDACI] (MHCLG, 2019) used in conjunction with NCMP data to identify the wards with highest obesity and deprivation could be more useful for future PASTA programme recruitment (Montemaggi *et al.*, 2017).

If future roll-out of PASTA intends to reduce obesity, the marketing and recruitment strategy would need to be amended, to effectively recruit children with a BMI ≥91st centile (PHE, 2018), but the targeted approach could be uninviting, potentially stigmatising and lead to considerable drop-out that ultimately impacts future funding. PASTA has recruited mostly healthy weight children and their families, but they are from deprived communities at risk of future weight gain and negative health consequences. This raises the question whether the PASTA healthy lifestyles programme aligns more with obesity prevention by raising awareness and developing key skills, rather than a weight management programme.

5.2 Effectiveness

The National Institute for Health and Care Excellence recommend that adult weight management programmes should last for at least 12 weeks (NICE, 2015), and most overweight prevention or treatment programmes for children deliver this as a minimum (Berry et al., 2014; Taylor et al., 2015; Muzaffar et al., 2019; Sahota et al., 2019). The PASTA programme was implemented on a practical basis, to fit around the school half-term, hence a 6-week programme, as opposed to being an evidence-based timeframe for a healthy lifestyles programme. The short programme was acknowledged at the start of the evaluation, hence the consensus to not perform an end-programme assessment of weight, but the provider was keen to find out if any other changes were possible over 6 weeks. The findings would suggest a 6-week course is too short to generate meaningful changes.

Some small, yet not statistically significant, improvements were noted in children's dietary intake, PA, and ST between week 1 and 6, but this feasibility study was not powered to detect change. The FNPA questionnaire that explored child and family nutrition and PA behaviours did report a statistically significant difference between week 1 and 6 of the programme and this potentially reflects an improved awareness of healthy behaviours. Although the sample at follow-up was small, the data did show small improvements in comparison to week 1, which is similar to other research studies exploring prevention and treatment programmes (Taveras, 2011; Kipping et al., 2014; Lloyd et al., 2018; Muzaffar et al., 2019).

To effectively alter perceptions, and for these to translate into healthier eating and PA behaviours the programme needs to be longer. This is further corroborated by evidence that states longer-term interventions are more effective in terms of changing behaviours, reducing weight status, and sustaining healthy lifestyle changes (O'Connor et al., 2017; Llargués et al., 2017; Llauradó et al., 2018). Furthermore, it has been documented in studies and systematic reviews with a focus on overweight prevention or treatment, that parents and adolescents suggest longer programmes would be beneficial to support maintenance of healthy behaviours (Putter *et al.*, 2022; Jones *et al.*, 2019). This was identified within the facilitator interviews, with the perception that a longer programme may enable any initial actions towards adopting healthy lifestyles to lead to future behaviour change. There was also an indication that families were willing to participate for more than 6-weeks, although the practicalities for delivery need further consideration, or alterations to the programme structure that provides a more consistent and regular follow-up plan.

Outcomes of the focus groups were suggestive that PASTA increased participant opportunity, capability, and motivation, and led to a change in perceptions and attitudes, and initiated actions towards healthy eating. However, there were some differences reported between districts and this could be related to the variability in delivery models. Most related studies have a focus on behaviour change (Mead *et al.*, 2017; Ells *et al.*, 2018; Pallan *et al.*, 2018; Nally *et al.*, 2021) so making direct comparisons to published work is somewhat difficult because PASTA focused on the behaviour change components of the COM-B model (capability, opportunity, and motivation), but did not embed a specific behaviour change intervention.

Capability was found to have increased mostly from the parent cooking sessions (West Lancashire), in comparison to the family food preparation sessions (Hyndburn). The reported increased capability in West Lancashire was mainly related to the cooking skills (e.g., knife skills, cooking methods), knowledge of food and cooking, and the increased confidence demonstrated

in the group. In West Lancashire, the parent cooking provided opportunity and increased their skills/capabilities, which seemed to positively impact motivation and resulted in changes to attitudes and actions towards healthier lifestyles. Michie and colleagues corroborate this, in that both capability and opportunity will often influence a person's motivation to enact a behaviour (Michie *et al.*, 2011; West and Michie, 2020). Cooking is a valuable life skill which is often linked with improved diet quality and an increased recognition of healthier foods (Lavelle *et al.*, 2016; McGowan *et al.*, 2017). The incorporation of cooking skill interventions and culinary education in multicomponent obesity interventions can have a positive effect on food literacy (defined as cooking skills, cooking competences, and culinary knowledge), and particularly in improving confidence in cooking (Nelson et al., 2013; Garcia et al., 2016; Dean et al., 2021). The findings appear well-aligned to the evidence on adult/parental involvement and cooking skill development and would support the continuation of cooking sessions in future PASTA programmes.

Within this evaluation, the 3 sites encouraged children to be involved in food preparation and tasting a wide range of foods. Involving children in choosing a recipe, purchasing ingredients, and cooking may also promote changing eating behaviours toward healthy habits (Maiz *et al.*, 2021), and this was reported by some focus group participants. Evidence highlights the importance of learning cooking skills at an early age to develop skill retention, confidence, cooking practices, cooking attitude and diet quality, all of which can track into adulthood (Lavelle *et al.*, 2016). Practical 'hands-on' approaches such as cooking programmes may encourage greater vegetable consumption and may have a larger effect on children's eating behaviours, compared to nutrition education alone (DeCosta *et al.*, 2017). These studies emphasise the importance of involving children in cooking skills, but the facilitator interviews and online survey confirmed only 50% (n=6) of the districts in Lancashire-12 involve children in cooking skills providing a potential area for PASTA development.

An example of effective practice adopted in Hyndburn was the low-cost demonstration and use of the NHS (Change4Life) Food Scanner application (NHS, 2022a). The application allows families to scan barcodes when shopping or at home and displays nutritional information using visual images alongside traffic light labels to encourage healthier swaps. This smartphone application was well-received and reported to have a positive impact on both adult and child knowledge, which appeared to influence motivation and attitudes associated with initiating actions towards healthier eating in children. For example, parents reported that children selected healthier foods when shopping, or initiated healthier snack choices at home.

This evaluation has identified that the opportunity to try a variety of foods was reported to motivate children (and adults) to eat new foods and initiated purchasing and eating new healthy food choices at home. This was noted particularly in relation to the parent-cooking and children's sessions in West Lancashire. This finding supports the theory that a child's intrinsic willingness to try new fruit or vegetables (e.g., taste sensitivity) may be altered or shaped by the extrinsic ones (e.g., exposure to a wide range of tastes) (Blissett and Fogel, 2013). Dietary habits are shaped at a young age and maintained during later life with implications for poor dietary variety, and increased obesity risk (Scaglioni *et al.*, 2018), so the focus of PASTA on 5–8-year-olds, with their parent or carer could lead to longer term benefits. Research shows that whilst eating behaviours and child weight are difficult to modify directly, preventing unhealthy eating patterns and excess weight gain in children could be facilitated by interventions targeting parental feeding practices (De Cosmi et al., 2017; Scaglioni et al., 2018), which further highlights the importance of the family approach adopted by PASTA.

The PA sessions for children attending PASTA were reported by the parents to be highly acceptable, but the parents did not perceive that the sessions initiated any change in PA levels, and this is consistent with data from the PA questionnaire. Although PA level may not have increased significantly, one example from Hyndburn stated that here was some indication that children were highly motivated to be active and try new approaches following engagement in a yoga class the previous week. However, overall, most parents perceived that their children were already active and did not need to increase their PA levels. This aligns to findings from a qualitative study in 6-8-year-olds that explored parental views of PA (Bentley *et al.*, 2012), with most parents describing their child as being active or very active and indicating that they did not perceive a need for an increase in their child's PA. This appears a consistent study outcome with other research reporting that many parents consider their children to very active, which led them to believe that their children's PA is high (De Craemer et al., 2013; Pesch et al., 2015; Alcántara-Porcuna et al., 2021). This contrasts with data that point out almost half of UK children do not meet daily PA recommendations (Hesketh *et al.*, 2022; Sport England, 2022a). It could potentially be accurate as the recruited children to PASTA were mostly healthy weight, and some studies have shown that they would be more active than overweight and obese children, particularly from age seven onwards (Cooper *et al.*, 2015), with differences demonstrated in MVPA from this age (Jago *et al.*, 2020). However, without objective assessment of PA the findings of this evaluation are self-reported and based on an overarching parental perception.

5.3 Adoption and Implementation

All providers in this feasibility study implemented PA for the children and weekly healthy lifestyle education, as the programme intended, although the content and delivery approaches varied between sites. Hyndburn and West Lancashire delivered a whole-family approach as defined in the service specification (LCC, 2021) because it is considered best practice for 5-8-year-olds (Luttikhuis et al., 2009; Mead et al., 2017), whereas in Chorley, most programmes have been children-only. As previously noted, a difference in the FNPA results could potentially be reflective of the importance of family involvement to initiate actions towards healthier lifestyles. This data is supported by studies that have concluded interventions to prevent or treat overweight in children obtain stronger effects when parents are involved (Elinder et al., 2018; Norman et al., 2019; Tomayko et al., 2021).

Furthermore, the aim of the programme was to include weekly family cooking sessions, although delivery of this varied across the districts, and did not always entail family cooking skills/ methods as intended. The qualitative corroborates that the variability in delivery models adopted by providers may affect programme outcomes; as outlined, for example, in terms of capabilities leading to increased cooking literacy in West Lancashire, where participants reported changes to attitudes and initiating actions towards healthier diets.

PASTA was developed to be flexible in its implementation, with no set programme but a set of aims that could be achieved via different approaches. Flexibility is a strength of PASTA as it enables providers to tailor their programme to the needs of their target community but across only three of the 12 districts there is notable variability that has led to different participant experiences and outcomes in terms of knowledge, awareness, and skills. The findings of this study suggest that a more standardised programme content and approach would generate consistency in terms of participant outcomes, whilst ensuring a more consistent level of engagement and satisfaction and avoiding any geographical inequities. This approach has also been adopted by similar prevention and treatment interventions (Sacher *et al.*, 2010; Berry *et al.*, 2014; Gatto *et al.*, 2017; Sahota *et al.*, 2019).

There appears to be strengths of different programmes so LCC could facilitate providers to openly share their practices based on aspects that received positive feedback. For example, parent cooking sessions (West Lancashire), Food Scanner application and the yoga session (Hyndburn). However, the evidence also points out the need for a degree of flexibility to tailor the course to the needs of the families and the local population (Taylor *et al.*, 2015; Coupe *et*

al., 2018; Pallan *et al.*, 2016, 2018, 2013; Day *et al.*, 2019), so co-creation with communities could be a worthwhile consideration going forward (Hawkins *et al.*, 2017).

Another advantage to a more standardised programme would be a more robust and comprehensive evaluation across Lancashire-12. National guidance highlights that there is a need for rigorous evaluation of both prevention and treatment interventions, particularly those that specifically reduce the health inequalities and prevalence of obesity (NICE, 2015; PHE, 2018), but it needs to be noted that PASTA does not report weight loss so comparing PASTA outcomes to weight-focused assessment processes would be redundant. Evaluations of public health interventions that are delivered across multiple sites often do not report on health outcomes and tend to focus disproportionately on process measures such as attendance (Nutbeam and Bauman, 2006; PHE, 2018b) and therefore creates difficulty in comparing the impact of PASTA across districts. Going forward LCC would benefit from reviewing outcomes measures included in the study to identify the most relevant and important in relation to participant engagement and programme KPI's and establish an evaluation process for all sites.

Engagement was defined as the family's level of participation in the PASTA programme and PASTA programme completion was defined as completing ≥4 weeks. An intervention attendance of ≥75% is described as good/acceptable adherence in many studies (Lackinger *et al.*, 2021; van het Reve *et al.*, 2014) and across the 3 districts, completion was acceptable at 86% (≥81% at provider level). In many lifestyle intervention studies, a certain number of dropouts is inevitable (Lackinger *et al.*, 2021), but staff interviews identified that discontinuation in PASTA was mainly unrelated to the programme, such as commitments external to PASTA. However, the reported engagement data was difficult to interpret when all children and adults were reported together, as this included siblings and other family members. Reporting the number of families engaged per week in the attendance log could be an easy modification to provide a more comprehensible KPI data collection.

As mentioned previously, this level of completion may not have been as high if PASTA had marketed and delivered PASTA as a weight management programme. Qualitative data suggested that PASTA was well-received by the families, who described their satisfaction with the programme and the perceived satisfaction of their children, which likely contributed to the levels of engagement. The focus group findings suggested that participant acceptability affected the motivation to attend, which supports the notion that programme acceptability is more likely to lead to families attending and completing the programme, and hopefully reaping the benefits (Sekhon *et al.*, 2017). Perceived psychosocial benefits of the programme through social

interactions was a motivating factor and this is often reported by studies. Social support offered through interventions can be beneficial in a number of ways for participants, via encouragement, establishing connection, providing accountability, and modelling or sharing a target behaviour has been shown to help improve adherence for a wide variety of health behaviours, including eating less fat, and exercising more (Barrera et al., 2006; Umberson and Karas Montez, 2010; Karlson, 2019; Lee and Park, 2021). Establishing a community was not a specific aim of PASTA but future evaluation focus groups could identify whether participants continued to connect with each other, and whether this influenced their ongoing engagement with the healthy behaviours following completion of PASTA.

Acknowledging barriers to programme recruitment and delivery is important to identify where changes could be made to the implementation. It was reported that engaging with stakeholders about the PASTA programme was challenging, particularly in the schools where providers had not previously worked. The facilitators needed to spend considerable time engaging with school staff, parents, and children, to build relationships and successfully recruit children to the courses that were due to start imminently. Stakeholder engagement, across intervention development and delivery builds trust and supportive relationships (Pearson et al., 2015; Estacio et al., 2017; Lloyd et al., 2017, 2018), but this needs time. One district highlighted that working with new schools where relationships had not yet been established, likely led to cancellation of a course, and low uptake on at least one other programme.

Related to this theme, it would seem insufficient time was allocated to mobilisation during the pre-delivery phase, which should be available to enable the provider to effectively promote, engage and recruit families to an intervention (Lloyd *et al.*, 2017, 2018; Persaud *et al.*, 2022). New interventions have a better chance of being effective and adopted widely when stakeholder engagement is given adequate time (NHS England, 2017; O'Cathain et al., 2019). This approach reinforces the importance of using a co-creation framework and allocating a realistic mobilisation period, or pre-delivery phase of PASTA to enable greater stakeholder engagement, potentially leading to more effective implementation going forward (NHS England, 2017; O'Cathain *et al.*, 2019; Lloyd *et al.*, 2017; Persaud *et al.*, 2022).

Enablers focused on how to improve programme delivery and sustain any motivation towards healthy lifestyle changes. Current PASTA delivery is based on the 3 wards with the highest prevalence of overweight children within each district of Lancashire-12, which for the school-based providers has resulted in a limited number of schools to work with. In terms of future delivery of PASTA, the NCMP data needs reviewing regularly to identify target wards.

Programme facilitators suggested that to enable future programme delivery, it would be beneficial to have a wider reaching programme, to benefit more children and families. Since the initial PASTA site selection, the 2019/20 - 2020/21 NCMP now reveals different wards within each district to have higher obesity prevalence. This will be changing periodically so the key is to get PASTA to a stage that it can be delivered more widely across Lancashire.

The evidence suggests that interventions should be mindful of cost, cultural diversity, and language and literacy barriers, as well as potential for disengaging hard-to-reach populations (Coupe *et al.*, 2018). Recognition of these constraints is highlighted in the PASTA service specification (LCC, 2021), and therefore modifications to the course structure could be piloted and the findings shared with other providers. To tailor programme structure, it is recommended to consult with stakeholders, including families and school staff, in addition to providers, regarding future programme development (Hayes *et al.*, 2019; Adab *et al.*, 2018; Persaud *et al.*, 2022).

5.4 Maintenance

This study identified limited levels of post-programme support with only one provider offering consistent support, in terms of signposting to a wide range of community opportunities to continue their engagement with healthy lifestyle behaviours, and regular, appropriately timed follow-up with families. LCC (2021) stipulates that families should receive end of programme summary packs, for example healthy recipes and local service contacts for support, plus a required KPI is to provide a log of where the families have been signposted to. Although there is no PASTA requirement to follow-up with the families, this was an additional component for the purpose of this evaluation, to establish any post-programme support offered by providers. Completion of any follow-up was poor, although this was to be expected reflecting the service specification. Post-programme support, including signposting to local opportunities and follow-up, needs further consideration to determine the longer-term impact of the 6-week PASTA programme.

Overweight prevention or treatment programmes are developed with the aim of modifying lifestyle behaviours during and following an intervention (Putter *et al.*, 2022) and the sustainability of healthy behaviours is a key consideration (Mead *et al.*, 2017; Colquitt *et al.*, 2016), but one that remains a challenge (Weiland *et al.*, 2022). PASTA is far shorter than the evidence-based recommendations so to support children and families to change perceptions, attitudes and behaviours, changes are needed to programme delivery. Consideration of including a specific behaviour change intervention and providing a well-formulated and

consistent post-programme support package after the 6-week intervention could help sustain any initial actions towards healthier lifestyles, leading to behaviour change (NICE, 2013; Mead et al., 2017; Ells et al., 2018; Nally et al., 2021). Ideally, interventions should offer a range of signposting options, including follow-up sessions, at different times and in easily accessible and acceptable venues (NICE, 2013; Adab et al., 2018).

A further enabler identified in this study was funding for post-programme support, to include, for example, providers delivering further PA or cooking sessions for families, or support for schools to continue with healthy lifestyles courses. This strategy is similar to many obesity-focused interventions, with further support through family and school sessions (Adab et al., 2014, 2018; Nyberg et al., 2016; Lloyd et al., 2018; Elinder et al., 2018). Hodder (2022) found that obesity prevention interventions in a school environment can have small benefits on child BMI, suggesting that incorporating post-programme healthy lifestyle support into schools may be favourable in reducing obesity levels in the target wards. Establishing and sustaining school-based healthy lifestyle programmes after PASTA would need to consider training staff; external support for delivery; knowledgeable, skilled, and motivated staff with sufficient capacity; good resources (e.g., interactive and practical); and facilities for cooking, healthy eating, and PA (Day et al., 2019; Hayes et al., 2019; Herlitz et al., 2020). PASTA could consider providers or partner organisations potentially offering local post-programme PA or healthy lifestyle opportunities for families, for example in schools, but this would be subject to funding, provider capacity, and the aforementioned factors.

Overall findings of this study demonstrate that sustainability is an important consideration for obesity prevention and treatment programmes, to build on any initial actions towards healthy lifestyles changes in the families engaging in PASTA. Strategies could include ensuring signposting to further support as recommended, in addition to following up with families and/or implementation of further healthy lifestyle opportunities, depending on funding and resources.

5.5 Limitations and recommendations for future research

The most suitable and age-appropriate questionnaires were selected for this study, but the quantitative methods adopted were subject to the usual limitations of self-reports. All dietary assessment methods and PA questionnaires are reportedly subject to measurement error, for example, social desirability can cause a general tendency to over-report foods that are perceived as healthy and under-report less healthy foods, or over-report PA behaviours (Bailey, 2021; Ainsworth *et al.*, 2012). Surveys are also susceptible to measurement error due to the difficulty recalling children's foods eaten and PA over the previous 7 days (Bailey, 2021; Marasso *et al.*,

2021). A future study could include the use of accelerometers in one sample group, to acquire a more comprehensive description of the quality and quantity of children's PA (Marasso *et al.*, 2021). Furthermore, there is some evidence that PA and diet can vary seasonally (Spence, 2021; Garriga *et al.*, 2021; Hesketh *et al.*, 2022) and therefore data collection would ideally be repeated in multiple seasons, if time constraints were not an issue.

The study planning phase involved engaging with providers, and a pre-course evaluation session was initially intended ('week 0') to capture baseline data. At this point, participants would be aware that PASTA is a healthy lifestyle programme, but this strategy would minimise risk of bias as much possible. However, in practice this was not feasible due to the evaluation taking place in a half-term with a duration of exactly 6-weeks and provider commitments during school holidays (e.g., delivery of the HAF programme). Therefore, the baseline data was collected at week one of the programme, which may have introduced some social desirability bias when participants reported child diet, PA, and family behaviours.

Ideally, the evaluation follow-up sessions would be conducted longer term, e.g., at 6- and 12-months post-programme, to track any sustained actions towards healthier lifestyles, but 2-3 months was feasible in the project timeframe. Quantitative follow up data was low, despite communicating with families in advance, and offering £10 shopping vouchers for follow-up attendance. For a full programme evaluation, a stronger communication plan is recommended to ensure participant engagement in this phase. For example, one provider delivered the follow-up evaluation letters to the school, for the school office staff to distribute to children. There was anecdotal evidence that not all parents received the letters, and the families that attended had done so because they had received an additional follow-up reminder email from the providers.

Another issue with recruiting families to the follow-up was potentially related to the sessions taking place right at the end of the summer term, which was a busy time for schools, families, and providers. This likely contributed to the cancellation and rescheduling of Hyndburn (based on facilitator feedback), and a slightly shorter follow-up in West Lancashire, in order to co-ordinate a session prior to the last week of term and before the 6-week school holidays. Future strategies could include seeking permission to collect home addresses for the purpose of posting the letters directly and avoiding follow-up sessions at the end of the school year, where possible. Furthermore, Burnley was added to the study sites to boost numbers, but the school could not accommodate a follow-up during the following term, highlighting the importance of involving all stakeholders in the planning phase early on, as opposed to inclusion of sites at a later date.

The qualitative data informed many aspects of the evaluation (RE-AIM), but there are methodological and analytical limitations. The focus groups were only conducted in two districts, so findings are not fully representative of the multiple demographics across Lancashire-12. To address this, consideration of a sample representation of Lancashire formed part of the planning phase and site selection, for example utilising ethnicity and deprivation data of the districts, to capture the experiences of a range of service users.

The qualitative aspects of this study only included caregivers, but it is recommended that research should include the views and experiences of children (Larsson *et al.*, 2018; Ijaz *et al.*, 2021), when they are the focus of the study. A child satisfaction questionnaire was devised to include the views of children, but further research would benefit from focus groups with children. Despite the limitations, there were many strengths of the qualitative data, as it provided a more in-depth exploration of experiences, attitudes, and behaviours and an understanding of the programme barriers and enablers.

The nature of reflective thematic analysis means that findings reflect the researcher's subjective interpretation of the data (Braun and Clarke, 2013, 2021; Byrne, 2021), which is both a strength and potential weakness in qualitative research. For the process to be as transparent and reflexive as possible (Galdas, 2017), the study analysis documented the iterative stages implemented to track the evolution of coding and the generation of themes (Byrne, 2021); ultimately, those carrying out qualitative research are an integral part of the process and final product, and separation from this is neither possible nor desirable (Galdas, 2017).

It is important to note that this feasibility study was not designed to detect effectiveness, due to a shorter follow-up period, smaller sample size and therefore limited statistical power (Bowen et al., 2009) and consequently results should not be taken to indicate efficacy. This study, however, has identified areas of good practice and programme acceptability and feasibility as intended. To ascertain programme efficacy, a larger sample size would be required to detect significant changes, inclusive of further districts across Lancashire-12. Research would need to focus on a longer-term follow-up period [e.g., 6- and 12-months post-programme as recommended for prevention or treatment interventions] (NICE, 2013; NICE, 2015), to evaluate any sustained changes in behaviour.

Future research on childhood obesity should include interventions that fully consider the wider determinants of health, including consideration of upstream and policy interventions. A recent in-depth secondary analysis of the childhood obesity prevention Cochrane Review concluded that the vast majority (92%) of obesity prevention and treatment programmes focused on

individual behaviour change, through diet and/ or PA programmes (Nobles *et al.*, 2021a). Where interventions targeted some of the wider determinants, this was often achieved via upskilling teachers to deliver educational content to children (Nobles *et al.*, 2021a). This reflects the evidence reviewed for this study (e.g., Sacher et al., 2010; Berry et al., 2014; Stettler et al., 2015; Taylor et al., 2015; Elinder et al., 2018; Hannon et al., 2018; Muzaffar et al., 2019), with only a few studies aiming to address the wider determinants beyond education (Adab *et al.*, 2014, 2018).

The evidence suggests that interventions targeting individual behaviour result in small or very small short-term changes to child weight (Mead et al., 2017; Brown et al., 2019; Nally et al., 2021; Hodder et al., 2022). Furthermore, it has been established that although individual behaviour contributes to healthy lifestyles, most drivers of obesity, the wider determinants of health, lie beyond the individual's control (WHO, 2016, 2018; DHSC, 2019a; Marmot et al., 2010, 2020). Nobles et al. (2021a) point out that the interventions, evaluated via RCTs, have persisted to focus on downstream (i.e., individual and family behaviour) determinants of obesity for almost 30 years, despite the increase in our understanding of its complex aetiology. The Cochrane Reviews evaluate the findings from RCTs, as they are considered the gold standard in research, and this evidence is then used to inform policy and public health practice (Nobles *et al.*, 2021a; Finegood, 2021; Mead *et al.*, 2017; Brown *et al.*, 2019). The authors suggest that the evidence base is therefore skewed towards downstream interventions, which subsequently impacts upon the type of interventions which are implemented in the real world (Nobles *et al.*, 2021a).

Interventions promoting PA and healthy eating for school-age children, such as PASTA, can contribute to the impact on childhood obesity, and this constitutes part of the recommended strategy by the World Health Organisation (2016). It is further acknowledged that the potential cumulative effect of small but sustainable changes towards a healthy lifestyle and small improvements in weight status have a meaningful effect when implemented at population level (Brown *et al.*, 2019; Mead *et al.*, 2017; Hodder *et al.*, 2022), such as the impact on families across Lancashire-12. Moreover, a healthy diet and a physically active lifestyle have many health benefits beyond the promotion of a healthy weight, which is the focus of the PASTA programme.

However, the evidence provided by Nobles et al. (2021a, 2021b) has implications for researchers and policymakers to focus more on interventions and policies that target upstream (e.g., infrastructure, environmental, policy) determinants of the obesogenic system, involving a paradigm shift within the field. As determined in the literature review, upstream interventions

and strategies can be problematic to evaluate (Shah, 2021), so consideration towards other research methods, including natural experiments (Hunter *et al.*, 2014; Arteaga *et al.*, 2018; Nobles *et al.*, 2021b) is needed to understand and improve population health and health equity.

5.6 Implications for future research and practical recommendations for Public Health

These findings provide a foundation for optimising future PASTA programme Adoption and Implementation. Although study findings are specific to this programme, the themes identified also contribute to the wider knowledge and understanding of childhood obesity, providing insights to develop effective future interventions. As outlined, childhood obesity and excess weight can have serious implications for a child's physical and mental health, which can track into adulthood. Not only are children from deprived areas more likely to be obese, but the gap is widening (DHSC, 2020), highlighting the importance of continued research.

The intervention took a novel approach to reducing obesity, as the assumption was that a programme in an area of higher deprivation and obesity would recruit children with overweight or obesity. Findings of this study suggest that most children were a healthy weight, and therefore a more standard approach, in terms of acceptance criteria and marketing, may be required to recruit children with a higher BMI.

Whilst PASTA did not include behaviour change as an aim, the overall purpose of the programme is to reduce obesity in Lancashire, and therefore indicates that behaviour change would be needed (NICE, 2013; Mead et al., 2017), which could also be a consideration for programme content. This feasibility study supports the evidence, as findings suggest that 6 weeks is insufficient to implement effective change in individuals, illustrated in only very small changes at programme end, when effects should be the strongest. However, the qualitative analysis revealed that the programme increased participant Motivation and actions towards a healthier diet in families, particularly in relation to the cooking sessions, which were associated with increased Capability and Opportunity. The COM-B model findings can be used to contribute to developing a behaviour change intervention, recognising the importance of all the relevant factors influencing behaviour (West and Mitchie, 2020), and drawing on areas of good practice. This study supports that a longer course, inclusion of a behaviour change intervention and post-programme opportunities, are crucial to supporting any initial actions towards behaviour change in families.

Many of the study findings further support current theories and evidence relating to implementing programmes. For example, stakeholder engagement was highlighted as an important aspect of implementation to contribute to programme success when the programme was new, or providers were working in schools where they had not yet built relationships. This finding is supported by the literature, which suggests that a preparation phase involving stakeholder engagement should be an integral part of intervention development and delivery.

The findings of this feasibility study will contribute to the potential continuation of PASTA, which has adopted a weight neutral programme, and will positively impact childhood obesity prevention and the healthy lifestyles of families in deprived areas of Lancashire.

Study findings in conjunction with the evidence base and/or best-practice is suggestive of the following practical applications to support future delivery of PASTA:

1. Current recruitment and attendance are suggestive of a prevention focus (i.e., most are healthy weight). If future roll-out of PASTA intends to reduce overweight and obesity, the marketing and recruitment strategy would need to be amended to effectively recruit children with higher weight (BMI ≥91st centile) or consider a prevention focus.
2. Longer-term interventions are more effective at initiating changes in families, and a 12-week (full school-term) course could be included for more effective behaviour change initiation. A strategy could be to recruit more families to each course, with consideration towards planning and stakeholder engagement well in advance of each programme commencing, and suitable venues and resources.
3. Inclusion of 'hands-on' cooking skills for families, including basic skills for children, is recommended, as evidence suggests that families can gain important life-skills to initiate healthy behaviour changes in families. A guide outlining the types of age-appropriate cooking skills (Dean *et al.*, 2021) that could be incorporated into the programme will be shared with Public Health and providers.
4. The Change 4 Life Food Scanner application (NHS, 2022a) could easily be demonstrated in a PASTA session and children and families encouraged to use it at home and whilst shopping to initiate actions towards healthier food choices.
5. A whole-family approach, as intended by the service, is recognised as best-practice for 5-8-year-olds and is a recommendation for all programmes.
6. A more standardised approach to programme content could generate more consistency in terms of participant outcomes and enable a comprehensive and robust evaluation process across the districts.

7. A standardised programme evaluation (at baseline, programme end and follow-up) across all districts would support best-practice and evaluate the impact of PASTA across the different populations in Lancashire-12. Ongoing engagement with stakeholders, including families and school staff, is key to programme planning and development.
8. Whilst a more uniform approach is suggested in terms of programme content, a degree of flexibility is recommended to continue to tailor the course to the needs of the families and the local population, as intended by the service. For example, consideration of budgets, cultural diversity, and language and literacy barriers, as well as potential for disengaging hard-to-reach populations. This could include piloting modifications to course structure (e.g., time of day offered, or a staggered delivery if stakeholder feedback suggests this may be useful) and sharing relevant findings and effectiveness with other providers at the PASTA forum.
9. In terms of future providers delivering PASTA, Public Health could consider the inclusion of a mobilisation period in the commissioning process, or a pre-delivery phase of PASTA, to enable stakeholder engagement, potentially leading to more effective recruitment and implementation at programme start-up.
10. NCMP data could be analysed to include further wards with the highest overweight and obesity prevalence, to reach more families in the districts where deprivation is highest. Obesity data could be cross-referenced with a deprivation measure, such as the Income Deprivation Affecting Children Index (IDACI) when identifying where to target.
11. Inclusion of a specific behaviour change intervention and providing a well-formulated and consistent post-programme support package after the 6-week intervention could help sustain any initial actions towards healthier lifestyles, leading to behaviour change.
12. PASTA could consider follow-up sessions (for example, at 3-, 6- and 12-months post-programme) and communicating a wide range of signposting opportunities, similar to the West Lancashire programme, as a minimum, with the aim of offering ongoing support to families.
13. Offer a range of signposting options, including follow-up sessions, at different times and in easily accessible and acceptable venues.
14. Ideally, further developments to support maintenance could include the implementation of post-programme opportunities such as PA or further cooking classes with providers, schools, or partner organisations, to enable sustainability of healthy lifestyles, although this would be subject to the allocation of funding, resources, and staff capacity.

15. Consideration of monitoring to include the following in the data reported: numbers recruited (children and families), numbers completing the programme (children and families) and numbers followed up after completing the programme (children and/or families).

5.7 Conclusion

This study assessed the feasibility and acceptability of a programme aiming to reduce childhood obesity, using a pragmatic mixed methods approach to generate insights within the context of the RE-AIM framework. Overall, the intervention was feasible with adequate retention, but most children recruited were not overweight as intended, potentially due to the healthy lifestyle focus for marketing and recruitment, with implications for future programme implementation and reach. The study suggested that PASTA was acceptable for participants.

Whilst this feasibility study has limited efficacy, quantitative data suggested some improvements to family behaviours between week 1 and 6. However, there was no statistical difference to child PA, ST, or diet. The qualitative findings indicated that the PASTA programme provided families with the opportunity, and capability to increase motivation towards changing perceptions and attitudes towards healthier diet at programme end, although reported impact on children's PA was limited.

Considerations for implementation include adopting a more standardised approach to programme content and evaluation, which would generate consistency in terms of delivery and enable a comprehensive and robust evaluation process across the districts. Notable comments included adopting a longer programme, widening the programme reach (using local data), and the importance of stakeholder engagement, particularly when the programme is new, or focusing on new wards. Maintenance is an important consideration in obesity prevention or treatment, and recommendations include follow-up sessions and a wide range of signposting for ongoing support, as a minimum.

Future research is needed to establish programme efficacy and if any initial actions towards healthy behaviours were sustained. A strategy to ensure participant retention at follow-up should be considered for a full-scale evaluation. These findings and recommendations have relevance for public health practitioners and providers who are involved in the commissioning and delivery of the service, and will contribute to the potential continuation of PASTA, which could have a positive impact on the healthy lifestyles of families in deprived areas of Lancashire.

APPENDIX A

Overview of the UK Holiday Activity and Food (HAF) Programme

One national initiative to address health inequalities is the Holiday Activity and Food (HAF) programme in England. The programme offers activities and food to children during the school holidays and is primarily for school aged children (reception to year 11 inclusive) who receive benefits-related free school meals (FSM) (DfE, 2022).

The rationale for the programme is based on research, which suggests that children from low-income households are more likely to be isolated and experience 'unhealthy holidays' in terms of nutrition and physical health, because of the increased financial strain on families during holidays (Bayes *et al.*, 2022). Evidence shows that free holiday clubs can have a positive impact on children and young people, including reducing food insecurity (Bayes *et al.*, 2021), reducing "holiday hunger" (Long *et al.*, 2021), and potentially resulting in better-quality diets in FSM-eligible children (Crilley *et al.*, 2022). Despite FSM offering some financial relief to families during term-time, its absence during school holidays can leave children at risk of experiencing further inequalities (Bayes *et al.*, 2022). The HAF programme was created to reduce this gap (Cox *et al.*, 2022).

The HAF programme was rolled out to all upper tier local authorities in 2021 (DfE, 2022). Local authorities are asked to ensure that the offer of free holiday club provision is available for all children in receipt of benefits-related FSM in their area. The recommended approach to the programme is to offer enrichment activities, including PA, to develop skills and knowledge. At least one nutritious meal a day (breakfast, lunch, or evening meal) should be provided, which ideally involves children and parents in the food preparation. The programme also involves increasing awareness of healthy eating, healthy lifestyles, and positive behaviours (DfE, 2022).

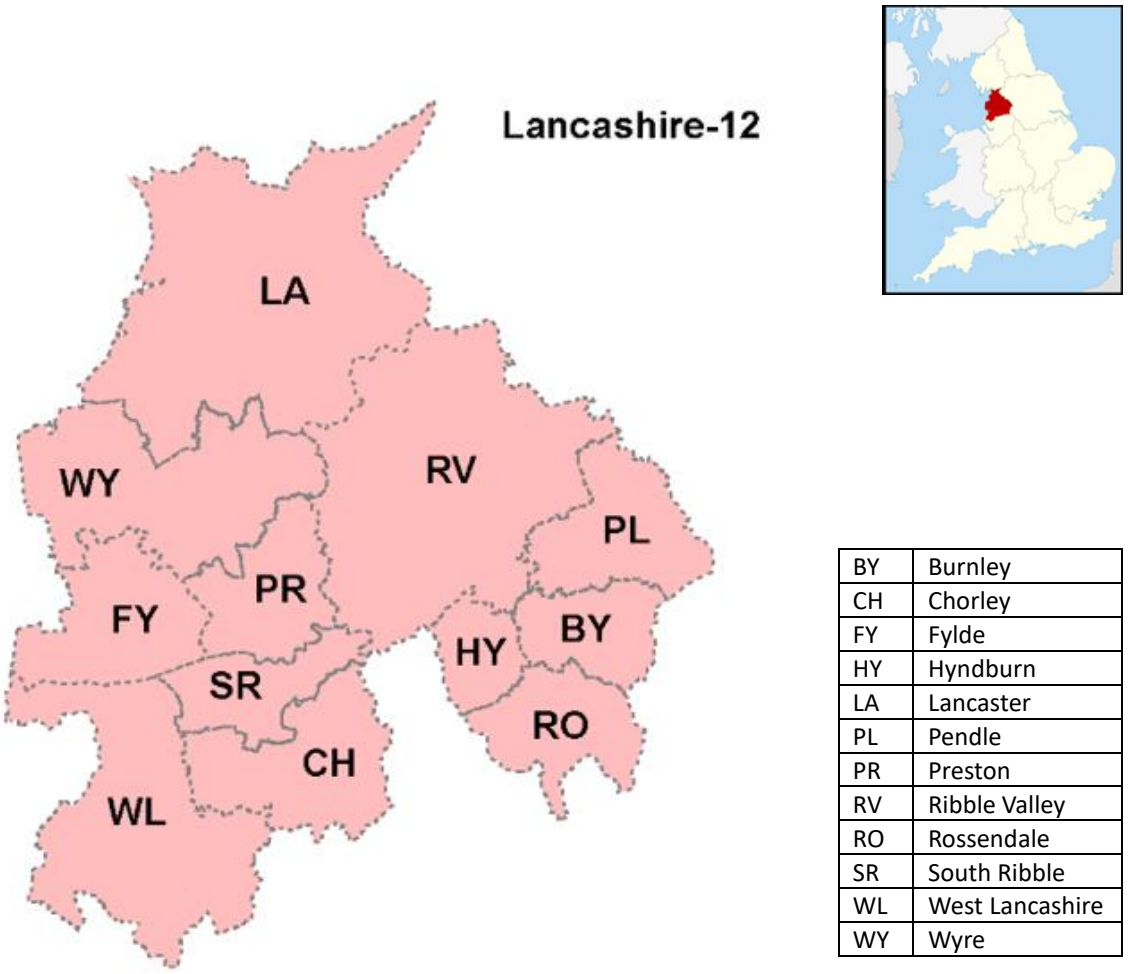
The "Play and Skills at Tea-time Activities" (PASTA) programme is commissioned by the Public Health Service in Lancashire County Council (LCC) and was developed as an extension of the national HAF programme. The HAF programme is aimed at children in receipt of FSM, whereas children eligible for PASTA should be from the target wards (of highest overweight children-Appendix C) and ideally be eligible for FSM. Both programmes recommend a focus on:

- Inclusion of fun PA opportunities.
- Provision of one nutritious meal, involving children and families in the food preparation
- Raising awareness of healthy lifestyles.

Key additional features of PASTA:

- Term-time and after school club.
- Ideally cooking skills involved in preparing a meal.
- Family involvement emphasised to address the importance of family behaviours to promote child health.

APPENDIX B.



BY	Burnley
CH	Chorley
FY	Fylde
HY	Hyndburn
LA	Lancaster
PL	Pendle
PR	Preston
RV	Ribble Valley
RO	Rossendale
SR	South Ribble
WL	West Lancashire
WY	Wyre

Figure i: The 12 districts (Lancashire-12) forming Lancashire County Council, where the PASTA programme is delivered (Lancashire County Council, 2023)**.**

APPENDIX C

Identified wards for the PASTA programme, based on NCMP data

Table 1: Identification of Wards for recruitment to the programme based on 2016/17 – 2018/19 NCMP data.

District	**Wards**
Burnley	Hapton w Park, Daneshouse w Stoneyholme, Rosegrove
Pendle	Bradley, Horsfield, Reedley
Rossendale	Longholme, Worsley
Hyndburn	Central, Spring Hill, Rishton
Ribble Valley	Edisford and Low Moor
Preston	Fishwick, Ribbleton, St Matthews, University
Chorley	Coppull, SW Chorley, Clayton le Woods N
South Ribble	Seven Stars, Broadfield, Bamber Bridge W
West Lancs	Digmoor, Tanhouse, Upholland

APPENDIX D

Study Objectives

To meet the aims set out in section 1.3, the feasibility study needed to achieve the specific objectives below:

- Measure child anthropometrics (height and weight) at baseline to establish if the programme was delivered to the intended target families.
- Collect child and family demographic data to describe the sample.
- Measure child diet, PA, sedentary behaviour, and family behaviours, using parent-reported questionnaires, at baseline, programme end and at follow up (~2 months).
- Conduct 2 focus groups with parents or carers, at programme completion, to:
    - explore any changes in awareness, perceptions, attitudes, or future intentions.
    - explore participant acceptability and feedback on the programme content and delivery.
- Children to complete a short self-report satisfaction questionnaire.
- Assess family engagement using data collected since the programme start.
- Conduct 3 facilitator interviews in each of the districts, to:
    - further explore programme acceptability in terms of reported feedback,
    - explore the known or perceived reasons for any participant discontinuation,
    - document any courses that were cancelled due to insufficient numbers and explore the perceived reasons,
    - determine how the programme is adopted in each area, including programme fidelity, i.e., was the programme delivered as intended.
    - identify any perceived barriers to programme delivery,
    - explore any perceived enablers of how the programme could be improved for participants to maintain any initial actions towards healthy behaviours.
    - identify any signposting opportunities provided by each district or any further support (such as follow-up sessions) provided to families when the 6-week programme ends.
- Conduct a survey across each district to gain an understanding of how the programme is delivered across Lancashire-12

APPENDIX E

Table 2. Overview of the districts and wards included in the study.

District	IMD score by District[a]	% Minority ethnic[b] (ONS, 2021)	**Wards**	% Minority ethnic[b] (ONS, 2021)	% Reception (year 6) with overweight/ obesity[b]	IMD score by ward[c] (decile)[d]	Child poverty (IDACI, 2019)[e]
Chorley	192/317	4.4%	Clayton le Woods N	4.4%	25.0% (33.3%)	1356 (2)	9.8%
Hyndburn	18/317	17.3%	Rishton	3.5%	29.6% (43.9%)	1254 (2)	19.0%
West Lancashire	178/317	3.1%	Tanhouse	3.7%	29.7% (42.1%)	415 (1)	31.0%
West Lancashire			Digmoor	2.7%	30.3% (45.5%)	168 (1)	35.2%
Burnley	11/317	17.5%	Daneshouse with Stoneyholme	82.3%	14.7% (41.8%)	46 (1)	30.8%

[a] Index of Multiple Deprivation (IMD) score by district (MHCLG, 2019); Burnley and Hyndburn are both in the most deprived 10% of the lower-tier local authorities within England on the IMD rank.

[b] % identifying as minority ethnic in each district or ward (all ethnic groups except the white British group).

[b] NCMP data, 2019/20-21/22 (OHID, 2023).

[c] IMD score by ward (MHCLG, 2019) ; Rank out of 7,408.

[d] Decile; (1)- 10% most deprived, (2)- 10 – 20% most deprived wards in England; Daneshouse with Stoneyholme is in the 1% most deprived wards in England.

[e] Child poverty score; Income Deprivation Affecting Children Index [IDACI] (MHCLG, 2019).

APPENDIX F (i) Parent/ Carer letter to invite families to take part in the study

Faculty of Health and Medicine,
Health Innovation One,
Sir John Fisher Drive,
Lancaster University,
Lancaster,
LA1 4AT

Dear Parent/ carer,

Re: Play and Skills at Teatime Activities Evaluation

The Play and Skills at Teatime Activities (PASTA) service has been developed by Lancashire County Council. The programme aims to promote healthy eating and physical activity in a fun, interactive and safe environment.

I am evaluating the service as part of a Masters research study with Lancaster University. The research will involve asking you about your child's lifestyle at the start and end of the programme, and approximately 2 months after completion. The lifestyle questionnaires will involve how much physical activity your child has done, and the kinds of foods they have eaten in the last week. Your child will be measured (height, weight, waist) and parents can be measured too (optional).

There is also an opportunity to take part in a group interview, where you can let us know what you think of the service, and your experiences of attending PASTA.

If you would like to take part in the research, please let your PASTA leader know when you come to the session.

I have enclosed an Information Sheet to give you more detail and to help you decide if you would like to take part. If you have any further questions, you can contact me at (email address).

Yours sincerely

C. Townson

Christina Townson
Postgraduate Researcher

APPENDIX F (ii)

Participant Information Sheet for parents or carers

An evaluation of 'Play and Skills at Teatime Activities'

You are being invited to take part in a research project. This information sheet explains why the research is being done and what it will involve for you if you choose to take part. If you have any questions at all, please do not hesitate to ask. Please talk to others about the study if you wish.

What is the purpose of this study?
The Play and Skills at Teatime Activities (PASTA) service has been developed by Lancashire County Council. The programme aims to promote healthy eating and physical activity in a fun, interactive and safe environment.

To find out if PASTA is beneficial for children and families, we are evaluating the service as part of a Masters research study with Lancaster University. We are interested in understanding what it was like to take part in the service, how useful it was, and if you or your child have made any lifestyle changes as a result of taking part in PASTA.

What will the study involve?
The research will involve asking you about your child's diet, physical activity and lifestyle at the start and end of the programme, and approximately 2 months after completion. You will be invited back to the venue for the 2 month follow up. The lifestyle questionnaires will involve how much physical activity your child has done, and the kinds of foods they have eaten in the last week. Your child will be measured (height, weight, waist) and parents or carers can be measured too (optional).

There is also an opportunity to take part in a group interview, where you can let us know what you think of the service, and your experiences of attending PASTA.

The evaluation measures will take part during the PASTA sessions that you attend, and you will be invited back to the venue to complete the follow up measures after 2 months.

Why take part?
We would really appreciate you taking part in the project evaluation. If you decide to take part, your feedback will help evaluate the effectiveness of PASTA and the potential continuation of the programme across areas of Lancashire.

How do I withdraw from the study?
If you decide that you no longer wish to take part in the study, you can withdraw at any time, without having to give a reason. If any questions during the study make you feel uncomfortable, you do not have to answer them. Withdrawing from the study will have no effect on you. If you withdraw from the study, the information you have given so far will not be retained, unless you are happy for this to be included.

What about confidentiality?
The records from this study will be kept confidential. Information will be stored securely, and only myself and my project supervisor will have access to the files and any audio tapes. Your data will be anonymised – your name will not be used in any reports or publications resulting from the study.

Following data analysis, the findings of the study will be presented in a thesis, and possibly written papers and conference presentations. Any quotes from the group interview will be used anonymously.
Audio recordings will be deleted at the end of the study in 2022. All other data relating to the project will be deleted after 10 years.

Limits to confidentiality: Confidentiality will be maintained as far as it is possible. However, if the researcher thinks that you, or someone else, is at significant risk of harm, they may have to break confidentiality and speak to a member of staff about this. If possible, the researcher will tell you if they have to do this.

Who is organising the study?
The study is being carried out by Lancaster University and funded by Lancashire County Council.

Where can I obtain further information?
If you wish to gain further information, please contact me: Christina Townson at (email address).

If you are happy to take part in this study, please sign the consent sheet attached.

APPENDIX F (iii)

CONSENT FORM FOR PASTA EVALUATION STUDY

PARTICIPATION IN THIS RESEARCH STUDY IS VOLUNTARY

I have read and understood the study information, or it has been read to me. I have been able to ask questions about the study.	YES/ NO
I consent voluntarily to be a participant in this study and consent for my child to take part in the study. I understand that I can refuse to answer questions and that I can withdraw from the study at any time.	YES/ NO
I understand that the information will be used for Christina Townson's thesis, and that the information will be anonymised.	YES/ NO
I agree that my anonymised information can be quoted in the research	YES/ NO
I understand that any personal information that can identify me- such as my name, will be kept confidential and not shared with anyone other than myself and project supervisor.	YES/ NO
I give permission for the (anonymised) information I provide to be deposited in a data archive so that it may be used for future research	YES/ NO
I consent to taking part in the focus group at week 6 or 7	YES/ NO
If I take part in the focus group, I agree to maintain the confidentiality of the group discussions	YES/ NO
If I take part in a focus group, I agree to the interview being audio recorded.	YES/ NO
I consent to being contacted 2 months after the programme, to voluntarily take part in the follow up evaluation	YES/ NO

Participant name:

Signature: _____ Date: _____

Researcher name:

Signature: _____ Date: _____

APPENDIX F (iv) Parent/ carer letter inviting the families to take part in the follow-up evaluation

Faculty of Health and Medicine,
Health Innovation One,
Sir John Fisher Drive,
Lancaster University,
Lancaster,
LA1 4AT

Dear Parent/ carer,

Re: Play and Skills at Teatime Activities Evaluation

Thank you for taking part in the evaluation of the Play and Skills at Teatime Activities (PASTA) service. I am evaluating the service as part of a Masters research study with Lancaster University. The research will help evaluate the effectiveness of PASTA and the potential continuation of the programme across areas of Lancashire.

We would like to invite your family back to repeat the evaluation following the PASTA programme. This will involve the same questionnaires asking about your child's physical activity, the kinds of foods they have eaten in the last week, and family lifestyle behaviours.

As a thank you for taking part in the next evaluation stage, we are offering each family a **£10 shopping voucher for a local supermarket**. The evaluation session will take part at:

Venue:

Date and time:

If you would like to take part in the final research session, please let your PASTA leader know that you can come along to the session.

I have enclosed an Information Sheet for your reference. If you have any further questions, you can contact me at (email address).

Yours sincerely

C. Townson

Appendix G.

Distress Protocol- PASTA project evaluation

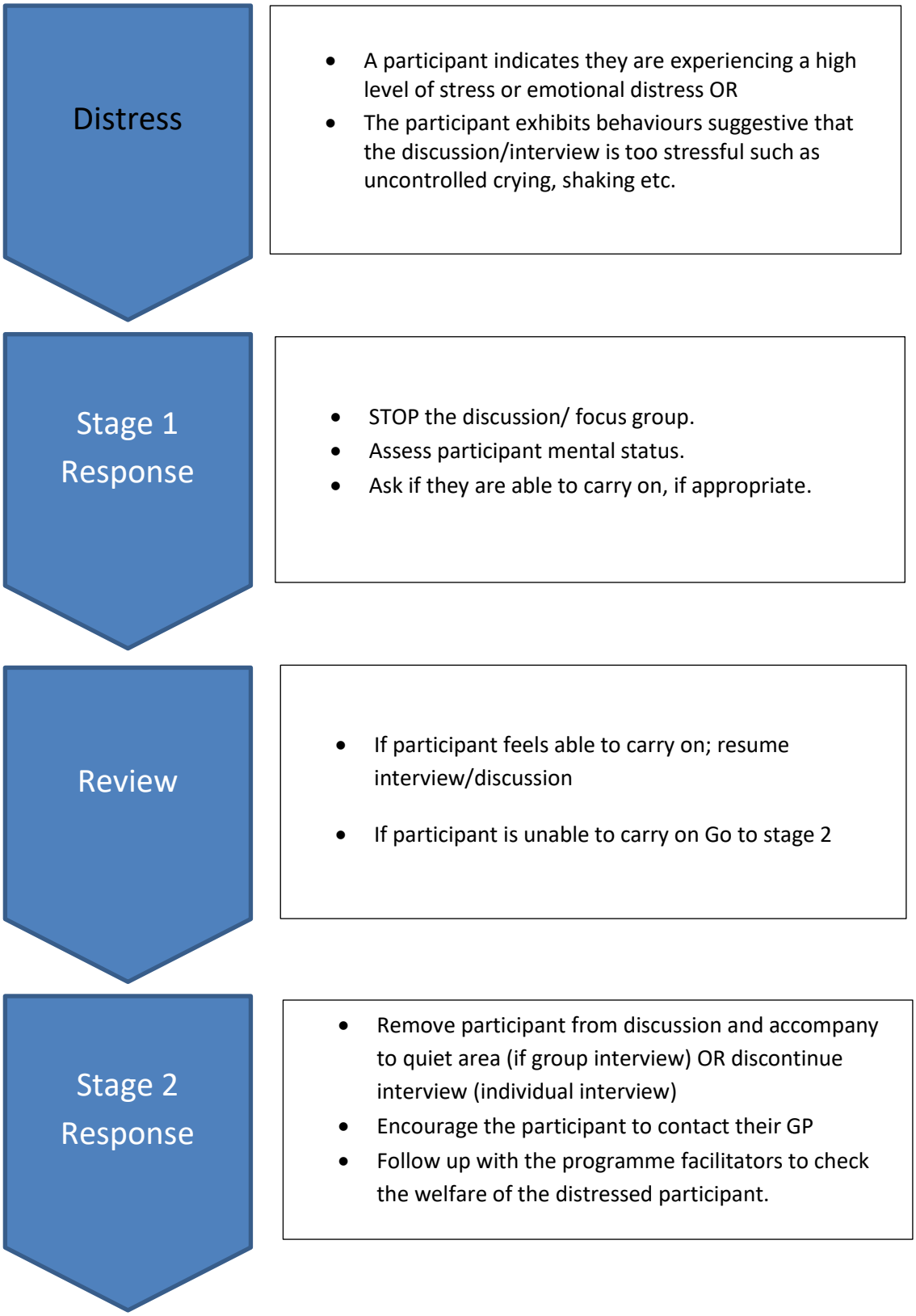


Figure ii: Distress protocol (adapted from Haigh and Witham, 2013, p.2, Draucker et al., 2009)

Appendix H.

Demographic Information sheet

An evaluation of 'Play and Skills at Teatime Activities'

Child(ren)'s name(s) attending PASTA:	Date of birth	Age:	Your relationship to child(ren) e.g., mother, father, grandparent, carer, guardian

This section is about you, the parent or carer:

Name: _____ Age: _____

Number of dependents (under the age of 18) living in your household: _____

Postcode: _____

Gender: (Please circle one)

Female / Male / Non-Binary / Prefer to self-identify / Prefer not to say

Relationship status:

Never Married/ Never in Civil Partnership	
Married	
Civil Partnership	
Widowed / Surviving Civil Partner	
Divorced / Civil Partnership Dissolved	
I do not want to disclose	

Employment status:

Full time employment	
Part time employment	
Unemployed/ looking for work	
Unemployed/ not looking for work	
Student	
Retired	
Other (please state)	

Ethnic group:

Asian or Asian British – Bangladeshi	
Asian or Asian British – Indian	
Asian or Asian British – Pakistani	
Asian or Asian British – Other Asian background	
Black or Black British – African	
Black or Black British – Caribbean	
Black or Black British – Other Black background	
Chinese	
Mixed – White and Asian	
Mixed – White and Black African	
Mixed – White and Black Caribbean	
Mixed – Other mixed background	
White – British	
White – Irish	
White – Other White background	
Prefer not to disclose my ethnicity	

Appendix I.

Child Satisfaction Questionnaire

Name:_____ Age:_____ Date:_____

Did you enjoy the play or exercise? (Tick the one you think)

Not at all [1]	A little [2]	Somewhat [3]	Quite a bit [4]	A lot [5]

Did you enjoy the food and making recipes? (Tick the one you think)

Not at all [1]	A little [2]	Somewhat [3]	Quite a bit [4]	A lot [5]

Did you enjoy everything else (other activities like learning things)?
(Tick the one you think)

Not at all [1]	A little [2]	Somewhat [3]	Quite a bit [4]	A lot [5]

What was your favourite part of this course?

_____
_____
_____

Appendix J. Table 3. PASTA delivery model/ Adoption across the 3 sites; June - July 2022.

	Hyndburn	West Lancashire	Chorley
Who programme targets/ where delivered	Whole-family approach in community venues	Whole-family approach in schools	4 courses were children-only. Parents attended 2 courses. Delivered in schools, or community venues when this is not possible.
Food preparation or cooking sessions	Food preparation- participants assemble ingredients to make their own meal (e.g. pitta pizzas, sandwich wraps, pasta and vegetables).	Children and adults are involved in food preparation* Adults participate in a cookery course (e.g., Risotto, curries) led by a qualified Chef and supported by a facilitator.	Children participate in a cookery session (e.g., pizza, pasta bolognaise). Parents support children with cookery when attending.
Participant cooking skills	No- the facilitators chop, peel and cook the food.	Yes- children prepare a healthy snack with parents. Parents chop, peel and cook the meals using hobs.	Yes- children are involved in peeling and chopping. The cooking is often demonstrated.
Fruit/ snacks	Different types of chopped fruit offered each week, children make 'fruit faces'	*Children prepare a healthy snack, which may include fresh or dried fruit, seeds, etc.	New types of fruit offered as snack each week.
Food preparation format across venues	Format is the same but in Rishton, families can see the cooking process, in Accrington Town Hall this is more difficult as it is cooked in another room. In Adventure City, it is cooked by kitchen staff.	Format is the same, sometimes adapted to use hobs in the hall.	Format is the same, but children cannot always see the cooking process if the kitchen is in another room.
Education	Education is weekly, including Change for Life resources and introducing a Change for Life recipe App and Scanner App to families. Another session focuses on salt and sugar. Participants encouraged to try different foods and record whether they like it.	The children's food preparation session includes weekly games and discussion around healthy eating themes, such as vegetables, and interactive resources, such as a sugar cubes game. Children have a worksheet to record foods that they've tried, to encourage eating new foods. Parental education is practical, around skills and knowledge e.g., knife skills session, methods to reduce food and energy costs associated with cooking.	The education in Chorley is based on a weekly theme, including sugar, the different types of fats, the benefits of fruit and vegetables and water. Each session starts off with a discussion about the education theme and the messages are repeated in the PA games and throughout the session.
PA or Play session	The PA session includes children's circuit training, games and one Yoga session per course. A session typically lasts 30 – 40 minutes	The session starts with a warm-up and discussion of why PA is important. The facilitators incorporate fun games and a cool down. The play session typically takes 30 - 35 minutes.	The PA session includes games, running around and fundamental skills. The games reflect the weekly education theme, such as fruit and vegetables. The session typically lasts 30 - 45 minutes.
Same format at each venue	Different PA took place at the Adventure City venue, as children participated in the soft play. Two sessions were structured (in a studio) for both parents and children, at the venue.	Yes- but the PA is adapted to the groups, as it's dependent on the numbers and ages of the children.	Yes- length of session adapted to any time constraints (e.g., families arriving from school).

Appendix K. Table 4. PASTA Adoption and Implementation (summer term 2022) identified from the Qualtrics survey findings; districts in Lancashire-12

	Pendle	**Rossendale**	**Ribble Valley**	**South Ribble**	**Lancaster**	**Burnley**	**Wyre**	**Preston**	**Fylde**
Organisation type	Leisure Trust	Leisure Trust	Leisure Centre (registered charity)	Borough Council Health team	Lancaster City Council team	Leisure (charitable) Trust	Healthy Heads (school ed.)	Football club Trust (PNE)	AFC Fylde
Commenced PASTA	June 2022	January 2022	March 2022	January 2022	April 2022	February 2022	February 2022	June 2022	March 2022
Family approach	✓	✓	✓	✓	✓	✓	✓	✓	✓
Food/ cooking every week	✓	✓	✓	X Fortnightly	✓	✓	✓	✓	✓
Cooking skills in session	✓	✓	✓	✓ Prep in session, cook at home	✓	✓	✓	X Cooking demo	✓
PA every week	✓ Gardening	✓ 30-40 mins	✓ 40-50 mins	X Fortnightly (10-20 mins)	✓ 10-20 mins	✓ 40-50 mins	✓ 30 – 40 mins	✓ 20-30 mins	✓ 20-30 mins
Education	✓ Harvesting, growing, cooking	✓ Hygiene, Eatwell plate, sugars, fussy eaters, healthy packed lunches.	✓ Leaflets, email handouts	✓ Eatwell plate, sugar, healthy lunchboxes/ snacks.	✓ Sugar, fat, salt, hydration, portion control	✓ Good/ bad fats, fruit and vegetables, PA etc.	✓ Home-made affordable takeaway recipes	✓ Eatwell plate, takeaways, calories, food labels	✓ Nutrition card handouts
Signposting	✓ Leisure Trust, partner organisations, Free swim vouchers	✓ HAF, local sports facilities	✓ HAF, Roefield children's activity courses	✓ HAF	✓ Food banks, leisure centre	✓ Leisure centres, family wellbeing service	✓ Community activities	✓	X
Follow-up with families	(adhoc)	(adhoc)	✓ email	(adhoc)	(adhoc)	X	(adhoc)	✓ (casestudies)	X

Key- Always- Dark green, Often- Light green, Sometimes- Yellow, Never- Orange

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