preparing for life

Early Childhood Intervention

Assessing the Impact of *Preparing For Life* at 18 Months

By the *PFL* Evaluation Team, UCD Geary Institute

UCD Geary Institute

preparing for life
planning together for our children

Preparing For Life:
Early Childhood Intervention

Assessing the Impact of *Preparing For Life* at Eighteen Months

EVALUATION OF THE *'Preparing For Life'*
EARLY CHILDHOOD INTERVENTION PROGRAMME

By
PFL EVALUATION TEAM AT THE UCD GEARY INSTITUTE
May, 2013

UCD Geary Institute

preparing for life
planning together for our children

Table of Contents

List of Tables

List of Figures

Acknowledgements

The *Preparing For Life* Team and the UCD Geary Institute Evaluation Team would like to thank all those who participated in and supported this research, especially the families participating in the *PFL* Programme and Evaluation.

Preparing For Life would particularly like to thank all members of UCD Geary Institute Evaluation Team over the last five years (Ailbhe Booth, Carly Cheevers, Maria Cosgrove, Sarah Finnegan, Olivia Joyner, Louise McEntee, Edel McGlanaghy, Judy McGrath, Kelly McNamara, Eylin Palamaro Munsell, Catherine O'Melia, Sarah Thompson, Gerard Victory), under the direction of Dr. Orla Doyle and the scientific advisory committee (Professor Colm Harmon, Professor James Heckman, Professor Cecily Kelleher, Professor Sharon Ramey, Professor Sylvana Cote, and Professor Richard Tremblay) for their work in bringing this report to life. The *PFL* Evaluation Team also would like to thank Caitriona Logue and Seong Moon, for contributing to the report and Mark Hargaden for IT support. We also would like to thank all the local organisations, including Sphere 17, the Darndale Belcamp Village Centre, Project West, Finglas and St. Helena's Resource Centre, Finglas, who offered work space in which to conduct interviews with participants.

We thank our funders The Atlantic Philanthropies and the Department of Children and Youth Affairs and acknowledge the advice and guidance given by staff of both organisations. We also thank our Expert Advisory Committee for their support and guidance.

We are most grateful to the Northside Partnership Board, CEO and staff team as well as the *PFL* Board Sub-Group, *PFL* Planning, Steering and Working Groups for their on-going encouragement and support. We appreciate the generosity of all the agencies, organisations and individuals who have given so willingly of their time and expertise in supporting *PFL* throughout the planning and implementation phases.

Finally we thank the members of the *PFL* staff team over the past five years (Val Smith, Sarah Jane Leonard, Melanie Murphy, Susan Cullen, Eva Rigo, Victoria Monkhouse, Sandra O'Neill, Cindy Lawson, Ann Loughney, Gemma Cooper and Bianca Toeneboen) who have brought the *PFL* programme to life.

Noel Kelly,

Manager, *Preparing For Life*

Executive Summary

Preparing for Life (PFL) is a prevention and early intervention programme which aims to improve the life outcomes of children and families living in North Dublin, Ireland, by intervening during pregnancy and working with families until the children start school. The *PFL* Programme is being evaluated using a mixed methods approach, incorporating a longitudinal randomised control trial design and an implementation analysis. The experimental component involves the random allocation of participants from the *PFL* communities to either a high support treatment group or a low support treatment group. Both groups receive developmental toys, as well as access to preschool, public health workshops, and a support worker. Participants in the high treatment group also receive home visits from a trained mentor and have group parent training via the Triple P Positive Parenting Programme. The *PFL* treatment groups are also being compared to a 'services as usual' comparison group (LFP), who do not receive the supports of the *PFL* Programme. This is a summary of the findings of the evaluation when the *PFL* children were approximately eighteen months of age.

Recruitment and Baseline Characteristics

In total, 233 pregnant women were recruited into *PFL* between January 2008 and August 2010. Randomisation resulted in 115 participants assigned to the high treatment group and 118 participants assigned to the low treatment group. In addition, 99 pregnant women were recruited into the comparison group. The population-based recruitment rate was 52%. Baseline data, collected before the programme began, was available for 104 high and 101 low *PFL* treatment group participants respectively, and 99 comparison group participants. Tests of baseline differences between the high and low *PFL* treatment groups found that the two groups did not statistically differ on 97% of the measures analysed, indicating that the randomisation process was successful. The aggregate *PFL* group and the *LFP* comparison group did not statistically differ on 75% of the measures; however, the comparison group was of a relatively higher socioeconomic status.

Findings from the Six Month Report

The six month evaluation of *PFL* indicated that the programme was progressing well. In total, 257 six month interviews (n*Low* = 90; n*High* = 83; n*LFP* = 84) were completed. As found in other studies of home visiting programmes, there were limited significant differences between the high and low treatment groups (14%) and the low treatment and comparison groups (11%) at six months. Many of the relationships were in the hypothesised direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. There were significant findings in the domains of parenting, quality of the home environment and social support, which correspond directly to information provided by the *PFL* mentors. However, the programme had no significant impact on pregnancy behaviour, infant birth weight, breastfeeding and child development at six months. While attrition from the programme was low and participant satisfaction was high, the level of engagement was less than anticipated with parents in the high treatment group receiving 14 home visits between programme entry and six months. Mothers with relatively higher cognitive resources received more home visits and may have benefited more from the programme at six months than those with lower cognitive resources.

Findings from the Twelve Month Report

In total, 247 twelve month interviews (n*Low* = 83; n*High* = 82; n*LFP* = 82) were completed. Limited significant differences between the high and low treatment groups (8%) and the low treatment and comparison groups (9%) were found. Note that the measures used at the six and twelve month evaluations differed, therefore outcomes between the two time points may not be directly compared. The high treatment group reported somewhat better outcomes than the low treatment group. Based on the literature, we hypothesised that treatment effects at twelve months would be found in the domains of child health, parenting and maternal health. The results suggest partial support for our hypotheses. Although there were no significant effects

in the domain of parenting, effects were found for maternal and child health. Counter to our hypotheses, significant treatment effects were found in the domains of child development and social support. This is noteworthy as previous studies of home visiting programmes do not report effects in these domains at twelve months. Although the findings from the dynamic analyses were limited, they revealed that children in the high treatment group had significantly better fine motor skill development between six months and twelve months than those in the low treatment group. Additionally, children in the high treatment group were significantly less likely to experience parental oppression of their power and independence by twelve months. The level of attrition between six and twelve months was extremely low, however engagement was lower than prescribed with the high treatment groups receiving 7 programme visits on average between six and twelve months. Overall, participant satisfaction with the programme was high and although the risk of contamination was high there was little evidence of contamination between the high and low treatment groups at twelve months.

Eighteen Month Report

The aim of this report is to determine whether the *PFL* programme had an impact on parent and child outcomes at and before eighteen months, and to provide a detailed review of implementation practices in the programme regarding attrition, dosage and participant engagement.

Impact of *PFL* at Eighteen Months: Main Results

In total, 225 eighteen month interviews (n*Low* = 80; n*High* = 74; n*LFP* = 71) were completed. The main analyses compared the outcomes of the high treatment group to the outcomes of the low treatment group across eight domains: child development, child health, parenting, home environment, maternal health and well-being, social support, childcare, and household factors and socioeconomic status (SES), incorporating 152 outcome measures.

Table ES.1 summarises the *PFL* results at six, twelve and eighteen months. Consistent with the literature, there were limited differences observed between the high and low treatment groups. However, many of the outcomes were in the hypothesised direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. Based on the literature, we hypothesised that treatment effects at eighteen months would be found in the domains of home environment, parenting, child health and child development. The results support our hypotheses and are consistent with previous studies of home visiting programmes at eighteen months. We also found limited effects in the domain of social support and child cognitive development which is noteworthy as other home visiting programmes do not report findings in these areas at eighteen months. In total, 21 of the 152 measures were statistically different (14%) in the individual tests and 5 of the 27 step-down categories (19%) remained significant in the multiple hypothesis analysis, including child health, parenting and home environment. Specific individual findings include the following. Children in the high treatment group displayed a higher level of gross motor skills and were less likely to be at risk for socio-emotional and cognitive delay compared to those in the low treatment group. Additionally, they had more appropriate eating patterns, were less likely to be hospitalised and had better self-reported health. Moreover, mothers in the high treatment group were more likely to have positive interactions with their children. The home environment was more likely to be appropriate and safe for those in the high treatment group, most notably in the realms of appropriate behaviours toward children, overall health and safety of the environment and the availability of age appropriate learning materials.

Table ES.1 - Summary of Main Findings at Six, Twelve & Eighteen Months

PFL Low – *PFL* High	Proportion of Measures Significantly Different					
	Six Months		Twelve Months		Eighteen Months	
	Individual Tests	Multiple Hypothesis Tests	Individual Tests	Multiple Hypothesis Tests	Individual Tests	Multiple Hypothesis Tests
Child Development	0% (13)	0% (2)	7% (28)	20% (5)	16% (25)	0% (6)
Child Health	10% (30)	0% (3)	17% (23)	0% (4)	24% (17)	67% (3)
Parenting	23% (22)	20% (5)	0% (16)	0% (2)	20% (10)	50% (2)
Home Environment	36% (22)	50% (2)	0% (6)	0% (1)	33% (21)	67% (3)
Maternal Health & Wellbeing	5% (20)	25% (4)	4% (28)	25% (4)	5% (19)	0% (3)
Social Support	38% (13)	0% (2)	43% (7)	0% (2)	8% (12)	0% (3)
Childcare	7% (14)	0% (2)	~	~	0% (16)	0% (2)
Household Factors & SES	0% (26)	0% (5)	3% (32)	0% (5)	8% (23)	0% (5)
Total Statistically Different	14% (23/160)	12% (3/25)	8% (11/140)	9% (2/23)	14% (21/152)	19% (5/27)

A similar amount of significant findings were found at eighteen and six months, while fewer significant findings were reported at twelve months. This is likely to be due to differences and similarities in the measures included at each time point. For instance, in the home environment domain, the six and eighteen month home environment measure focused on aspects of the physical environment and appropriateness of toys and activities. At twelve months, the home environment measure focused on aspects of the family relationship. Similarly, different aspects of parenting were measured at six, twelve and eighteen months.

Additional Eighteen Month Analyses Results

Additional analyses were conducted to explore different aspects of the data not captured in the main analysis. These included a comparison of the eighteen month outcomes of the low treatment group to the comparison group and the eighteen month dynamic analysis which examined changes in child and parent outcomes over time.

Overall, the mixed results of the low treatment group and comparison group analysis support the study design as they suggest that the low treatment group is not systematically better than the comparison group across most domains. Of the 143 items analysed, there were findings in the hypothesised direction for 38 measures (27%) and 9 of these (6%) were statistically significant, however, only two of these effects remained significant in the multiple hypothesis analysis, child development and child health. In addition, there were 104 differences in the non-hypothesised direction, and 22 of these were statistically significant (15%). These findings were in all areas except childcare. Overall, these results suggest that the comparison group is outperforming the low treatment group, suggesting that contamination between the high and low treatment group is minimal.

A number of standardised instruments used to evaluate the programme were collected at multiple time points which allowed us to compare the outcomes of the high and low treatment groups over time in order to track changes in child and parent outcomes. Overall, few significant findings emerged from the dynamic analysis. Three of the 43 measures measured (7%) over three domains were significant in the hypothesized direction for fine motor skills between six and twelve months, and two of the HOME subdomains between six and eighteen months.

PFL Implementation Analysis at Eighteen Months

ATTRITION

The level of official attrition from *PFL* between baseline and eighteen months was 15% across the whole sample. Importantly, no attrition was experienced in the high treatment group or the comparison group and only 2% attrition was experienced in the low treatment group between twelve and eighteen months. Official attrition between programme intake and eighteen months was slightly higher among the high treatment group (19%) than among the low treatment group (16%). A greater proportion of the low treatment group (21%) was classified as disengaged or missed their eighteen month interview when compared with the high treatment group (11%). Total non-completion (attrition & disengaged) at eighteen months is highest among the low treatment group (37%), followed by the high treatment group (30%), and lowest among the comparison group (28%). In order to test for non-random attrition, we compared the baseline characteristics of those who participated in the eighteen month survey to those who did not. Overall, there is weak evidence that there are systematic differences between these groups. We found that more disadvantaged participants were difficult to contact or had dropped out of the programme by eighteen months. However, as shown in previous reports, the majority of individual characteristics were not associated with attrition from the programme.

ENGAGEMENT

Families in the high treatment group received an average of 27 home visits by the *PFL* mentors between programme intake and eighteen months, with each visit lasting one hour on average. The frequency and duration of visits did not differ significantly across each time period. On average, participants met their mentor once a month between twelve and eighteen months. Two participant characteristics were associated with the frequency or duration of home visits – the timing of programme entry and cognitive resources. Mothers who entered the programme earlier in pregnancy had more home visits and subsequently spent more time in the programme. That mothers in the *PFL* sample with higher cognitive resources participated in more home visits and had visits of a longer duration suggest that engagement also may be related to the mother's ability to understand the programme materials and recognise the need for the programme in their lives. Factors such as age, marital status, employment status, and socio-emotional functioning were not associated with engagement in *PFL*.

CONTAMINATION

Overall, the contamination analysis revealed three findings. First, the indirect measures of contamination indicated that the potential for contamination was high as participants in both the high and low treatment groups reported knowing multiple neighbours in the programme and stated that they regularly share material with each other. Second, direct measures of contamination reveal that contamination between the high and low treatment group was minimal at eighteen months. Third, the indirect measures of contamination validate the use of the comparison group as a safeguard against contamination as a relatively small proportion of the comparison group stated they knew other people in the programme. These findings indicate that the level of contamination in the *PFL* programme up to eighteen months was quite low and does not bias the results.

Conclusion

The eighteen month evaluation of *Preparing for Life* suggests that the programme is progressing well regarding the retention of participants and the results are in line with evaluations of other home visiting programmes, which typically identify few significant effects at this time point. Many of the relationships were in the hypothesised direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. As hypothesised, there were some significant findings in the domains of home environment, parenting, child health and child development. Furthermore, contrary to much of the literature, there were significant findings in the domain of child cognitive development and social support. However, the programme had no significant impact on childcare. Findings at eighteen months were consistent with the six month results, which included many of the same measures. In addition, there were findings in the realm of child development which were not found at six months. As more data is gathered, we will be able to expand this analyses.

The reports of the six, twelve and eighteen month *PFL* evaluations can be found at the following website under publications: http://geary.ucd.ie/preparingforlife

The Life of Kirsty, an Average PFL Child, at 18 Months

At eighteen months, Kirsty lives at home with her mother, father and her siblings. Her parents are in a committed long-term partnership. Extended family, such as grandparents, play a significant role in her life. Kirsty attends a formal crèche. Her family is at low risk for problems such as addiction, abuse and family violence. Her father has been out of work for many months and the family is receiving social welfare payments. Kirsty eats appropriate foods for her age and is up to date on her immunisations. At eighteen months of age she is generally in good health, although there is at least one adult in her home who smokes cigarettes. This puts her at greater risk for bronchial issues, such as chest infections, yet her family takes steps to reduce smoking in her presence. Kirsty's mother is in good physical health. She drinks alcohol, but generally in moderation and she does not use drugs. Her mother is however at risk for depression and anxiety. Kirsty's mother spends time interacting with her, engaging in activities such as playing, singing and reading. Both her parents use appropriate punishment when disciplining her and are not likely to engage in behaviour that would harm her. Kirsty's home environment is a safe one, filled with good people and a variety of learning materials. Her mother is not worried about her behaviour; but she is worried about her language development. Yet due to her exposure to books, Kirsty can readily combine words. She is at risk for cognitive delays, however Kirsty is at low risk for physical and socio-emotional delays and is not recieving special services.

Chapter One

Background of the *PFL* Programme Eighteen Month Evaluation

1.1 Introduction

This report is the third in a series of reports which presents the result of the *PFL* evaluation. The report 'Assessing the early impact of *Preparing For Life* at six months' contains relevant background information about the programme and serves as the foundation for this report. The six month report included a detailed description of the *PFL* intervention and evaluation, the *PFL* logic model, and an explanation of the theoretical underpinnings of home visiting interventions. The six and twelve month reports include a review of home visiting interventions, in addition to the results of the impact and implementation evaluation at six and twelve months. The present report focuses on information specific to the eighteen month evaluation, including new measures collected as part of the eighteen month interview, the results of the evaluation at eighteen months, and new implementation data collected between twelve and eighteen months. In addition, as there are now multiple waves of *PFL* data, the results of longitudinal analyses (dynamic analyses), which examine the impact of the programme on changes in child and parent outcomes over time, are included.

Chapter 1 of this report provides a brief summary of the recruitment process, analysis of baseline data, and the results of the evaluation at six and twelve months. It then presents a review of relevant findings from the literature on the impact of home visiting programmes at eighteen months of age. An updated hypothesis is then presented, as well as information regarding the collection of eighteen month interview data. A description of the remainder of the report concludes this chapter.

1.2 Recruitment & Baseline Analysis

In total, 233 pregnant women were recruited into the *PFL* Programme between January 2008 and August 2010. Randomisation resulted in 115 participants assigned to the high treatment group and 118 participants assigned to the low treatment group. In addition, 99 pregnant women were recruited into the comparison group. The population based recruitment rate was 52%. Baseline data, collected before the programme began, was available for 104 and 101 high and low *PFL* treatment group participants respectively, and 99 comparison group participants. Tests of baseline differences between the high and low *PFL* treatment groups found that the two groups did not statistically differ on 97% of the measures analysed, indicating that the randomisation process was successful. The aggregate *PFL* group and the *LFP* comparison group did not statistically differ on 75% of the measures; however, the comparison group was of a relatively higher socioeconomic status.

Full details of the recruitment methods and baseline analysis are available in Chapter 2 of '*Preparing For Life* Early Childhood Intervention; Assessing the Early Impact of *Preparing For Life* at Six Months'.

[1] This report can be found at the following website under publications: http://geary.ucd.ie/preparingforlife

1.3 Summary of Six Month Evaluation

The six month evaluation suggested that the programme was progressing well. In total, 257 six month interviews (n*Low* = 90; n*High* = 83; n*LFP* = 84) were completed. Analysis of the six month data across eight domains revealed there were limited significant differences reported between the high and low treatment groups (14%). This was consistent with the programme evaluation literature which finds few treatment effects at this stage. Many of the relationships were in the hypothesised direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. There were significant findings in the domains of parenting, the quality of the home environment and social support, which correspond directly to information on the *PFL* Tip Sheets delivered to participants during this period.

Specifically, children in the high treatment group compared to those in the low treatment group had more appropriate eating patterns, had a higher level of immunisation rates, had more parental interactions, and parent-child interactions were of a higher quality. Additionally, children in the high treatment group were exposed to less parental hostility, a safer home environment, and more appropriate learning materials and childcare. Moreover, mothers in the high treatment group were more likely to be socially connected in their community and less likely to be hospitalised after birth. The results of the multiple hypotheses tests strengthen these findings by showing that the high treatment group reported higher scores on the quality of the home environment and in the domain of maternal physical health, and lower scores on parental stress compared to the low treatment group. The interaction and subgroup analysis revealed that the programme had differential impacts with some groups benefitting more from the programme than others. For example, there was suggestive evidence that the programme benefited mothers with relatively higher cognitive resources, mothers with multiple children, and families who have experienced familial risk. It is important to note that the programme had no significant impact on key factors such as pregnancy behaviour, child birth weight, breastfeeding, and child development.

These lack of effects may be attributed to dosage and timing. Participants, on average, received 14 home visits between baseline and six months, thus the intervention may not have been sufficiently intensive to generate significant treatment effects at this early stage. These results were also supported by the findings from the qualitative interviews which highlighted the small changes in behaviour and attitudes in the participants witnessed by the mentors. They acknowledged that these changes, while small, may be indicative of cumulative effects for the parents, children and community in the future. Despite these relatively modest effects, the low level of attrition (10% dropped-out and 8% disengaged) and high participant satisfaction were indications that programme engagement was high which may result in positive future outcomes.

The results comparing the low treatment groups to the comparison community confirmed the integrity of the RCT design. The comparison of the low treatment and comparison groups suggest that, as expected, the *PFL* programme is not having a significant impact on the outcomes of the low treatment group (only 11% of the differences between the low treatment group and comparison group were significant in a positive direction). This finding echoes the results of the contamination analysis which suggest that despite the high risk of contamination within the community contamination was not a significant issue at this stage of the study.

1.4 Summary of Twelve Month Evaluation

The twelve month evaluation suggested that the programme was progressing regarding the retention of participants and programme satisfaction and the results were in line with evaluations of other home visiting programmes, which typically identify few significant effects at this time period. Although there were less significant differences reported between the high and low *PFL* treatment groups at twelve months (81%) than at six months (14%), measures which focus on different aspects of the domains of interest were utilised at each time point. Therefore, it is not possible to make a direct comparison between findings from the two reports on some domains, most notably parenting and home environment.

At twelve months, 6% of the variables measured were statistically significant in the non-hypothesised direction, such that the low treatment group were outperforming the high treatment group on these measures. As the report adopted an acceptance level of 10% regarding statistical significance, it is possible that the 8% of positive findings and the 6% of negative findings were random. The discrepancy in the proportion of significant differences between six and twelve month results is difficult to interpret at this stage and trends in results may become clearer as data collection continues. However, overall these findings are consistent with previous evaluations of home visiting programmes that report limited results at twelve months (Gomby, Curloss, & Behrman, 1999).

The majority of the relationships in the analysis were in the hypothesised direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. We hypothesised that treatment effects would be found in the domains of child health, parenting and maternal health. The results suggested partial support for our hypotheses as there were some significant findings in the domains of child health and maternal health. However, there were no significant results found in the parenting domain at twelve months. Moreover, the programme appeared to have little significant impact on the home environment and household factors/SES. Counter to our hypotheses, significant treatment effects were found in the domains of child development and social support. This is noteworthy as previous studies of home visiting programmes do not report effects in these domains at twelve months. There were findings in the non-hypothesised direction in all domains except social support. Although positive effects for parenting and the home environment were found at six months, no significant effects for child development were found at six months. One potential explanation for the differences between findings at six and twelve months is that many of the measures which were significant at six months were not included in the twelve month survey (e.g. the HOME). While some measures (ASQ, WHO-5 and satisfaction with father involvement, for example) were present in both the six and twelve month surveys, there were a number of measures which were used at six months and not at twelve months and vice versa. In the parenting domain for example, parental locus of control, attachment and stress were measured at six months, whereas at twelve months, the parenting domain consisted of parenting knowledge and parenting attitudes. Therefore, comparing changes in significance on the same measures over time may be a more appropriate means of monitoring changes in the effectiveness of the programme.

Overall, the results of the dynamic analysis reported few significant differences between the high and low treatment groups regarding changes in outcomes between baseline and twelve months and six and twelve months. While 7% of the results were significant in the hypothesised direction, a further 7% were significant in a non-hypothesised direction, overall indicating few improvements across time in parent or child outcomes during the first year of life. Again, few studies identify such significant dynamic effects during this early stage of programme delivery.

With regards to dosage and timing, participants, on average, received 7 home visits between six and twelve months, which is lower than anticipated yet equivalent to the number of visits delivered during the first six months, averaging just over 1 visit per month over the postnatal period. In total, the participants in the high treatment group received an average of 21 visits between recruitment at the 22nd week of pregnancy and when the infant turned twelve months, which represents just over half of all prescribed home visits planned, based on a fortnightly visits. However, there was minimal attrition between six and twelve months (2 participants) and participant satisfaction was high, indicating that while engagement among participants is relatively low, they are satisfied with the level of support they are receiving and they are choosing to remain in the programme.

The results comparing the low treatment groups to the comparison community can be interpreted as confirming the integrity of the RCT design. There were significant differences in the hypothesized direction on 12% of the measures analysed, however there were also effects in the non-hypothesised direction. For example, parents in the low treatment group read more to their children than those in the comparison group, while no significant difference was found in reading between the high and low treatment groups. Similarly, the low treatment group reported better child cognitive functioning than those in the comparison group, while no difference was detected between the high and low treatment groups. These findings suggest that some common programme components, such as the developmental and reading packs may have an impact on both the high and low treatment group participants.

However, as there were a number of results in the non-hypothesised direction in the comparison of the low treatment and comparison groups this suggest that the *PFL* programme is not having a significant impact on most of the outcomes for the low treatment group. This finding echoes the results of the contamination analysis which suggest that despite the high risk of contamination within the community, contamination was not a significant issue at twelve months into the study. As the programme progresses, the evaluation team will continue to test for potential contamination between the treatment groups.

1.5 Evidence on Short-term Effectiveness of Home Visiting Programmes

The six and twelve month reports reviewed the evidence on the effectiveness of home visiting programmes on outcomes observed up to twelve months of age. This section reviews the evidence on outcomes reported between twelve and eighteen months. Few evaluations of home visiting interventions measure or report outcomes for when the infant is eighteen months old, and of those that do, the results are mixed.

Table 1.1 reflects the outcomes from home visiting programmes from twelve to eighteen months postpartum. The primary source of information for the table was the Home Visiting Evidence of Effectiveness (HomVEE) website (http://homvee.acf.hhs.gov/). This site was launched by the U.S. Department of Health and Human Services to conduct a thorough and transparent review of the home visiting research literature and provide an assessment of the evidence of effectiveness for home visiting programme models that target families with pregnant women and children from birth to age five. Trained reviewers evaluated randomised controlled trials and quasi-experimental designs for each model and authors were given the opportunity to respond to missing information.

The table contains results from studies that were rated as either:

(1) High: random assignment studies with low attrition of sample members and no reassignment of sample members after the original random assignment, and single case and regression discontinuity designs that meet the What Works Clearinghouse (WWC) design standards, or
(2) Moderate: random assignment studies that due to flaws in the study design or analysis (e.g. high sample attrition) do not meet the criteria for the high rating, matched comparison group designs, and single case and regression discontinuity designs that meet WWC design standards with reservations.

In addition, the *PFL* evaluation team conducted an extensive literature search according to the criteria outlined by HomVee and added any additional relevant studies. The table consists of findings observed between twelve and eighteen months postpartum from sources after 1989.

Table 1.1 Evaluations of Early Outcomes for Home Visiting Programmes at 12-18 Months.

Outcome	Author	Sample Size	Programme
Child Development & School Readiness	Black, Nair, Kight, Wachtel, Roby &Schuler (1994)	43	Home visiting for drug abusing mothers.
	Wasik, Ramey, Bryant, & Sparling (1990)	62	Project CARE
	Caughy, Huang, Miller, & Genevro (2004)	378	Healthy Steps
	Drotar, Robinson, Jeavons, & Kirchner (2009)	364	Parents as Teachers (PAT)
	Roggman, Boyce & Cook (2009)	161	Early Head Start- Home Visiting
Child Health	Wiggins et al. (2004)	493	Social Support and Family Health Study
	Mackenzie, Shute, Berzins & Judge (2004)	294	Starting Well
	Larson (1980)	115	Pre/Post natal Home Visiting
Positive Parenting Practices	Black et al. (1994)	43	Home visiting for drug abusing mothers.
	Wiggins et al. (2004)	493	Social Support and Family Health Study
	Caughy et al. (2004)	378	Healthy Steps
	Caughy, Miller, Genevro, Huang & Nautiyal. (2003)	378	Healthy Steps
	Larson (1980)	115	Pre/Post natal Home Visiting
Reductions in Child Maltreatment	Silovsky et al. (2011)	105	Project 12-Ways/SafeCare
	Black et al. (1994)	43	Home visiting for drug abusing mothers.
	Nair, Black, Schuler, Keane, Snow & Rigney (1997)	152	Home visits and parent support program, based in Infant Health and Development Program.
Home Environment	Mackenzie et al. (2004)	294	Starting Well
	Larson (1980)	115	Pre/Post natal Home Visiting
	Wasik et al. (1990)	62	Project CARE
	Black et al. (1994)	43	Home visiting for drug abusing mothers.
	Caughy et al. (2004)	378	Healthy Steps
Maternal Health	Silovsky et al. (2011)	105	Project 12-Ways/SafeCare
	Wiggins et al. (2004)	49	Social Support and Family Health Study
	Mackenzie et al. (2004)	294	Starting Well
	Black et al. (1994)	43	Home visiting for drug abusing mothers.
Social support	Wiggins et al. (2004)	493	Social Support and Family Health Study
Household Factors and SES	Silovsky et al. (2011)	105	Project 12-Ways/SafeCare
	Wiggins et al. (2004)	493	Social Support and Family Health Study
Reductions in Juvenile Delinquency, Family Violence, and Crime	Silovsky et al. (2011)	105	Project 12-Ways/SafeCare
Participant Satisfaction	Mackenzie et al. (2004)	294	Starting well

Favourable impact. A statistically significant impact on an outcome measure in a direction that is beneficial for children and parents

	Measures used	Sig. Finding Between 12-18 Months	Effect
	Bayley Scales of Infant Development	None	None
	Bayley Scales of Infant development	None	None
	Attachment Security Q-Sort	None	None
	Attachment Security Q-Sort	None	None
	Attachment Security Q-Sort	Attachment security	Favourable
	Child Injury (i.e. received an injury requiring medical attention), use of health services, hospitalisation, medication, maternal reported infant health, colic, immunisations. Maternal worry about infant health. Infant feeding.	Infants less likely to attend GP, more likely to see health visitor	Favourable
	Child's dental registration status (mother reported)	None	Favourable
	Child Health status: Up-to-date immunisations, emergency room visits, accident rates.	Up to date immunisations	Favourable
	Parenting Stress Index (PSI)	None	None
	Experiences of looking after baby, (easy/difficult), views on child development	None	None
	Nursing Child Assessment by Satellite Training (NCAST) total score, Parent/ Caregiver Involvement Scale (P/CIS)	None	None
	Parental Responses to Child Misbehaviour –modified	Use of inductive/authoritative discipline	Favourable
	Maternal Behaviour Scale	Maternal Behaviour Scale	Favourable
	Post-enrolment referral to child welfare. Child Abuse Potential Inventory (CAPI), Conflict Tactics Scales-Parent-Child (CTS-PC)	None	None
	Child Abuse Potential Inventory (CAPI)	CAPI score	Favourable
	Disruption of care index, i.e. whether the infant received substitute care because of mother's inability to care for infant due to neglect/abuse, incarceration, continued drug abuse or homelessness.	None	None
	Home Observation for Measurement of the Environment; HOME Inventory	Total HOME Score	Favourable
	HOME Inventory	Total score, also provision of play materials,	Favourable
	HOME Inventory	None	None
	HOME Inventory	Total HOME score, Maternal Responsively subscale and Variety Subscale	Favourable
	HOME Inventory	None	None
	Beck Depression Inventory (BDI-2)	None	None
	Maternal Depression (self–report and Edinburgh Postnatal Depression Scale), maternal smoking, maternal health service use, maternal self-rated health, use of medication	None	None
	Edinburgh Post-natal Depression Scale (EPDS)	None	None
	Drug-use status	Drug-free status more likely	Favourable
	Support from partner. Self report 'overall support'	None	None
	Family Resources Scale- Revised (FRS-R)	None	None
	Financial situation compared to before infant birth. Employment	None	None
	Revised Conflict Tactics Scale (CTS2)	None	None
	Maternal satisfaction with levels of health visitor support.	Satisfaction with HV support	Favourable
	Unfavourable or ambiguous impact. A statistically significant impact on an outcome measure in a direction that may indicate potential harm to children and/or parents.		

CHILD DEVELOPMENT

In the area of child development, two studies using the Bayley Scales of infant development at eighteen months reported no difference as a result of the home visiting intervention. One of these was an evaluation of a home visiting intervention for mothers with a drug abuse problem (Black, Nair, Kight, Wachtel, Roby, & Schuler, 1994). The other study evaluated a mixed design programme for children who were at risk of delayed development due to family, educational or social circumstances (Wasik, Ramey, Bryant & Sparling 1990). They reported favourable treatment effects for child development based on a combined home visiting intervention and centre based educational day care, yet there were no significant differences between the home visiting only group and comparison groups.

Three home visiting evaluations measured the child's attachment security, each using the Attachment Q-sort. Neither the evaluation of the Healthy Steps home visiting intervention, assessed between sixteen and eighteen months (Caughy, Huang, Miller & Genevro, 2004) nor the evaluation of Parents as Teachers reported significant treatment effects on attachment (Drotar, Robinson, Jeavons, & Kirchner, 2009). In contrast, an evaluation of Early Home Start reported a favourable effect for infant attachment security (Roggman, Boyce, & Cook, 2009).

CHILD HEALTH

Few studies either report or identify significant child health effects at eighteen months. There were no significant effects regarding reported instances of colic, maternal worry about child's health, injury, hospitalisations, medication, feeding or immunisations. At fourteen months of age, Wiggins et al. (2004) reported that while infants were less likely to be brought to their GP, they were more likely to be seen by a health visitor. Mackenzie, Shute, Berzins & Judge (2004) reported no differences in child dental registration, whereas Larson (1980) found a treatment effect for the level of up to date immunisations. Effects were not found for emergency room visits or accident rates.

PARENTING

Parenting as an outcome of home visiting interventions between twelve and eighteen months was evaluated by parental stress, maternal attitudes towards their child/caregiving and discipline. There were no reported findings for parental stress (Black et al., 1994) or parenting experiences at fourteen months (Wiggins et al., 2004). There were mixed results for Health Steps, with no effects between sixteen and eighteen months for parent involvement or parent-child interaction (Caughy et al., 2004), however there were favourable effects for parental use of authoritative/inductive discipline (Caughy et al., 2003). Larson (1980) reported favourable outcomes for maternal behaviour using the Maternal Behavior Scale included responsiveness, skill in caretaking, maternal attitude toward child, emotional involvement, which appropriateness of maternal behaviour.

REDUCTIONS IN CHILD MALTREATMENT

Mixed results were found for reducing the instance of child maltreatment as a result of home visiting. Black et al. (1994) found a reduction in Child Abuse Potential Inventory scores in an evaluation of a home visiting intervention for women with a drug abuse problem, whereas Silovsky et al. (2011) did not find favourable results for high risk families on the same measure at seventeen months. Furthermore, they did not report effects for parent child conflict or referral to child welfare. Nair, Black, Schuler, Keane, Snow and Rigney (1997) also did not find an effect on disruption of care for the infant.

HOME ENVIRONMENT

Five evaluations used the Home Observation for Measurement of the Environment (HOME Inventory) as a measure of the home environment when the infant was approximately eighteen months old. Three reported favourable outcomes on the total HOME score (Black et al., 1994; Larson, 1980; Mackenzie et al., 2004), whereas two did not (Caughy et al., 2004; Wasik et al., 1990). The provision of play materials, maternal responsivity and variety subscales were identified as areas of positive effect.

MATERNAL HEALTH

There were few favourable findings in the domain of maternal health, with only Black et al. (1994) reporting a reduction in drug use. It is of note that this intervention specifically targeted mothers with a drug abuse problem. Maternal depression, as measured by the Beck Depression Inventory (BDI-2) and Edinburgh Post-natal Depression scale, was not identified as a treatment effect (Mackenzie et al., 2004; Silovsky et al., 2011; Wiggins et al., 2004).

SOCIAL SUPPORT

Only one study measured social support and did not find any favourable outcomes (Wiggins et al., 2004). It is of note that this 'Social Support and Family Health Study' provided social support as one of its key functions.

HOUSEHOLD FACTORS AND SES

Of two studies, neither reported favourable results of home visiting interventions on family finances. There were no changes in family resources at seventeen months or financial situation or employment at fourteen months as a result of home visiting (Silovsky et al., 2011; Wiggins et al., 2004). Silovsky et al. (2011) did not find any effect of the home visiting intervention on the revised conflict tactics scale. This scale measures psychological and physical attacks within a relationship, as well as the use of negotiation.

PARTICIPANT SATISFACTION

An evaluation of Starting Well at eighteen months reported favourable results for client satisfaction. There were no other studies of client satisfaction at eighteen months available.

There are few reported evaluations of home visiting interventions when the infant is eighteen months old. In addition, for studies reporting outcomes at eighteen months there were no effects in the vast majority of domains. There were mixed findings for child attachment security, some positive effects for parental choices for child health, i.e. up to date immunisations and use of appropriate health services. Parents receiving home visiting interventions were also reported to have improved discipline use, maternal behaviour, reduced potential for child abuse and drug use, in at least one study. The most researched outcome at eighteen months was the HOME inventory with 3 of 5 studies reporting favourable outcomes in this domain.

1.6 Hypotheses

The primary aim of the *PFL* Programme is to change parental knowledge, attitudes, and feelings leading to improved parenting behaviour, which will then positively impact on child development, ultimately increasing a child's school readiness. *PFL* also hypothesises that the programme will have an effect on other child and family outcomes (e.g. social support, service use, maternal health and wellbeing). Therefore, *PFL* may affect both primary and secondary outcomes. In effect, secondary outcomes may serve as mediators or explanatory factors that may help to clarify the relationship between the *PFL* Programme and any observed effects on parenting skills or child school readiness.

For the main results (High versus Low Treatment groups), our hypotheses regarding the effectiveness of the *PFL* Programme at eighteen months of age are informed by the evidence described above on the early impact of home visiting programmes. Results from previous studies indicate that at eighteen months home visiting programmes have limited positive effects on child health and development. Consistent with these findings we expect that the impact of *PFL* at eighteen months also will be limited. Regarding child health, based on the results from similar programmes, we hypothesise that *PFL* children may be more likely to see a health care provider. Previous studies suggest that home visiting has limited impact on parenting outcomes. We expect to find limited findings in this domain. Similarly given that several home visiting programmes found positive effects on the home environment, we expect similar *PFL* programme results, most notably in the areas of play materials, parental responsivity and variety. Consistent with

other studies we expect to see limited programme effects in the realms of maternal health, SES and social support. Consistent with the evaluation design, we expect to find few significant differences between the low treatment group and comparison group.

Given previous findings from the literature our hypotheses for results at eighteen months are as follows:

- Children in the high treatment group will be more likely to see a health care provider.
- Mothers in the high treatment group will be more likely to use appropriate forms of discipline.
- Those in the high treatment group will be more likely to have a safe and developmentally appropriate home environment for their children.
- For the comparison group analyses, there will be few significant differences in the outcomes of the low treatment group and the comparison group.

1.7 Description of Eighteen Month Survey & Data Collection Process

Between January 2010 and October 2012, a fifth research interview was conducted by the *PFL* Evaluation Team, within two weeks before or two months after each *PFL* child reached eighteen months of age. In total, 225 eighteen month interviews (n*Low* = 74; n*High* = 80; n*Comp* = 71) were completed. The average age of the target child at time of completion was 18.3 months old (*SD*= 2.7 weeks). Two *PFL* participants (n*Low* = 2) dropped out of the evaluation after completing the baseline, six and twelve month interviews, but prior to completing an eighteen month interview, while one *PFL* participant reengaged with the programme (n*High* = -1). There were no comparison group dropouts between the twelve and eighteen month time points. Fifty participants in total dropped out prior to the eighteen month interview. A comprehensive analysis of attrition rates may be found in Chapter 5 of this report.

The eighteen month interviews lasted approximately one to one and a half hours and were conducted using a Computer Assisted Personal Interviewing (CAPI) technique on tablet laptops. The interviews were conducted by trained interviewers who were blinded to participant treatment status. Immediately prior to the interview, participants were asked to complete the MacArthur-Bates Communicative Development Inventory (CDI) on paper. Although home interviews were encouraged, participants had the option of conducting the interview either in her home or in a local community centre. The majority of participants completed the interview in their homes (80.0% high treatment group, 83.8% in the low treatment group, and 94.4% in the comparison community). Each participant was given a €20 shopping voucher after the eighteen month interview was completed as a thank you for taking the time to complete the interview.

During the interview the interviewer asked some of the questions that were asked previously as well as several new questions, particularly in relation to the *PFL* child. The repeated questions included family demographics and socio-economic profile, maternal physical and psychological health, substance use by the mother, family risk factors, parenting knowledge, use of childcare, child motor skills, cognitive development, behavioural and emotional functioning, temperament, and social emotional development, child health and routines. Questions new to the eighteen month questionnaire included items related to parenting stress, separation anxiety, social support, self-control, and deprivation.

The eighteen month survey was divided into nine modules, each containing questions with a common theme.

1. Your Child's Development: Part 1
2. Update on Your Life
3. Your Health
4. Your Social Support Network
5. Your Child's Development: Part 2
6. Your *PFL* Child & Other Children
7. Your Thoughts on Parenting
8. Your Home Environment
9. Closing

Similar to the six and twelve month report, this report focuses on eight domains incorporating 27 categories and 152 outcome measures. The domains and categories within each domain are – child development (Ages Stages Questionnaire, Brief Infant Toddler Social and Emotional Assessment, MacArthur-Bates Communicative Development Inventory, Developmental Profile-3, and special services child is receiving), child health (child physical health, mother's health decisions for her child, and diet), parenting (Parenting Daily Hassles Scale, Maternal Separation Anxiety Scale, and activities with child), home environment (Household Material Deprivation, Framingham Safety Survey, Home Observation for Measurement of the Environment (HOME) and Supplement to the HOME for Impoverished Families (SHIF), Difficult Life Circumstances, and social worker involvement), maternal health and wellbeing (maternal physical health, maternal mental health, current substance use, Edinburgh Postnatal Depression Scale, Rosenberg Self-Esteem Scale, and Baumeister Self-Control Measure), social support (father involvement, social support measures), childcare (childcare measures), and household factors and socioeconomic status (household factor measures, parental education, maternal employment, paternal employment, household finances and expectations of future finances). Note that while the same domains as the six and twelve month report are reported, the measures included in each domain may differ as different questions are asked in sequential interviews.

1.8 Aims and Overview of Report

The aims of this report are threefold. First, to determine whether the *PFL* programme had an impact on parent and child outcomes at and before eighteen months, second, to examine the impact of the programme on changes in mother and child behaviour over time through a dynamic analysis comparing outcomes at baseline, six months, twelve months and eighteen months, and third, to provide a detailed review of implementation practices in the *PFL* programme regarding attrition, dosage, and participant engagement.

The report is organised as follows. Chapter Two presents the results comparing the *PFL* high treatment group and the *PFL* low treatment group on all primary outcome domains (child development, child health, parenting) and secondary outcome domains (home environment, maternal health and wellbeing, social support, childcare, household factors and socio-economic status). Chapter Three presents a summary of the results comparing the *PFL* low treatment group to the community comparison group and a summary of the results from the dynamic analysis which examines changes in child and parent outcomes over time. Chapter Four presents an implementation analysis of the *PFL* Programme between programme intake and eighteen months. Chapter Five summarises and concludes the results from the impact and implementation analyses.

Chapter Two

Main Results
High and Low Treatment Groups

2.1 Introduction

This chapter presents the main results comparing the eighteen month outcomes of the high treatment group to those of the low treatment group. As there were no statistical differences, on average, between these groups before the programme began, any identified statistical differences between the two groups at eighteen months are indicative of a programme effect. The analysis focused on eight main domains – child development, child health, parenting, home environment, maternal health and wellbeing, social support, childcare and household factors and socioeconomic status. Although the six, twelve and eighteen month reports contain the same overarching eight domains, measures which focus on different aspects of these domains were utilised at each time point. Therefore, it is not always possible to make a direct comparison between the findings from the three reports on some domains unless the same measures are used. This chapter contains relevant literature for the new measures which were not included in the six and twelve month reports, and considers the relevance and impact of previous home visiting programmes on these measures at eighteen months. Each section also includes a description of the instruments used to measure the domain and the statistical results, in both text and table format, comparing the high and low treatment groups on that domain. Each section should be read in conjunction with the corresponding section in Chapter 3 of '*Preparing For Life* Early Childhood Intervention: Assessing the Early Impact of *Preparing For Life* at Six Months' and Chapter 2 of '*Preparing For Life* Early Childhood Intervention: Assessing the Impact of *Preparing For Life* at Twelve Months' as these will be referenced where relevant. These reports can be found at the following website under publications: http://geary.ucd.ie/preparingforlife.

The chapter proceeds as follows: Section 2.2 describes the methods used to conduct the analyses and information on how to interpret the outcomes tables presented in the report. Sections 2.3 to 2.11 present the results for each of the eight main domains under analysis.

2.2 Methods & Description of Outcome Tables

A full description of the methodology used to analyse each wave of outcomes data may be found in '*Preparing For Life* Early Childhood Intervention; Assessing the Early Impact of *Preparing For Life* at Six Months'. It describes the permutation method used for hypothesis testing[1], including conditional permutation testing, the step-down procedure which is used for multiple hypotheses testing, and the procedure for dealing with missing data[2].

[1] Note that due to an improvement in computing power, the permutation testing is now conducted with 100,000 replications.

[2] Overall, the extent of missing information in the eighteen-month data is very low; less than 4.0 per cent of data were missing for each psychometric scale, with the majority of scales missing less than 1% of data. In order to account for missing data, interpolation methods were used. Note that such methods were only used for standardised psychometric scales, as it is possible to utilise information within that scale to replace the missing data. in cases where data were missing on single item measures, observations with missing data were excluded from the analysis. On average, 99 per cent of data were present for single item measures.

The following information is included in the outcomes tables presented in this report and provides a reference for interpreting the results.

N	*N* represents the number of respondents who are included in the analysis.
M	*M* is the mean, or average value, of responses. This statistic represents the average response of all participants who answered the question of interest. For binary variables, this value can be interpreted as the proportion of the sample who reported being in the category described.
SD	*SD* is the standard deviation. This is calculated by summing the difference between each observed response and the average response. This sum is then divided by the total number of observations to derive the average difference between responses and the mean. It serves as a useful indication of how varied the responses were.
Low/High/ LFP	*Low/High/LFP* subscripts attached to the summary statistics *(N, M, and SD)* indicate the subgroups for which the summary statistics have been calculated.
Individual Test *p*[1]	The individual *p-value* represents the probability of observing differences between two groups by chance. In cases where there is a statistically significant difference between the two groups, a *p-value* is presented which indicates the likelihood that the group difference could have randomly occurred. A *p-value* of less than .10 is considered to be statistically significant. A *p-value* of less than 0.10 (10%), 0.05 (5%), and 0.01 (1%) conveys that the probability that the difference between the two groups is due to chance is less than 10%, 5%, or 1% respectively. Given that this is a eighteen month comparison, low *p-values* (i.e., significant results) would be a positive outcome indicating that the high treatment group is outperforming the low treatment group, and the *PFL* groups are outperforming the comparison group. *p-values* are presented for significant differences only. Non-significant differences are denoted by *ns*. A significant result in the non-hypothesised direction is denoted by *s~*. Classical statistical tests rely on the assumption that sample sizes are large, and produce inferences based on *p-values* that are only valid for large samples. These tests can be unreliable when the sample size is small. As the sample size of *PFL* is relatively small, all the analyses comparing the eighteen month outcomes of the high treatment, low treatment and comparison groups use an alternative approach called Permutation-based hypothesis testing. This approach has been found to be appropriate for small samples and was used to analyse data for a similar evaluation of the Perry Preschool Program by Heckman and colleagues (2010).
Step-down Test *p*[2]	As 152 outcome measures are considered in this report, it is possible that we may reject some of these null hypothesis by chance (i.e. we may identify a significant difference between the high and low treatment groups on certain outcomes when there is, in fact, no significant difference). Multiple hypothesis testing allows us to test for the joint significance of multiple outcomes at the same time, thus minimising the likelihood of finding treatment effects that are false. The multiple hypothesis method we use is called the Step-down procedure. To illustrate the Step-down procedure, consider the null hypothesis of no treatment effect for a set of, say, *K* outcomes jointly. The complement of the joint null hypothesis is the hypothesis that there exists at least one hypothesis out of *K* that we reject. We apply the analysis of Romano and Wolf (2005) and its extension by Heckman et al., (2010). Their methods control for overall error rates for vectors of hypothesis using family-wise error rate (FWER), the probability of yielding one or more false positives out of a set of hypotheses tests, as a criterion. The *p-value* from the Step-down test may be interpreted in the same manner as the individual *p-value* discussed above. Each *p-value* in the Step-down test represents the joint test of all outcomes included in that category. For example, the *p-value* corresponding to the first outcome in that category represents a test of the joint significance of all outcomes included in that category. The next *p-value* corresponding to the second outcome in that category represents the test that all remaining outcomes in that category are jointly significant, excluding the first outcome in that category. Similarly, the *p-value* corresponding to the third outcome in that category represents a test of the joint significance of all the outcomes remaining in that category, excluding the first two outcomes. Note that all outcomes in the tables are organised according to their individual *p-values*, such that the measure with the smallest *p-value* is listed first and the outcome with the highest *p-value* is listed last within that category. Thus, the ordering of the outcomes in the tables (within categories) is indicative of the strength of the treatment effects.
Effect Size *d*	Effect size (d) illustrates the magnitude of the difference between the groups. While the *p-value* allows the reader to determine whether or not there is a statistically significant difference between groups, it does not indicate the strength of the difference. As the strength of a relationship can provide valuable information, the effect size was calculated using Cohen's d. A Cohen's d ranging from 0.0 to 0.2 is deemed a small effect; values ranging from 0.2 to 0.8 represent a medium effect; and values greater than 0.8 illustrate a large effect (Gravetter & Wallnau, 2004).

2.3 Child Development

Understanding the various domains and the processes of child development is necessary for promoting healthy development and for identifying areas where further support is required (Sheridan, 2004). All children develop at different rates with some children developing slower than others. The majority of children will catch up with time, however there may be an underlying problem that is causing their delayed development (Sheridan, 2004). Outlines of developmental milestones allow us to track child's development. Understanding the positive and negative influences on child development, and the strategies for fostering positive development are fundamental for interventions that engage parents (OPRE, 2011).

The term 'toddler' is commonly applied to children around eighteen months as they are beginning to learn to how walk (Carr, 2006). A child of this age is experiencing a lot of change and there is much variation in children's skills and abilities. Some eighteen month old toddlers are in the process of toilet training whereas others have not yet begun, some have a large repertoire of words and are putting two words together whereas others are still using basic gestures to communicate their needs. Between twelve and eighteen months children become more mobile, gaining a sense of independence and control over their environment. A child's development is influenced by heredity, social and environmental factors. At this age environmental and social factors begin to have a very strong influence. In this section we will describe different areas of development and review the impact of home visiting interventions on each area of development.

PHYSICAL DEVELOPMENT

Physical development is usually considered in terms of gross motor and fine motor skills. Gross motor skills refer to movements involving large muscles, such as leg muscles for walking. Fine motor skills refer to movements involving smaller muscles, such as writing (Bartolla & Shulman, 2009). Physical development is not only important for gross and fine motor skills, it is suggested to be a prerequisite for the acquisition of other developmental functions such as perceptual or cognitive ability (Bushnell & Boudreau, 1993).

GROSS MOTOR SKILLS

In terms of gross motor milestones one of the most significant developments is that by eighteen months of age most children are able to walk steadily and stop safely, even while carrying an object (Meggit, 2007). They often can run carefully, but find difficulty in negotiating obstacles in their path (Sheridan, 2004). Most children can also climb up and down stairs when aided by an adult or railing (Meggit, 2007). However there is still enormous variation among children at this age with some children not taking their first independent steps until they are eighteen months (WHO Multicentre Growth Reference Study Group, 2006).

FINE MOTOR SKILLS

Fine motor skills measured at eighteen months include a delicate pincer grasp to pick up very small objects and children are often able to use a spoon to feed themselves (Meggit, 2007). By fifteen months, most children have developed precision reaching, which is a task for which vision plays a critical role (Carrico & Berthier, 2008). Leading on from this skill, most children of eighteen months can build a tower with three or more cubes (Carr, 2006).

COGNITIVE DEVELOPMENT, PROBLEM SOLVING, COMMUNICATION & LANGUAGE

It is difficult to elicit milestones for cognitive development as children's acquisition of concepts depends on their experiences and own individual pattern of development (Tassoni et al., 2002). Between twelve and fifteen months children are shown to seek out hidden objects in the most likely places (Beaver et al., 1999). They are still exploring using the trial and error methods but begin to investigate new ways to achieve purposes, such as knocking over a container to see what is inside (Bartolotta & Shulman, 2009). They begin to treat objects in the appropriate ways, like cuddling a doll and talking on a play telephone (Beaver et al., 1999). At eighteen months they begin to understand the consequences of their own actions, for example that pouring juice makes a wet patch (Beaver et al. 1999). They begin to point to indicate desire and follow

when others point (Meggit, 2007). They can take out objects one by one from a container, points of parts of the body, scribble and point to a named picture (Tassoni et al., 2002).

At eighteen months a child's verbal language skills are beginning to emerge and many children of this age can use 6-40 recognisable words and they can understand much more (Meggit, 2007). However a child's words can often mean more than one thing depending on the intonation they use (Tassoni et al., 2002). They also begin to use two word combinations and try to 'tell' stories (Owens, 2008). Many children at eighteen months can understand and obey simple instructions such as 'shut the door' (Meggit, 2007). However variations in language and communication abilities in early childhood are common (Carr, 2006). Scores on communication measures among children aged thirteen to twenty-one months have showed that typical development seems to be nonlinear and does not occur at a constant rate (Darrah et al., 2003).

PERSONAL, SOCIAL AND EMOTIONAL DEVELOPMENT

This refers to a child's ability to engage effectively in social interactions to perceive and interpret social cues accurately, and to regulate emotional responses (Denham et al., 2003). Toddlers of eighteen months often show an awareness of their own emotional responses and an increased ability to verbally express their emotional state (Carr, 2006). They often show an increased desire for independence and they show irritability when parents place limits on their expression of their needs for autonomy and exploration. This irritability is often referred to as the 'terrible twos' as their frustration occasionally causes temper tantrums (Carr, 2006; Meggit, 2007). They begin to develop a recognisable character and personality of their own (Meggit, 2007). Around eighteen months young children also start to choose gender-stereotyped toys (Tassoni et al., 2002). Toddlers can show signs of rudimentary empathy towards others, for example sympathy for someone who is hurt (Carr, 2006). They are emotionally still very dependent upon their familiar adult using them as a secure base; however they often alternate between clinging and resistance (Ainsworth et al., 1978; Sheridan, 2004).

HOME VISITING INTERVENTIONS

Many home visiting interventions similar to *PFL* do not record children's development at eighteen months and so many studies are not comparable at this time point. From the few that exist, there have been limited effects in terms of child development improvements (Anisfeld et al., 2004; Caughy et al., 2004; Drotar et al., 2009; Roggman, Boyce & Cook, 2009). Toddlers from the Early Head Start program showed an increase in secure base behaviour from fourteen to eighteen months, whereas the comparison toddlers did not (Roggman et al., 2010). These results suggest that the Early Head Start program had a positive effective on the children's emotional wellbeing and their secure attachment to their caregivers. Other studies which assess child development outcomes at eighteen months found no significant programme effects (Anisfeld et al., 2004; Caughy et al., 2004; Drotar et al., 2009).

2.3.1 Child Development Instruments

AGES AND STAGES QUESTIONNAIRE

Child development in the *PFL* evaluation was assessed using the eighteen month version of the Ages and Stages Questionnaire (ASQ; Squires et al., 1999). The ASQ was designed as an effective screening measure for young children who were considered to be at risk for developmental delay. The ASQ child monitoring system consists of 19 screening questionnaires at specific age intervals ranging from four to sixty months of age and provides scores across five domains of child development, with each domain comprising six items. Communication (α=0.64) measures the child's babbling, vocalisation, listening and understanding. The gross motor domain (α=0.78) measures the child's arm, body and leg movements. The fine motor domain (α=0.31) assesses the child's finger and hand movements. Problem solving (α=0.48) measures the child's learning and playing with toys. Finally, the personal-social domain (α=0.28) provides a rating of solitary social play with toys and other children. During the interview, the interviewer asked the participant questions related to different activities the child is capable of. The participant responded by indicating if her child exhibits the behaviour regularly, sometimes, or not yet. If the participant did not know whether her child was capable of the behaviour, where appropriate, the interviewer asked her to test the behaviour

during the interview using the ASQ toolkit. Domain scores represent the sum of all six items in that domain, resulting in a possible range of 0 to 60 with higher scores indicative of more advanced development. One participant was close to 20 months of age, completed the 20 month version of the ASQ.

In addition the ASQ provides age-specific standardised cut-off points for each domain (communication=23.0; gross motor=41.5; fine motor=39.5; problem solving=33.0; and personal-social=37.0). In line with these cut-off scores, a binary variable was calculated for each domain illustrating if the child scored below the cut-off point. Those children who scored below the cut-off point on a domain are considered to be at risk of developmental delay in that domain. Furthermore, an ASQ standardised total score was calculated by creating a standardised score, with a mean of 100 and standard deviation of 15, for each domain. These standardised scores for communication, gross motor, fine motor, problem solving and personal-social were then summed and standardised again, to a mean of 100 and standard deviation of 15, to produce the ASQ standardised total score.

AGES AND STAGES QUESTIONNAIRE: SOCIAL-EMOTIONAL

Children's social-emotional development was assessed using the Ages and Stages Questionnaire: Social-Emotional (ASQ:SE; Squires, Bricker, & Twombly, 2003). The ASQ:SE (α=0.72) is a screening tool used alongside the ASQ to identify children from six to sixty months of age who are in need of further social and emotional behavioural assessment. Questions on the ASQ:SE pertain to self-regulation, compliance, communication, adaptive functioning, autonomy, affect, and interaction with people. During the interview, the interviewer asked the participant questions related to different behaviours the child displays. The participant responded by indicating if her child exhibited the behaviour most of the time, sometimes, or never. Additionally, the participant indicated if the behaviour was a concern for her. Scores to each item were rated on a 0 to 10 scale and an additional five points was added to the score for every indication that the behaviour was a concern for the participant. Scores were summed to provide a total ASQ:SE score, with a possible range of 0 to 285. Higher scores indicated that the child may be at risk of poor social-emotional development. In addition, the ASQ:SE provides a cut-off score of 50 and suggests that children with scores above this cut-off may be at risk. In line with this cut-off score, a binary variable was calculated to illustrate if the child was at risk of poor socio-emotional development.

MACARTHUR-BATES COMMUNICATIVE DEVELOPMENT INVENTORIES: WORDS AND GESTURES (CDI-WG)

The MacArthur-Bates Communicative Development Inventories: Words and Gestures (CDI-WG; Fenson et al., 2000) *short form* is a parent report instrument for assessing language and communication skills in children. It provides norms for children aged eight to eighteen months of age. The CDI inventories measure a range of early communicative and representational skills that are related to language development in typically developing and language-delayed children. The CDI-WG consists of three sections; first signs of understanding, first communicative gestures, and a vocabulary checklist, and a single question asking the participants whether the child can combine words.

Participants were asked to complete the CDI-WG with pen and paper before beginning the main part of the interview. The first section, first signs of understanding, contained 3 questions with the response options yes or no. In the second section, first communicative gestures, there were 12 questions with the response options *not yet*, *sometimes* and *often*. The final section contained an 89-word vocabulary checklist with 3 separate columns; understands, understands and says and does not understand or say. The individual question was a binary variable with a yes or no response asking the parents whether the child can combine words. First signs of understanding (α=0.88), and first communicative gestures (α=.65) each produced a summed raw score. The vocabulary checklist columns understands and understands and says provided 2 scores: words understood (α=.97) and words produced (α=.98). For children under eighteen months of age when the interview was conducted, these variables were then normed by age and gender, according to Fenson et al. (2000). In total, the CDI produces five scores.

BRIEF INFANT-TODDLER SOCIAL AND EMOTIONAL ASSESSMENT (BITSEA)

The Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2006) is a 42-item screening tool for social-emotional/behavioural problems and delays in competence in children aged twelve months to thirty-six months. This version is a shortened version of the Infant-Toddler Social and Emotional Assessment (ITSEA). The BITSEA yields a Problem score (α=0.85) and a Competence score (α=0.64). Problem behaviour items include externalising (6 items), internalising (8 items) and dysregulation problems (8 items). Competencies include areas of attention, compliancy, mastery, motivation, pro-social peer relations, empathy, play skills and social relatedness (11 items). The interviewer asked participants to verbally rate each item on a 3 point scale (0=not true/rarely, 1=somewhat true/sometimes, 2=very true/often). Items were summed to obtain a total score, with higher Problem scores indicating greater levels of social-emotional or behavioural problems and lower Competence scores indicating possible delays/deficits in competence. These scores were normed by child gender. In addition, the BITSEA provides cut-off scores which indicate a 'Possible Problem' (25th percentile) or 'Possible Deficit/Delay' (15th percentile) respectively. There are different cut-off scores for different ages: twelve to seventeen months, eighteen to twenty-three months, twenty-four to twenty-nine months and thirty to thirty-six months. At eighteen months, the cut-off scores are a score greater than 13 for girls and 15 for boys for the Problem score; and less than 14 for both boys and girls for the Competence score, which suggest that children with scores above/below these cut-offs respectively may be at risk. In line with these cut-off scores, binary variables were calculated to illustrate if the child was displaying potential problem or competence difficulties.

DEVELOPMENTAL PROFILE 3- COGNITIVE SECTION

The Developmental Profile 3 (DP-3; Alpern, 2007) is a parent report measure of child development from birth to age twelve years and eleven months. The *PFL* evaluation included the DP-3 cognitive section which measures cognitive abilities in an indirect manner (α=0.80). This is a 38 item scale, starting at number 1 and continuing until the stop rule is satisfied (i.e. when five consecutive no responses are recorded). Each of the items refer to tasks which require cognitive skill and are arranged in order of difficulty, for example, 'When an adult points to something, does the child usually look where the adult has pointed?'. For each item, participants were asked whether their child had carried out the task and responded yes or no accordingly. The Yes responses were tabulated to create a continuous score whereby higher values indicated greater cognitive development. These scores were standardised to a mean of 100 and standard deviation of 15, to produce the DP3 standardised score. In addition, a binary variable was created to indicate those above the average score, that is, a score of above 115.

SERVICES RECEIVED

Participants were asked yes/no if their child was receiving any special services, specifically any services to help their child catch up in any area such as speech or physical development.

2.3.2 Child Development Results

Table 2.1 presents the results comparing the high and low treatment groups on the child development domain.

ASQ SCORES

Within the ASQ Scores category, five of the six child development measures were in the hypothesised direction and one of these, ASQ Gross Motor Score, was statistically significant. The high treatment group scored an average of 56.31 on this subscale while the low treatment group scored an average of 53.72 (p<.05, d=.28) indicating that children in the high treatment group were more likely to display developmentally appropriate movement skills (e.g. walking and kicking) than children in the low treatment group. The step-down test showed that the joint effect of all six measures in the ASQ Scores category was not statistically significant.

ASQ CUT-OFF SCORES

Within the ASQ Cut-off Scores category, which measures the proportion of children at risk of development delay, five of the six measures were in the hypothesised direction. Two of these differences were statistically significant. 3% of children in the high treatment group were at risk of developmental delay in gross motor skills, compared with 9% of children in the low treatment group ($p<.05$, $d=.30$). Also, 1% of the high treatment group were at risk of delay in personal social development, whereas 7% of the low treatment group were reported to be at risk ($p<.05$, $d=.29$). The step-down test showed that the joint effect of all six measures in the ASQ Cut-off Scores category was not statistically significant.

COMMUNICATIVE DEVELOPMENT INVENTORY (CDI)

Within the CDI category, two of the three variables were in the hypothesised direction. Neither of these was statistically significant. Furthermore, the step-down test showed that the joint effect of all three measures in the CDI category was not statistically significant.

COMMUNICATIVE DEVELOPMENT INVENTORY (CDI) NORMS

Within the CDI Norms category neither of the two variables were in the hypothesised direction or statistically significant. Furthermore, the step-down test showed that the joint effect of both measures in the CDI Norms category was not statistically significant.

BITSEA

Within the BITSEA category one of the two measures was in the hypothesised direction but was not statistically significant. In addition, the step-down test showed that the joint effect of the BITSEA scores was not statistically significant.

BITSEA CUT-OFF SCORES

Within the BITSEA cut-off score category one measure, the BITSEA Competence Cut-off score, was in the hypothesised direction. This difference was not statistically significant. Furthermore the step-down test showed that the joint effect of the BITSEA cut-off scores was not statistically significant.

NON STEP-DOWN MEASURES

All of the four non step-down measures were in the hypothesised direction. There was one statistically significant difference between the high and low treatment groups. The high treatment group scored an average of 119.01 on the DP-3 cognitive development scale, compared to the low treatment score of 114.57 ($p<.10$, $d=.27$). This indicates that the high treatment group were displaying more advanced cognitive abilities, than the low treatment group.

Table 2.1 - Results for High and Low Treatment Groups: Child Development

	Variable	*N*	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size *d*
ASQ Scores										
	ASQ Gross Motor Score	154	(80/74)	56.31	(5.44)	53.72	(12.02)	$p<.05$	ns	0.28
	ASQ Personal Social Score	154	(80/74)	50.88	(7.91)	49.46	(9.24)	ns	ns	0.17
	ASQ Fine Motor Score	154	(80/74)	54.13	(8.26)	53.38	(8.28)	ns	ns	0.09
	ASQ Problem Solving Score	154	(80/74)	45.69	(11.60)	45.14	(10.63)	ns	ns	0.05
	ASQ Communication	154	(80/74)	45.69	(13.16)	45.34	(13.96)	ns	ns	0.03
*	ASQ Social-Emotional Score	154	(80/74)	29.13	(19.92)	29.05	(31.84)	ns	ns	0.00
ASQ Cut-off scores										
*	ASQ Gross Motor Cut-off	154	(80/74)	0.03	(0.16)	0.09	(0.29)	$p<.05$	ns	0.30
*	ASQ Personal Social Cut-off	154	(80/74)	0.01	(0.11)	0.07	(0.25)	$p<.05$	ns	0.29
*	ASQ Fine Motor Cut-off	154	(80/74)	0.06	(0.24)	0.08	(0.27)	ns	ns	0.07
*	ASQ Problem Solving Cut-off	154	(80/74)	0.14	(0.35)	0.15	(0.36)	ns	ns	0.03
*	ASQ Communication Cut-off	154	(80/74)	0.06	(0.24)	0.07	(0.25)	ns	ns	0.02
*	ASQ Social-Emotional Cut-off	154	(80/74)	0.15	(0.36)	0.11	(0.31)	ns	ns	0.12
Communicative Development Inventory (CDI)										
	First Signs of Understanding	148	(76/72)	2.99	(0.11)	2.94	(0.37)	ns	ns	0.16
	Can Combine Words	138	(71/67)	0.69	(0.47)	0.66	(0.48)	ns	ns	0.07
	First Communicative Gestures	154	(79/75)	11.25	(1.37)	11.39	(1.23)	ns	ns	0.10
Communicative Development Inventory (CDI) Norms										
	Vocabulary Words Produced NORM	126	(62/64)	54.34	(27.85)	54.38	(30.37)	ns	ns	0.00
	Vocabulary Words Understood NORM	126	(62/64)	63.95	(30.65)	68.94	(27.83)	ns	ns	0.17
Brief Child-Toddler Social and Emotional Assessment (BITSEA)										
	BITSEA Competence Score	154	(80/74)	17.85	(2.61)	17.59	(3.45)	ns	ns	0.08
*	BITSEA Problem Score	154	(80/74)	9.44	(6.63)	9.14	(7.18)	ns	ns	0.04
BITSEA Cut-off scores										
*	BITSEA Competence Score Cut-off	154	(80/74)	0.11	(0.32)	0.16	(0.37)	ns	ns	0.15
*	BITSEA Problem Score Cut-off	154	(80/74)	0.24	(0.43)	0.24	(0.43)	ns	ns	0.01
Non Step-down Measures										
	ASQ Standardised Total Score	154	(80/74)	100.82	(14.35)	97.92	(17.64)	ns	-	0.18
	DP3: Cognitive Development Standardised Score	154	(80/74)	119.01	(15.83)	114.57	(17.81)	$p<.10$	-	0.27
	DP3: Cognitive Development Above Average Cut-Off	154	(80/74)	0.66	(0.48)	0.58	(0.50)	ns	-	0.17
*	Child receiving special services	154	(80/74)	0.03	(0.16)	0.04	(0.20)	ns	-	0.88

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) *p* value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) *p* value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.4 Child Health

One of the main aims of many intervention programmes is to improve child health through activities designed to support families, coupled with access to enhanced community-based resources for parents and their children (MacKenzie, Shute, Berzins & Judge, 2004). People living in disadvantaged areas suffer disproportionately from preventable health conditions, such as asthma, type 2 diabetes, dental morbidity, and injuries (Komro, Flay & Biglan, 2011). The findings from home intervention studies regarding child health are limited at eighteen months as many programmes do not record findings at this time period.

PHYSICAL HEALTH

From twelve to eighteen months, children are becoming more stable in their walking and running, however falls, physical accidents and injuries may still occur. Elkan et al. (2000) reviewed evidence from home visiting programmes and concluded that advice given during home-visiting interventions has the potential to reduce the frequency of childhood injury (as discussed in Bull, 2004). One study has shown that during the second year of life, children involved in a home visiting programme were seen fewer times at doctors/ emergency departments due to accidents and injuries (Kitzman et al., 1997).

Many other factors can also affect a child's physical health. The contraction of illnesses and even the subsequent use of medication such as antibiotics can have implications for future child health (Cole Johnson et al., 2005; Marra et al., 2006). The 'Starting Well' project in Scotland found that children were more likely at eighteen months to be registered with a dentist (MacKenzie et al., 2004). Furthermore, at fourteen months parents of children in a social support and family health study were shown to visit their GP less than socio-economic matched controls, however they had an increase in the use of NHS health visitors and social workers (Wiggins et al., 2004).

IMMUNISATIONS

In Ireland, vaccines for Meningococcal C and the flu are scheduled for thirteen months. Afterward there are no scheduled vaccines until the child reaches 4 or 5 years of age (www.citizeninformation.ie). There are few recent studies which directly address the impact of home visiting programmes on immunisation rates at eighteen months. However, Larson (1980) found that home visits during pregnancy and after birth had a modest impact on the immunisation rates of children in a Canadian sample (Larson, 1980).

CHILD FEEDING

Appropriate nutrition levels and feeding behaviours are critically important to maintain good physical development and health not only in infancy but also in adulthood (Grantham-McGregor, Walker & Chang, 2000, Twomey, Kiberd, Matthews & O'Regan, 2000). The WHO recommends that breastfeeding continues alongside appropriate complementary foods up to two years of age or beyond (WHO, 2009). However, most children in Ireland are weaned between three and four months of age and children are introduced to a full and varied diet within their first year of life (Twomey et al., 2000). Feeding difficulties can affect child nutrition. However, research has shown that giving appropriate foods, such as lumpy rather than pureed foods early in infancy, can result in less feeding difficulties at fifteen months (Chan, Magarey & Daniels, 2011; Northstone et al., 2001). Furthermore, exposure to fruit and vegetables before two years of age has been shown to be predictive of variety of food intake at school age, and this effect is stable between two and eight years of age (Skinner, Carruth, Wendy & Ziegler, 2002). Toddlers need to consume a healthy diet consisting of the right amounts of dairy, fruit/vegetables, grains, fats and protein (Gottesman, 2002). There is some evidence that home visiting programmes have a positive effect on children's diet, however there are no known evaluations that measure the impact of interventions on child diet at eighteen months (Elkan et al., 2000).

CHILD WEIGHT

Weight is a contemporaneous indicator of general health and nutrition. It reflects the combined effects of energy intake (food and diet) and energy output. At eighteen months it is suggested that an average girl weights around 10.2kg and an average boy weights 10.9kg (WHO growth charts: http://www.cdc.gov/

growthcharts/who_charts.htm). There are no known evaluations measuring the impact of home visiting on children's weight at eighteen months.

2.4.1 Child Health Instruments

GENERAL HEALTH

A number of variables were used to assess child health. A variable representing the overall general health of the child was asked with response options given on a five point scale ranging from excellent to poor. This measure was dichotomised to create a binary variable denoting whether the child had ill health (poor, fair) or not (good, very good, excellent). The number of health problems the child had in the last six months was assessed by asking the participant whether her child had ever been taken to the GP, Health Centre, or Casualty for any problems on a list of 13 possible options. A variable denoting the total number of health problems the child had was created by summing the number of child health problems endorsed by the mother. Three binary variables were created to determine whether the child had a chest infection or asthma in the last six months and whether the child had an accident in the last six months. A binary variable was also created based on whether or not the child had ever stayed overnight in hospital in the last six months for any illness.

MOTHER'S HEALTH DECISIONS FOR HER CHILD

Participants were asked about the vaccinations their child had received. A binary variable was created denoting whether the child had received all recommended vaccinations up until thirteen months. In addition, a binary variable was created indicating whether the child had ever received the swine flu vaccine. Participants were asked if they knew their child's current weight, and if so, what it was. A binary variable was created to indicate whether the mother knew her child's weight or not, and a variable of child weight (in kilograms) was created.

APPROPRIATE FOOD

Participants were asked how often their child ate grains, dairy, protein, fruit, vegetables, and other foods (including sugars and fats, sweets, crisps etc.). These were scored as a continuous variable with 1 representing 'never' up to 9 representing 'more than six times a daily'. The sugars and fats category was reverse scored to indicate that more of these foods was not beneficial.

2.4.2 Child Health Results

CHILD HEALTH IN LAST 6 MONTHS

Five of the six measures in the Child Health in Last 6 months category were in the hypothesised direction and two were statistically significant. 1% of children in the high treatment group were reported to have stayed in hospital for at least one day, compared with 9% of the low treatment group ($p<.01$, $d=.38$). Also, 94% of the children in the high treatment group were scored as having good, very good or excellent health, compared to 84% of the low treatment group ($p<.05$, $d=.32$). Overall, the step-down test showed that the joint effect of all six measures in the Child Health in Last 6 months category was statistically significant ($p<.10$). The joint effect finding was driven by the significant results found for the stayed in hospital for at least one day variable.

MOTHER'S HEALTH DECISIONS FOR HER CHILD

Within the Mother's Health Decisions for her Child category, two of the three measures showed differences in the hypothesised direction, however none were statistically significant. Overall, the step-down test showed that the joint effect of all three measures in the Mother's Health Decisions category was not statistically significant.

APPROPRIATE FOOD

Four of the seven measures in the Appropriate Food category were in the hypothesised direction, two of which were statistically significant. Children in the high treatment group were reported to eat more protein ($p<.05$, $d=.37$) and more dairy ($p<.10$, $d=.25$) than children in the low treatment group. There was also one statistically significant difference in the non hypothesised direction. Children in the high treatment group were reported to eat less grains than children in the low treatment group ($p<.10$, $d=.21$). The step-down test showed that the joint effect of the seven measures in the Appropriate Food category was statistically significant ($p<.10$). This joint effect was driven by the finding for how often the child eats protein.

NON STEP-DOWN MEASURES

The measure in the non step-down category was not in the hypothesised direction, or statistically significant.

Table 2.2 - Results for High and Low Treatment Groups: Child Health

Variable	N	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size d
Child Health in Last 6 months									
* Stayed in hospital for at least one day	154	(80/74)	0.01	(0.11)	0.09	(0.29)	$p<.01$	$p<.10$	0.38
Child has good health	154	(80/74)	0.94	(0.24)	0.84	(0.37)	$p<.05$	ns	0.32
* Had asthma	154	(80/74)	0.14	(0.35)	0.19	(0.39)	ns	ns	0.14
* Had chest infection	154	(80/74)	0.29	(0.46)	0.32	(0.47)	ns	ns	0.08
* No. of health problems taken to GP/ health centre/casualty	154	(80/74)	1.34	(1.30)	1.43	(1.28)	ns	ns	0.07
* Had an accident	154	(80/74)	0.08	(0.27)	0.05	(0.23)	ns	ns	0.09
Mother's Health Decisions for her Child									
Mother knows child's current weight	154	(80/74)	0.29	(0.46)	0.24	(0.43)	ns	ns	0.10
Necessary immunisations at 13 months	154	(80/74)	0.88	(0.33)	0.85	(0.36)	ns	ns	0.07
Swine flu vaccine	154	(80/74)	0.16	(0.37)	0.20	(0.40)	ns	ns	0.10
Appropriate Food									
How often the child eats protein	154	(80/74)	5.90	(1.01)	5.47	(1.31)	$p<.05$	$p<.10$	0.37
How often the child eats dairy	154	(80/74)	6.85	(1.20)	6.55	(1.21)	$p<.10$	ns	0.25
How often the child eats vegetables	154	(80/74)	6.14	(1.09)	6.00	(0.91)	ns	ns	0.14
* How often the child eats other food (e.g. sugars and fats, etc., sweets, crisp, chips.)	154	(80/74)	5.14	(1.38)	5.31	(1.27)	ns	ns	0.13
How often the child eats fruits	154	(80/74)	6.36	(1.60)	6.51	(1.35)	ns	ns	0.10
How often the child drinks formula/ breastmilk	154	(80/74)	2.70	(2.66)	3.23	(2.91)	ns	ns	0.19
How often the child eats grains	154	(80/74)	6.26	(0.87)	6.45	(0.86)	s~	ns	0.21
Non Step-down Measures									
Current weight (kilograms)	42	(23/19)	10.93	(1.80)	11.30	(2.30)	ns	-	0.19

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) p value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.5 Parenting

PARENTING DAILY HASSLES

Parenting involves particular responsibilities and demands related to childrearing. The frequency of these events, as well as the intensity affects how parents experience their parenting and how stressful they find their everyday lives. In addition, each family will involve unique demands, depending on the family structure as well as the developmental stages of the child/children.

Different parents can experience the same events differently depending on their level of stress or their interpretation of what the event means. For example, during a child's tantrum, if a parent believes that their child is expressing themselves as opposed to purposely trying to upset the parent, they will experience the same tantrum differently. The parent-child relationship is a dynamic relationship, where the parental reaction to a child's behaviour can impact the child's future behaviour, and the child's reaction can affect the parent's response. Considering the daily events, rather than parental stress directly, acknowledges the role of the child's behaviour in the parent-child dynamic (Crnic & Low, 2002; Mash & Johnston, 1990; Patterson, 1983; Short & Johnston, 1997; Webster-Stratton, 1990).

A strained or negative parent-child relationship may be an indirect result of parental stress, stress which may in part be due to everyday hassles (Belsky, Woodworth, & Crnic, 1996; Jain, Belsky, & Crnic, 1996; Pett, Vaughn-Cole, & Wampold, 1994). As reported in the *PFL* six month report, children of highly stressed parents are at risk for a number of negative outcomes, such as poor vocabulary skills (Noel, Peterson, & Jesso, 2008), a greater number of problem behaviours (Guthermuth-Anthony et al., 2005; Patterson, 1983), and insecure infant attachment (Jarvis & Creasey, 1991; Vaugn, Egeland, Sroufe, & Waters, 1979).

MATERNAL SEPARATION ANXIETY

Separation anxiety is most often considered from the point of view of the infant, particularly as a developmental milestone (Dallaire &Weinraub, 2005). Maternal separation anxiety in contrast refers to the emotional state of the mother associated with separation from their child. It is acknowledged that the child's experience of separation and reunion is influenced by the mothers, particularly if the mother finds the experience to be negative (Hock, McBride, & Gnezda, 1989). The feelings associated with maternal anxiety are guilt, worry and sadness, all of which can interfere with parenting and the mother child relationship (Hock, McBride, & Gnezda, 1989; van Bussel, Spitz, & Demyttenaere, 2009).

Furthermore, parents who, as a result of separation anxiety, are unwilling to leave their child with a minder may deny the child the opportunity to develop relationships with other adults or a sense of independence (Hock & Schirtzinger, 1989). Family functioning can be negatively influenced by unhealthy separation anxiety (Hock & Schirtzinger, 1989). Interestingly however, maternal separation anxiety has not been found to be linked with the child's attachment style (Wille, 1998). Dallaire and Weinraub (2005) found that the impact of maternal separation anxiety on the child's separation anxiety may be mediated by maternal sensitivity to the child. This indicates that separation anxiety for the mother and child may not be directly linked, but maternal behaviour also plays a role. In contrast however, maternal separation anxiety has been seen to affect children's directly, for example, night waking for infants has been linked with maternal separation anxiety (Scher, 2008).

Social acceptability and cultural factors also play a role in maternal reported separation anxiety, as they may be affected by perceived societal norms and expectations of how a mother 'should' behave (Hock, McBridem, & Gnezda, 1989; Hock & Schirtzinger, 1989).

ACTIVITIES/INTERACTIONS WITH BABY

Parental interaction and activities with children are discussed in depth in the *PFL* six month report and reading is addressed in the *PFL* twelve month report.

Few studies refer to the instance and impact of reading to an eighteen month old infant, however one study indicates that parental reading with their infants is generally seen to change around the age of eighteen months. Prior to eighteen months, parents tend to use attention-getting strategies, pointing and commenting on pictures, whereas when the child is over eighteen months, parents are more likely to ask questions and have conversations about the pictures (Fletcher & Reese, 2005). Few studies report the frequency of reading with children under 3 (Fletcher & Reese, 2005). In general, up until the age of 3, parents are typically responsible for choosing the child's books (Fletcher & Reese, 2005). Children are active participants in that they often request that the same book be repeated. Popular books for children include alphabet books, storybooks and counting books, although few studies consider the types of books read with children. In a review of studies that consider the type of reading material. Fletcher and Reese (2005) report that children interact more with simple books than complex books, as well as interact more with their parents when reading books without text, as opposed to books with text. Children's attention to books in general has been seen to increase over the first 3 years (Senechal et al., 1995).

Overall the literature regarding the impact of home visiting programmes on parent-child interactions is mixed (Kahn & Moore, 2010). Many programmes find that home visiting intervention groups do not differ significantly from control groups when assessed at a variety of ages (Butz et al., 2001; Duggan et al., 1999; Hutcheson et al., 1997; Koniak-Griffin et al., 2002; Siegel et al., 1980; Wolfe et al., 1988). Whereas other evaluations suggest that home visiting intervention groups are more likely to demonstrate higher levels of responsiveness, involvement, attachment security, competence and maternal sensitivity (Doesum et al., 2008; Heinicke et al., 2000; Lieberman et al., 1991) assessed between birth and 12 months.

There are limited evaluations which assess this aspect of parenting between 12 and 18 months. However one evaluation of an early home intervention targeting at low birth weight infants and their parents found that at 16 months parents participating in the intervention group were less likely to become unresponsive to infants compared to those in the control condition (Barrera, Rosenbaum, & Cunningham, 1986). Another evaluation targeting a population of drug users found that mothers in a home visiting intervention were more emotionally responsive at 18 months than those in the intervention group (Black, Nair, Kight, Wachtel, Roby, & Schuler, 1994). Similarly Black, Nair and Harrington (1994) found that home visiting promoted positive parental involvement at 18 months in a sample of mothers diagnosed with HIV. However Schuler, Nair and Black (2002) found no significant impact on parent child interactions at 18 months following a home visiting intervention with a population of drug using mothers

HOME VISITING EVALUATIONS

There are few studies reporting the impact of home visiting on parenting outcomes at eighteen months. Black et al. (1994) in a review of a home visiting intervention for mothers with a drug abuse problem did not find any effects on parental stress at eighteen months. Whereas Larson (1980) reported an improvement in maternal behaviour and Caughy et al. (2003) reported favourable outcomes for parental discipline style. In a similar evaluation of Healthy Steps, Caughy et al. (2004) did not report positive findings for parental involvement or parenting skills. Wiggins et al. (2004) also did not find a positive effect on parental attitudes to their children. In relation to child protection concerns, there were mixed findings with Black et al. (1994) finding a reduction in child abuse potential at eighteen months, whereas Silovsky et al. (2011) at seventeen months, did not. Nair et al. (1997) did not find any effect on the disruption of child care.

Overall, the evidence indicates that home visiting may have some impact on parenting at eighteen months, however there are not enough studies to predict the likely impact of *PFL*. There are no home visiting evaluations which measure reading as an outcome when the child is eighteen months old.

2.5.1 Parenting Instruments

PARENTING DAILY HASSLES

The Parenting Daily Hassles Scale (PDH; Crnic & Greenberg, 1990) is a 20-item measure of typical everyday events in parenting and parent-child interactions, some of which may make life difficult. It assesses the frequency and intensity of these hassles. The frequency of each event is proposed to give an objective marker of how often the event occurs and the intensity or impact score indicates the caregiver's subjective appraisal of how much those events affect or hassle them.

The PDH provides two main global measures, a frequency scale (α=0.85) score which indicates the frequency of typically hassle events and an intensity scale (α=0.90) score which reflects the parent's subjective appraisal of how much of a hassle she finds the event to be. Two further subscales are also calculated; parenting hassles related to parenting tasks (α=0.80), that is hassles related to typical tasks or duties a parent may be exposed to, and parenting hassles related to challenging behaviour (α=0.82). The latter refers to hassles arising from the child's challenging behaviour.

Mothers were asked to self-complete this measure and instructed to select the option that best represents her household. Each question had two parts, how often the event occurred (rarely=1 to constantly=4) and how much of a hassle she found the event to be in the last 6 months (range of 1-5). Higher scores represent a higher frequency of hassle events and a greater impact on the parent as a result of the events. The total scores were calculated by summing all items. The frequency scale score has a range 0-80 and the intensity score has a range of 0-100. Items related to the 2 subs scales were also summed to provide a score between 0-40 for parenting hassles related to parenting tasks and a score of 0-35 for parenting hassles related to challenging behaviour. There is no cut off for the scales, however total scores above 50 on the frequency scale indicate that a high frequency of potentially hassling happenings and scores above 70 on the intensity scale indicate that the parent is experiencing significant pressure regarding parenting. Individual events which occur with a frequency of 3 or 4 indicate an above average occurrence of the event and intensity of scores of 4 or 5 indicate that it is at least some problem to the parent.

MATERNAL SEPARATION ANXIETY SCALE

The Maternal Separation Anxiety Scale (MSAS: Hook, McBride & Gnezda, 1989) is a 35 item (α=0.93) self report measure of maternal separation anxiety, that is, the emotional state of the mother associated with separation from their child. Feelings associated with maternal anxiety are guilt, worry and sadness. Social acceptability and cultural factors have been incorporated into the scale, as there is an acknowledgement that maternal anxiety may be affected by perceived societal norms. The *PFL* evaluation includes the 'maternal separation anxiety' subscale from the overall MSAS, reducing the number of items administered to 21.

Mothers were asked to self-complete this measure and to indicate their level of agreement on a scale of 1 (strongly disagree) to 5 (strongly agree) for each of the 21 statements. These statements refer to the mother's feelings about spending time with and away from their child, as well as their beliefs about how the child adapts to separation from the mother. The scores are added and then divided by 3 to give a score within the range of 7-35. A higher score indicates a higher level of concern on the mother's behalf about spending time away from her child, as well as a higher likelihood of experiencing sadness and worry as a result of separation from her child.

ACTIVITIES/INTERACTIONS WITH BABY

Mothers were asked 16 questions (α=.71) relating to how often they did certain activities (e.g., singing songs, dancing, telling stories) with their baby. These items were taken from the My Baby and Me program and Parenting for the First Time program (Centres for the Prevention of Child Neglect, 2000). Answers were given on a 6 point scale ranging from 0 representing not at all to 5 signifying more than once a day. A scale representing the frequency of the mother's interaction with her baby was created by taking an average of all responses, with higher scores indicating more interaction.

2.5.2 Parenting Results

PARENTING DAILY HASSLES

One of the four Parenting Daily Hassles (PDH) subscales was in the hypothesised direction, and there were no significant differences. In addition, the step-down test showed that the joint effect of the four PDH subscales was not statistically significant.

INTERACTION WITH CHILD

Two of the three interaction measures were in the hypothesised direction, and there was one significant difference between the high and low treatment group. The high treatment group scored higher for interaction with their child, 3.21 compared to the low treatment group score of 3.05 ($p<.05$, $d=.35$). This indicates that the high treatment group engaged in more activities, more often, with their children. The step-down test showed that the joint effect of the three interaction measures were statistically significant ($p<.05$). This joint effect was driven by the interaction with child score.

NON STEP-DOWN MEASURES

Two of the three measures in the non step-down category were in the hypothesised direction and one was significantly different. 18% of the high treatment group were worried about their children's language development compared to 8% of the low treatment group ($p<.05$, $d=.28$).

Table 2.3 - Results for High and Low Treatment Groups: Parenting

Variable	*N*	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size *d*
Parenting Daily Hassles (PDH)									
* PDH Frequency Scale Score	154	(80/74)	33.61	(7.98)	34.14	(8.21)	ns	ns	0.07
* PDH Challenging Behaviour Score	154	(80/74)	11.46	(4.74)	11.41	(4.06)	ns	ns	0.01
* PDH Intensity Scale Score	154	(80/74)	31.54	(11.52)	30.43	(9.86)	ns	ns	0.10
* PDH Parenting Tasks Score	154	(80/74)	12.38	(4.82)	11.65	(4.20)	ns	ns	0.16
Interaction With Child									
Interaction with child	154	(80/74)	3.21	(0.48)	3.05	(0.47)	$p<.05$	$p<.05$	0.35
Mother reads to child daily	154	(80/74)	0.24	(0.43)	0.22	(0.41)	ns	ns	0.05
Mother reads to child	154	(80/74)	0.94	(0.24)	0.95	(0.23)	ns	ns	0.04
Non Step-down Measures									
Worried about child's language development	154	(80/74)	0.18	(0.38)	0.08	(0.27)	$p<.05$	-	0.28
Worried about child's behaviour	154	(80/74)	0.10	(0.30)	0.08	(0.27)	ns	-	0.07
* Maternal Separation Anxiety Scale	154	(80/74)	22.13	(5.93)	22.03	(5.24)	ns	-	0.02

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) *p* value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) *p* value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.6 Home Environment

The early home environment can have a profound effect on child development and wellbeing (Bradley & Caldwell, 1980; Bradley, Corwyn, Burchinal, McAdoo, & Coll, 2001; Gottfried, Fleming, & Gottfried, 1998). The home environment impacts on children's development both directly, through the cleanliness and safety of the home (Parcel & Dufur, 2001), and indirectly by impacting family functioning, including parent-child interactions and parental responsiveness to the child (Illig, 2008). These factors have a strong impact on the social, emotional and cognitive developmental aspects of school readiness such as academic and behavioural outcomes, learning problems, sustained attention, stress-related disease and the ability to deal with complex situations (Bradley & Caldwell, 1976; Caughy, 1996; Evans et al., 2010; Hammen, Adrian, Gordon, Burge, & Jaenicke, 1987; Trentacosta et al., 2008; Vernon-Feagans, Garrett-Peters, Willoughby, & Mills-Koonce, 2011). This section will examine how the home environment can play a role in children's development by focusing on the social, cognitive and physical aspects of the home environment.

Social aspects of the environment, including parental responsiveness, warmth and nurturance have been linked to social, emotional, cognitive and communicative competencies (Edwards, Sheridan & Knoche, 2010). Research indicates that children exposed to a responsive environment early in childhood have better classroom behaviour and more positive coping strategies for emotional expression later in childhood (Bradley et al., 2010; Bradley & Caldwell, 1980; Bradley, Caldwell, & Rock, 1988).

Cognitive aspects of the home environment including the quality and quantity of language used in the home and variety and stimulation also directly influence child development. Studies indicate that exposure to environments with low levels of stimulation is associated with cognitive, social and behavioural delays (WHO, 2009). Whereas children exposed to variety, regular change in stimulating toys and novel perceptual, cognitive, motor and social interactions are more likely to demonstrate better levels of intrinsic motivation, language development, and mathematics and reading ability in later childhood (Bradley & Caldwell, 1976; Gottfired et al., 1998; Farah et al., 2008).

Physical factors, including safety, deprivation and toxin exposure often have a dual influence on child development, by impacting children both directly and indirectly. The direct influence of the physical home environment can be seen through exposure to environmental toxins. For example, second hand smoke is strongly related to a variety of health difficulties (Cook & Strachan, 1999; Culp, Culp, Anderson & Carter, 2007; Mannino, Albalak, Grosse, & Repace, 2003) and exposure to high noise levels, lead and other toxins, impacts IQ and long term memory (Evans, 2006). However physical aspects of the home environment also have an indirect influence on child development. Environmental issues including overcrowding, chaos and confusion may lead to low levels of parental responsiveness and are also associated with psychological distress and behavioural adjustment problems in school (Evans, 2006). Moreover, enrichment or deprivation during the early years of life is also important for later development (Sharma & Nagar, 2009). Early childhood deprivation is associated with lower IQ scores, deficits in school achievement, and poorer socio-emotional functioning (McLoyd, 1998). Physical safety in the home can also influence child development indirectly. Safety in the home helps to reduce accidental injury, but the presence of a safe environment also benefits the child's learning potential as children learn best when they feel safe and valued (Rushton & Larkin, 2001).

Home visiting programmes often help to educate parents on household safety and preventable accidents as well as encouraging the parent to use positive parenting strategies, such as using developmentally stimulating toys and adopting non-physical disciplining strategies (Culp et al., 2007; Gomby, 2003; Roberts, Kramer, & Suissa, 1996). Evidence suggests that home visiting programmes can have a positive impact on the quality and safety of the home environment (Bakermans-Kranenburg, Van Ijzendoorn & Bradley, 2005; Gomby, 2003; Kendrick et al., 2000; King, et al., 2001; Parcel & Dufur, 2001). Findings from studies conducted between twelve months and eighteen months suggest that improvements in the home environment can be observed, but results are mixed. An evaluation of a home visiting programme targeting drug-abusing women found that at eighteen months the intervention group mothers had significantly higher scores than mothers in the comparison group on the emotional and verbal responsivity subscale

of the HOME assessment (Black et al., 1994). Furthermore, Larson (1980) reported that at eighteen months mothers receiving home visits starting prenatally had higher scores on assessments of the home environment than mothers who received no visits or those that received visits starting postnatally. An evaluation of "Starting Well", a Scottish home visiting programme found a small but positive effect on the quality of the home environment at eighteen months that was not found at six months (Mackenzie, Shute, Berzins, & Judge, 2004). However, other evaluations have investigated the influence of home visiting on the home environment at eighteen months and have not found favourable outcomes (Caughy, Huang, Miller & Genevro, 2004; Wasik, Ramey, Bryant & Sparling, 1990).

2.6.1 Home Environment Instruments

QUALITY OF THE HOME ENVIRONMENT[1]

The Infant-Toddler version of the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 2003) is a 45-item instrument completed by a trained interviewer. It measures the stimulation potential of the child's home environment, and may be used as a substitute for reliance on social class as an indicator of quality of the child's home environment. The HOME Inventory comprises six domains. Responsivity (11 items, α=0.71) illustrates the degree to which a parent is responsive to the child's behaviour. Acceptance (8 items, α=0.54) represents parental acceptance of negative behaviour from the child and avoidance of unnecessary punishment. Organisation (6 items, α=0.14) pertains to the degree of routine in a family's schedule, safety of the environment, and community supports utilised. The learning materials domain (9 items, α=0.41) assesses the appropriateness of play materials for the child. Involvement (6 items, α=0.59) illustrates the degree to which the parent is involved in the child's learning and promotes child development. Finally, the variety domain (5 items, α=0.46) assesses visitation of people and attendance of activities that introduce variety into the child's life. Each item was scored by a trained interviewer as true or not. Items were scored based on observations while in the home. For items where this was not possible, the mother is directly asked the question in an interview format. If the item was true it is scored as a 1, if it is not true it is scored as 0. Scores for each domain on the HOME Inventory were obtained by averaging the responses to each question in that domain resulting in a score ranging from 0 to 1 with higher scores indicating a more nurturing home environment.

The Supplement to the HOME Scale for Children Living in Impoverished Urban Environments (SHIF; Ertem, Avni-Singer, & Forsyth, 1996) consists of 20 items that were combined with the HOME Infant/Toddler Inventory and administered by a trained interviewer along with the HOME Inventory. The SHIF was developed to be used in conjunction with the HOME Infant/Toddler Inventory to provide a more suitable and accurate assessment of the home environment of young children living in low socioeconomic urban areas. Additionally, four items assessing child interaction with adult figures (not father figures) and the level of noise generated inside and outside the house were added to this measure as they were thought to be particularly relevant to low income populations. SHIF items, as well as these additional four items, are scored in the same way as items on the HOME Inventory, with a score of one representing that the statement is true and a zero representing that it is not true. In addition to the individual HOME Inventory domains described above, a combined score using information from all questions related to the home environment (e.g., HOME + SHIF) was used to form a composite measure of stimulation in the home environment. The combined measure consists of 69 items, 45 from the HOME Inventory, 20 from the SHIF, and the four additional questions described above which form eight subscales. Daily Routines (10 items, α=0.46) contains items pertaining to the child's eating and sleeping patterns and the availability of food and safe sleeping facilities. Child Care (5 items, α=0.27) provides details about the range, adequacy and appropriateness of childcare used by parents. Outings (5 items, α=0.30) measures the variety of stimulation the child receives in the form of trips made outside the home environment.

[1]While the extent of missing data was minimal for the majority of standardised instruments used, the amount of missing data on the HOME and SHIF instruments was more sizable as some of the HOME/SHIF items were based on observations of interactions between the parent and child items and therefore could not be measured if the child was not present or was asleep when the interview took place. 39% of children were not present at the 18 month interview. In addition, some of the items are based on observation of materials available within the home, thus if the interview was not conducted in the home these items could not be measured. 21% of interviews were conducted outside of the home at 18 months. Missing data on the HOME/SHIF was imputed using a multivariate normal regression. The covariates used in the imputation process were based on measures for which the respondents significantly differed in terms of the probability that the interview was conducted in the home, the probability that the child was present, and the HOME scores. Overall, the mean and dispersion of the imputed and non-imputed data were quite similar.

Toys and Books (10 items, α=0.35) measures the variety of appropriate play and learning materials available to the child in the home environment. Play (10 items, α=0.44) contains items relating to stimulating interactions between the parent and the child, and the parent's conscious encouragement of the child's development. Physical Environment (10 items, α=0.47) is an observational subscale which contains items relating to cleanliness and safety in the home, as well as the presence of literacy materials. Interaction (13 items, α=0.80) measures the parent's warmth and responsiveness in interacting with the child. Finally, restriction (6 items, α=0.75) measures the level of restraint the parent places on the child during the visit, in the form of physical punishment and scolding, as well as inappropriate handling by older children. Scores for each domain were obtained by averaging the responses to each question in that domain. In addition, an overall home environment score (α=0.63) was obtained by calculating the average of all responses. All calculated scores range from 0 to 1 with higher scores indicating a more stimulating home environment.

INFANT SAFETY

The *PFL* evaluation combined multiple measures to assess the safety of the physical environment. Specifically, 15 of the 23 items on the birth to twelve month version of the Framingham Safety Survey (FSS; American Academy of Pediatrics, 1991) were combined with questions assessing the presence of five common safety items (e.g., safety gate) in the house. Two scores related to safety of the physical environment were derived from these questions. First, a summed score was created indicating the presence of five common household safety items (safety gate/barrier, fire guard, smoke alarm, electric socket covers, child car seat). This score ranges from 0 to 5 and represents the total number of safety items present in the house. Second, mothers were asked questions relating to the safety of the home from a list of high-risk behaviours, such as the absence of child-locks on windows. These items were rated on a scale from 0 to 10. An average score was calculated for all safety items, resulting in an overall safety score (α=0.41), whereby higher scores represent a safer environment for the child. Additionally, participants were asked whether or not the baby's father or another person smoked in the house.

2.6.2 Home Environment Results

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT

Of the six subscales on the Home Observation for Measurement of the Environment (HOME) measure, four were in the hypothesised direction and two were statistically significant - Acceptance and Learning Materials. The high treatment group scored significantly higher (6.09) than the low treatment group (5.63) on the Acceptance subscale (p<.01, d=.44). This scale measures parental acceptance of negative behaviours and situations. In addition, the high treatment group scored significantly higher (8.25) than the low treatment group (8.00) on the Learning Materials subscale (p<.05, d=.29), which assesses the appropriateness of play materials available to the child.

In addition, the step-down test showed that the joint effect of the six HOME subscales was statistically significant. This joint effect was driven by the findings on the Acceptance (p<.05) subscale.

SUPPLEMENT TO THE HOME SCALE FOR IMPOVERISHED FAMILIES (SHIF)

Of the eight subscales on the Supplement to the HOME Scale for Impoverished Families (SHIF) measure, all eight were in the hypothesised direction and three were statistically significant - Restrictions/Not Items, Physical Environment, and Interaction. Firstly, the high treatment group scored significantly higher (5.57) than the low treatment group (5.20) on the Restrictions/Not Items subscale ($p<.01$, $d=.46$), which indicates the absence of restrictive parenting practices during the interview. Second, the high treatment group scored significantly higher (6.52) than the low treatment group (6.00) on the Physical Environment subscale ($p<.01$, $d=.43$), an observational subscale which is designed to assess the factors related to cleanliness and safety in the home as well as the presence of literacy material. Also, the high treatment group scored significantly higher (11.93) than the low treatment group (11.04) on the Interaction subscale ($p<.05$, $d=.37$), which is an observational measure of parental responsiveness.

In addition, the step-down test showed that the joint effect of the eight SHIF subscales was statistically significant. This joint effect was driven by the findings on the Restrictions/Not items ($p<.05$), Physical Environment ($p<.05$) and Interaction ($p<.10$) subscales.

SAFETY

Two of the six measures in the Safety category were in the hypothesised direction, and were statistically significant. 62% of mothers in the high treatment group reported that they used electrical socket covers compared with 49% of low treatment mothers ($p<.05$, $d=.27$). Also, less children in the high treatment group were exposed to cigarette smoke 35%, compare to 47% of the low treatment group ($p<.10$, $d=.24$). There was one significant difference in the non-hypothesised direction. 56% of the high treatment group reported using a safety gate in their home, compared with 68% of the low treatment group ($p<.10$, $d=.26$). The step-down test showed that the joint effect of the six measures in the Safety category was not statistically significant.

NON STEP-DOWN MEASURES

The total HOME SHIF score, based on all fourteen subscales from the HOME and SHIF subscales, was in the hypothesised direction but was not statistically significant.

Table 2.4 - Results for High and Low Treatment Groups: Home Environment

Variable		N	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size d
Home Observation for Measurement of the Environment (HOME)										
	Acceptance	152	(79/73)	6.09	(0.87)	5.63	(1.21)	$p<.01$	$p<.05$	0.44
	Learning Materials	152	(79/73)	8.25	(0.82)	8.00	(0.88)	$p<.05$	ns	0.29
	Organisation	152	(79/73)	5.53	(0.64)	5.46	(0.71)	ns	ns	0.10
	Variety	154	(80/74)	4.08	(1.00)	3.99	(1.05)	ns	ns	0.09
	Involvement	152	(79/73)	4.06	(1.45)	4.16	(1.48)	ns	ns	0.07
	Responsivity	150	(80/70)	9.12	(1.84)	9.38	(1.72)	ns	ns	0.15
Supplement to the HOME Scale (SHIF)										
	Restrictions/Not Items	152	(79/73)	5.57	(0.58)	5.20	(1.01)	$p<.01$	$p<.05$	0.46
	Physical Environment	152	(79/73)	6.52	(1.21)	6.00	(1.26)	$p<.01$	$p<.05$	0.43
	Interaction	150	(79/71)	11.93	(2.09)	11.04	(2.73)	$p<.05$	$p<.10$	0.37
	Outings	154	(80/74)	4.78	(0.53)	4.70	(0.59)	ns	ns	0.13
	Childcare	154	(80/74)	3.84	(0.77)	3.77	(0.79)	ns	ns	0.09
	Play	153	(79/74)	7.25	(1.57)	7.18	(1.71)	ns	ns	0.04
	Daily Routines	154	(80/74)	8.14	(1.31)	8.12	(1.20)	ns	ns	0.02
	Toys and Books	154	(80/74)	9.36	(0.92)	9.35	(1.00)	ns	ns	0.01
Safety										
	Electrical socket covers	153	(79/74)	0.62	(0.49)	0.49	(0.50)	$p<.05$	ns	0.27
*	Baby exposed to cigarette smoke	150	(77/73)	0.35	(0.48)	0.47	(0.50)	$p<.10$	ns	0.24
	Framingham Safety Survey	154	(80/74)	8.33	(0.95)	8.34	(0.88)	ns	ns	0.00
	No. of safety items	153	(79/74)	3.20	(1.13)	3.26	(0.91)	ns	ns	0.05
	Smoke alarm	153	(79/74)	0.97	(0.16)	0.99	(0.12)	ns	ns	0.09
	Safety gate	141	(72/69)	0.56	(0.50)	0.68	(0.47)	s~	ns	0.26
Non Step Down Measures										
	Total HOME SHIF	152	(79/73)	17.15	(1.75)	16.98	(1.83)	ns	-	0.09

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) *p* value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) *p* value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.7 Maternal Health & Wellbeing

Maternal health during toddlerhood is an important predictor of early child outcomes that is often overlooked (Cheng, Fowles, & Walker, 2006; Kahn, Zuckerman, Bauchner, Homer, & Wise, 2002; Mensah & Kiernan, 2010). Traditionally research investigating the impact of maternal health on child development either focuses on health issues that arise during pregnancy and the early postnatal period, or explores individual maternal risk factors, such as drug use (Kahn et al., 2002). However several studies have identified the importance of maternal general health and psychological well-being during toddlerhood on important early child outcomes including physical health, language and behaviour problems (Kahn et al., 2002; Mensah & Kiernan, 2010). This section presents an overview of research relating to maternal health,

including physical health, mental health, and maternal substance use during toddlerhood. Each factor will be explored in relation to its impact on child development and the effectiveness of interventions to promote positive outcomes.

PHYSICAL HEALTH

Physical health difficulties associated with pregnancy and child birth are often persistent and experienced through the early years of raising children (Kahn et al., 2002; Mensah & Kiernan, 2010). Common symptoms experienced include tiredness, backache, sexual problems and haemorrhoids (Brown & Lumley, 1998; Saurel-Cubizolles, Romito, Lelong, & Ancel, 2000). These difficulties can have knock on effects as maternal health is associated with children's learning, development and behaviour (Mensah & Keirnan, 2010). The American National Maternal and Child Health survey identified the importance of maternal physical health. It found that poor physical health was associated with poor physical health of the child, tantrums and difficult peer interactions (Cheng et al., 2006).

Health service use is another indicator of health status. An individual's use of health services is dependent on a number of factors including his or her health, awareness of symptoms, belief in the advantages of use, a psychological readiness to attend services, and finally, accessibility (Field & Briggs, 2001; Rosenstock, 2005). The complex relationship between health, income, and health service utilisation is difficult to disentangle. Past research found that higher income groups tend to access medical services more frequently than lower income groups (Lerner & Anderson, 1963; Somers & Somers, 1961). Conversely, newer studies report the opposite (Droomers & Westart, 2004; Layte & Nolan, 2004). A recent Irish study found that lower income groups are more likely to access GP services, while higher income groups are more likely to make use of more specialist services like the dentist and the optician (Layte & Nolan, 2004). While this relationship may in part be explained by the poorer health of lower income groups (Mackenbach, Bakker, Kunst, & Diderichsen, 2002), that certain low income groups can access GP services free of charge through the Medical Card Scheme also may be a factor.

SUBSTANCE USE

There is a well-established literature base highlighting the negative impact of maternal substance use, such as smoking, drinking and drug taking, during pregnancy on later child development (Pattenden et al., 2006). However, there is also a growing body of research which highlights the impact of exposure to these factors and the associated lifestyle into the postnatal period (Das Eiden, Peterson, & Coleman, 1999; Pattenden et al., 2006). Schuler, Nair, and Black (2002) report that children exposed to drugs during pregnancy and raised in an environment with on-going maternal drug use were more likely to display problems in cognitive development than children exposed to drugs during pregnancy who were raised in a drug free environment.

MENTAL HEALTH

Maternal mental health is an important determinant of child developmental outcomes. There is an abundance of research which identifies the potential negative impact of poor maternal mental health during infancy on later child outcomes (Atkinson et al., 2000; Black et al., 2007; Conroy et al., 2012; Goodman & Gotlib, 2002). Maternal depression is associated with psychological and physical unavailability of the caregiver (Atkinson et al., 2000). This unavailability impacts negatively on interactions between the infant and the mother, which may in turn effect the cognitive, social and emotional development of the child (Conroy et al., 2012). However, this relationship is not straightforward. While longitudinal studies report significant negative associations between maternal depression and children's development (Atkinson et al., 2000; Conroy et al., 2012), some studies indicate that the effects may be different at different time points. For example, Lung, Shu, Chiang and Lin, (2011) report that child fine motor development was affected by maternal mental health at the age of six months, yet this effect was not apparent at eighteen months.

While rates of postnatal depression typically decline as children age, (Matthey, Barnett, Judy, & Waters, 2000), many mothers experience symptoms for prolonged periods. A study by Monti, Agostini, Marano, and Lupi (2008) indicated that in a sample of 234 women, 8.9% experienced symptoms of postnatal

depression at eighteen months postpartum. The persistence and stability of depressive symptoms is supported by other studies, which identify symptoms of psychological distress beyond the immediate postnatal period (Beeghly et al., 2003; Vänskä et al., 2011).

Two other important factors which influence mental health are self-esteem, or how valuable an individual feels he or she is worth as a person, and self-control, a person's ability to adapt or change oneself to better fit the environment (Tangney, Baumeister, & Boone, 2004). Both are important for child development. Maternal self-control influences parenting practices, for example mothers with high self-control are more likely to have realistc expectations of child behaviour and are more likely to supervise the child (Nofziger, 2008). Self-control is also strongly correlated with self-esteem (Tangney et al., 2004). Parents with high self-esteem are less likely to perceive stress (Abel, 1996; Kreger, 1995). In this way, negative life experiences, such as living in poverty, are more likely to cause stress in people with low self-esteem than in people with higher self-esteem (Brown & Dutton, 1995). Parents with high self-esteem are more likely to engage in authoritative parenting (Aunola, Nurmi, Onastu-Arvilommi, & Pulkkine, 1999; Lutenbacher & Hall, 1998), a style of parenting commonly associated with positive child developmental outcomes (Steinberg, Lamborn, Dornbusch, & Darling, 1992). Furthermore, increases in maternal self-esteem have been associated with greater child development at age two and it has been suggested that high maternal self-esteem could act as a buffer in a high stress environment which allows the mother to maintain her ability to effectively parent the child (Surkan et al., 2008).

At eighteen months home visitation appears to have limited significant impact on maternal health, including mental health, physical health and substance use over time (Ammerman, et al., 2009; Barnes, Senior, & MacPherson, 2009; Wiggins et al., 2004).

2.7.1 Maternal Health & Wellbeing Instruments

GENERAL HEALTH

The mother's current health status was assessed using a self-rated report of general health measured on a five point scale ranging from excellent to poor. This measure was dichotomised to create a binary indicator of ill health if the participant reported fair or poor health. The mother was considered to not have ill health if she indicated her current health was good, very good, or excellent. Participants were also asked how many times they visited the GP in the last six months (not including visits for child). Participants were also asked to select the services that they had used in the last six months from a list of 24 health and well-being related services. A variable denoting the total number of services used was created by summing the number of services selected. A binary variable indicating hospital use was also created.

Participants were asked if they were pregnant at the time of interview, and whether the pregnancy was planned. If they were not pregnant, they were asked whether they used birth control, and asked to identify what type from a list. Valid methods of birth control included: 'I take birth control pills at least sometimes', 'I take birth control pills regularly' and 'I have my partner use condoms'.

CURRENT SUBSTANCE USE

Three binary indicators were used to assess whether participants smoked, drank alcohol or took drugs in the past six months. For yes responses to the smoking question participants were asked how many cigarettes they smoked per day, and for a yes response to the alcohol question, participants were asked how often and how much they drank. A binary indicator was calculated indicating whether the participant consumed alcohol above the recommended level or not (that is, more than 14 units of alcohol per week on average). A binge drinking variable was created for participants who reported consuming more than 6 units in a sitting, more than twice a week. Whether the participant changed her smoking and/or drinking habits was also calculated based on changes in reported smoking/drinking habits between twelve and eighteen months.

MATERNAL SELF-CONCEPT AND MENTAL HEALTH
EDINBURGH POSTNATAL DEPRESSION SCALE

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) is a 10-item (α=0.90) measure designed to identify women who are at risk of depression. Mothers were asked to tick the option that best represents how she had been feeling over the previous seven days. The four responses to each question were rated on a zero to 3 point scale with higher scores indicating a greater likelihood of depression. The total score obtained represents the sum of all responses and has a range of zero to 30. Additionally, a binary variable indicating risk of depression was created and represents participants who scored 10 or higher on this measure.

ROSENBERG SELF ESTEEM SCALE

Maternal self esteem was assessed using the Rosenberg Self Esteem Scale (RSE; Rosenberg, 1965), a six item (α=0.87) measure assessing maternal self esteem on a continuous scale. Mothers were presented with statements about how they feel about themselves and were asked to rate how much they agree or disagree with each statement on a four point Likert-scale ranging from zero meaning strongly agree to three representing strongly disagree. Scores were created by summing responses to all items, providing a range of zero to 18 with higher scores representing higher self esteem.

BAUMEISTER SELF-CONTROL MEASURE

The Baumeister Brief Self-Control Measure (Tangney, Baumeister, & Boone, 2004) is a 13-item (α=0.76) measure designed to evaluate areas of self-control failure, with an emphasis on control over thoughts, emotional control, impulse control, performance regulation, and habit breaking. Participants rank how well a series of 13 statements describe them on a 5-point scale, with 1 representing not at all like me and 5 representing very much like me. These scores were then summed to obtain a total self-control score, whereby higher values indicate greater self-control.

2.7.2 Maternal Health & Wellbeing Results

MATERNAL PHYSICAL HEALTH AND HEALTH BEHAVIOURS IN LAST 6 MONTHS

Of the four measures included in the Maternal Physical Health in the Last 6 months category, none were in the hypothesised direction. The high and low treatment groups differed significantly in the non-hypothesised direction on two measures; hospital use and number of health services used. 43% of the high treatment group reported use of hospital services in the previous 6 months, compared with 27% of the low treatment group (p<.05, d=.34). The high treatment group also reported using a greater number of health services, 2.33, compared with the low treatment group average of 1.74 (p<.05, d=.36). The step-down test showed that the joint effect of the four measures in this category was not statistically significant.

CURRENT SUBSTANCE USE

Three of the four measures in the Current Substance Use category were in the hypothesised direction however there were no significant differences between the high and low treatment groups on any of the current substance use outcomes. In addition, the step-down test showed that the joint effect of the four measures in this category was not statistically significant.

MATERNAL SELF-CONCEPT AND MENTAL HEALTH

One of the three Maternal Self-Concept and Mental Health measures was in the hypothesised direction; however this was not significantly different. In addition, the step-down test showed that the joint effect of the three measures in this category was not statistically significant.

NON STEP-DOWN MEASURES

Four of the eight measures not included in the step-down categories were in the hypothesised direction, and there was one significant difference in the hypothesised direction. 10% of the high treatment group reported binge drinking at least twice a week compared with 18% of the low treatment group ($p<.10$, $d=.22$). There was also a significant difference in the non hypothesised direction; 14% of the high treatment group were pregnant at the time of the interview compared with 7% of the low treatment group ($p<.10$, $d=.24$).

Table 2.5 - Results for High and Low Treatment Groups: Maternal Health and Wellbeing

	Variable	*N*	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size *d*
	Maternal Physical Health & Health Behaviours in Past 6 Months									
*	No. of GP visits	151	(77/74)	2.90	(4.47)	2.59	(4.76)	ns	ns	0.07
	Good health compared with other women	153	(79/74)	0.80	(0.40)	0.86	(0.34)	ns	ns	0.18
*	Hospital use	153	(79/74)	0.43	(0.50)	0.27	(0.45)	s~	ns	0.34
*	No. of health services used	153	(79/74)	2.33	(1.92)	1.74	(1.26)	s~	ns	0.36
	Current Substance Use									
*	Drank alcohol in past 6 months	153	(79/74)	0.81	(0.39)	0.88	(0.33)	ns	ns	0.19
*	Consumed alcohol above recommended level	153	(79/74)	0.05	(0.22)	0.09	(0.29)	ns	ns	0.17
*	Drug use in past 6 months	153	(79/74)	0.03	(0.16)	0.04	(0.20)	ns	ns	0.09
*	Currently a smoker	153	(79/74)	0.54	(0.50)	0.50	(0.50)	ns	ns	0.09
	Maternal Self-Concept and Mental Health									
	Baumeister Self-Control Measure	154	(80/74)	50.29	(7.20)	49.65	(7.80)	ns	ns	0.09
	Rosenberg Self-Esteem Scale	154	(80/74)	13.48	(3.57)	13.51	(3.48)	ns	ns	0.01
*	Edinburgh Postnatal Depression Score for past 7 days	154	(80/74)	7.54	(5.78)	7.22	(5.64)	ns	ns	0.06
	Non Step-down Measures									
*	Binge drinking (> 6 units in any sitting at least twice per week)	153	(79/74)	0.10	(0.30)	0.18	(0.38)	$p<.10$	-	0.22
*	Changed drinking between 12 and 18 months (Number of Drinks)	112	(55/57)	0.78	(6.11)	0.17	(7.77)	ns	-	0.14
*	Number of cigarettes per day	82	(45/37)	11.87	(5.88)	12.43	(5.79)	ns	-	0.10
*	Changed smoking between 12 and 18 months (Number of cigarettes)	71	(39/32)	0.97	(4.15)	1.06	(4.06)	ns	-	0.02
*	Edinburgh Postnatal Depression Cut-off (10)	154	(80/74)	0.33	(0.47)	0.28	(0.45)	ns	-	0.09
	Currently using a valid form of birth control	153	(80/73)	0.59	(0.50)	0.68	(0.47)	ns	-	0.20
*	Currently pregnant	153	(79/74)	0.14	(0.35)	0.07	(0.25)	s~	-	0.24
	New pregnancy planned	16	(11/5)	0.45	(0.52)	0.20	(0.45)	ns	-	0.54

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) *p* value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) *p* value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.8 Maternal Social Support

There is a strongly established relationship between maternal social support and positive outcomes for mothers and children (Cobb, 1976; Cohen & Wills, 1985; Dalgard, Bjork, & Tambs, 1995). Maternal social support may be an important protective factor for individuals residing in disadvantaged communities, many of whom are at greater risk of poor mental and physical health (Bradley & Corwyn, 2002). Maternal social support is associated with many positive outcomes for children, including cognitive benefits (Slykerman et al., 2005), socio-emotional skills (Izzo, Weiss, Shanahan, & Rodríguez-Brown, 2000), and a more stimulating home environment (Adamakos et al., 1986). In particular, social support has been shown to have a particularly positive influence on the quality of parenting and attachment in the presence of stress (Crnic, Greenberg, & Slough, 1986; Crockenberg, 1981; Koeske & Koeske, 1990). Furthermore, mothers with more social support may more often engage in positive parent-child activities (Green, Furrer, & McAllister, 2007). Social support may influence parenting by helping parents feel less anxious about their relationships and, thus, engage more with their children.

One particularly important source of maternal social support is the support that a mother receives from a spouse or partner. Indeed, support from a spouse or partner is cited most frequently as being the strongest predictor of maternal wellbeing (Crnic, Greenberg, Ragozin, Robinson, & Bashman, 1983), particularly for first-time mothers (Levitt, Webber, & Cherie, 1986). However, it must be noted that the relationship between father involvement and child development is complicated as a father's presence does not guarantee quality of interaction. In some cases father involvement is associated with negative child outcomes, including child conduct problems. Moreover, there are factors that serve as barriers to father involvement, such as mothers' perceptions and workplace barriers. These factors can contribute to both quantity and quality of father-child interactions (McBride et al., 2005; Robinson & Godbey, 1997).

In general promoting social support is not the primary aim of many home visiting interventions, but it is often cited as a secondary or mediating outcome (Hodnett & Roberts, 2007; Kearney, York, & Deatrick, 2000). Results from home visiting interventions show that these programmes have mixed effects on maternal social support. Several studies found improvements in social support over time (Barlow, Cohen & Stewart-Brown, 2005; de la Rosa, Perry, Dalton & Johnson, 2005). Whereas McCurdy (2001) failed to find significant changes in social support over time, but did find that mothers in the programme were less likely to report dissatisfaction with those in their support network. Literature which documents the impact of home visiting programmes on maternal social support between twelve and eighteen months is scarce. One study conducted by Wiggins et al. (2004), investigated the impact of home visiting on the level of support from a partner and found no significant difference between intervention and control groups at fourteen months.

To our knowledge, there are no previous studies investigating the impact of home visiting programmes on voting behaviour.

2.8.1 Maternal Social Support Instruments

PARTNER SOCIAL SUPPORT

Participants were asked questions relating to how involved the child's father is in her child's life and how satisfied she is with his level of involvement. Binary variables were used to assess whether or not the father was involved in the child's life, and whether or not the mother felt they received support from the baby's father and/or partner. Also, binary variables were created for the non-step-down items regarding whether or not the father pays maintenance and whether he pays regularly.

SOCIAL SUPPORT

Mothers were asked to rate on a four point scale the amount of support they felt they received from their partner, parents, close relatives, friends, neighbours, and people at work (if applicable). Responses were dichotomised into no/little/some support, or a lot of support. The responses were used to generate five

yes/no binary variables indicating whether or not the participant received a lot of support from her partner, her parents, her family, her friends and her neighbours.

MATERNAL SOCIAL SUPPORT INDEX

Maternal social support at eighteen months was assessed using an adapted version of the Maternal Social Support Index (MSSI; Pascoe, Ialongo, Horn, Reinhart, & Perradatto, 1988). The adapted version consists of 9 items related to maternal perception of help with daily tasks (α=0.78). The participant responded to these 9 items by indicating who does different household tasks in her household, with the response options: I generally do it, someone else and I generally do it, or someone else generally does it. Items were summed to obtain a total score, with higher scores representing more perceived support by the mother.

VOTING BEHAVIOUR

Participants were asked whether they voted in the last general election and in the last local/European elections. Binary variables were calculated indicating whether participants reporting voting or not in each election.

2.8.2 Maternal Social Support Results

PARTNER SOCIAL SUPPORT

Two of the three measures within the Partner Social Support category were in the hypothesised direction, however neither were statistically significant. The step-down test showed that the joint effect of the three measures in this category was not statistically significant.

SOCIAL SUPPORT

Three of the five measures included in the Social Support category were in the hypothesised direction with one significant difference. 71% of the high treatment group reported receiving a lot of support from their parents, compared with 60% of the low treatment group (p<.10, d=.23). The step-down test showed that the joint effect of the five measures in the Social Support category was not statistically significant.

VOTING

One of the two measures in the voting category was in the hypothesised direction, but was not statistically significant. The step-down test showed that the joint effect of both measures in the Voting category was not statistically.

NON STEP-DOWN MEASURES

Both measures in this category were in the hypothesised direction, however neither were statistically significant.

Table 2.6 - Results for High and Low Treatment Groups: Social Support

Variable	*N*	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size *d*
Partner Social Support									
Support from baby's father	147	(76/71)	0.70	(0.46)	0.65	(0.48)	ns	ns	0.11
How often does father have contact with child (Daily/Not Daily)	153	(79/74)	0.71	(0.46)	0.68	(0.47)	ns	ns	0.07
Support from partner	114	(58/56)	0.84	(0.37)	0.84	(0.37)	ns	ns	0.02
Social Support									
Support from parents	146	(76/70)	0.71	(0.46)	0.60	(0.49)	$p<.10$	ns	0.23
Support from friends	151	(79/72)	0.24	(0.43)	0.18	(0.39)	ns	ns	0.15
Support from relatives	152	(79/73)	0.34	(0.48)	0.32	(0.47)	ns	ns	0.06
Support from neighbours	139	(70/69)	0.06	(0.23)	0.06	(0.24)	ns	ns	0.00
Maternal Social Support Index	154	(80/74)	24.43	(4.59)	25.31	(4.91)	ns	ns	0.19
Voting									
Voted in last General Election	150	(77/73)	0.58	(0.50)	0.52	(0.50)	ns	ns	0.13
Vote in last Local Elections and European Elections	145	(74/71)	0.50	(0.50)	0.52	(0.50)	ns	ns	0.04
Non Step-down Measures									
Child's father pays maintenance	68	(33/35)	0.64	(0.49)	0.54	(0.51)	ns	-	0.19
Child maintenance paid regularly	40	(21/19)	0.90	(0.30)	0.89	(0.32)	ns	-	0.03

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) *p* value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) *p* value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.9 Childcare

There are many elements which mediate the effect of childcare on child outcomes. These include the socio-economic status and home environment of the child (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007; Scaramella, Neppl, Ontai, & Conger, 2008), the quality and type of childcare, and the duration of childcare (both how long the child has been attending the centre and the number of hours) (NICHD, 2004; Sylva, Stein, Leach, Barnes, & Malmberg, 2011).

Formal centre-based childcare has been associated with increased cognitive development (Sylva et al., 2011, NICHD, 2002), yet it has also been associated with higher incidences of externalising behaviours in children (Loeb et al., 2007; NICHD, 2004). These behavioural effects appear to be more pronounced for children entering childcare at less than one year of age (Loeb et al., 2007; NICHD, 2004). Furthermore, children receiving more centre-based care between the ages of zero and seventeen months displayed a reduction in academic skills indicating that the cognitive benefits may not apply to younger children (NICHD, 2004). A study using a UK sample found that centre-based childcare during the first year was particularly beneficial to children of low educated mothers, and had no effect on the later cognitive development of children from higher educated families (Cote, Doyle, Petitclerc & Timmins, forthcoming). The suggested optimal age to begin childcare is 2-3 years old, with children who begin younger displaying more negative behavioural effects (Barnett, 1995; Loeb et al., 2007). In contrast, it was found that children who attended centre-based childcare in Scandinavia scored highest in cognitive development at eighteen months (Berglund, 2005).

Further investigation indicates that higher quality childcare can enhance academic performance, regardless of the duration, whereas behaviour problems are related to the duration of care, regardless of the quality (NICHD, 2002). Additionally, child temperament was seen to be exacerbated by lengthy periods of centre-based childcare, such that children who were classified as easily frustrated before starting childcare displayed more externalising behaviours, and 'distressed' children more internalised behaviours (Crockenberg, 2005).

There are few studies which report benefits of informal childcare at any age. Groeneveld and colleagues (2010) report that children cared for in a home other than their own, received higher caregiver sensitivity and consistency, along with a less noisy environment, yet their cortisol levels (a by-product of stress) were the same when compared with children in centre-based care. Overall, centre-based childcare is reported to have greater cognitive benefits, yet more behaviour difficulties, whereas informal childcare, by its nature is less consistent.

As discussed, there are cognitive benefits and behavioural disadvantages associated with centre-based childcare during infancy. The quality of the centre, as well as the duration of attendance, plays a role. There is limited research which assesses the impact of childcare in general for children aged eighteen months or younger and it is unclear whether the benefits of centre-based care outweigh the disadvantages. In addition, there is limited research on the impact of home visiting programmes on childcare use for children aged eighteen months or younger.

2.9.1 Childcare Instruments

CHILDCARE

Participants were asked if they have used any type of childcare for the *PFL* child, that is, if anyone besides themselves looked after the child for more than 10 hours per week. This was used to create a binary measure indicating if the child is in any type of childcare. Those who indicated that they used childcare in the last six months were then asked to choose what type of childcare they mainly used from of a list including child's grandparent, parent/friends/other relatives, nanny/child minder, or nursery/crèche. A binary variable was created indicating whether the participant used formal childcare (nursery/crèche) or not, and whether the child's grandmother provide childcare to them. Additionally, participants were asked how many hours per week their child was in childcare, whether they paid for this childcare and how much, as well as what age their child was when he/she first started childcare. The cost of childcare on an hourly basis was calculated from this information. In addition, participants were asked how satisfied they were with this childcare.

SERVICE USE

Participants in the *PFL* cohort were asked if they had ever used any of the 63 services listed. Services were grouped into the following domains: emergency services, health services, family services, employment/adult education services, community information services, residents' association services, childcare services, and other services. Scores for each domain represent the number of services ever used by participants in that domain. In addition, a variable representing the total number of services mothers indicated using was created. Note that these questions were not asked of the comparison community.

2.9.2 Childcare Results

CHILDCARE USE SAMPLE

Two of the six measures in the Childcare Use sample category were in the hypothesised direction however, neither of these differences were statistically significant. There was a significant difference in the non hypothesised direction, with 74% of the high treatment group indicating that they were satisfied with their childcare, compared with 88% of the low treatment group ($p<.10$, $d=.35$). In addition, the step-down test showed that the joint effect of the six measures in the Childcare Use sample category was not statistically significant.

SERVICE USE

Five of the nine measures in the Service Use category were in the hypothesised direction, however none of these effects indicated statistically significant differences between the high and low treatment groups. In addition, the step-down test showed that the joint effect of the nine measures in the Service Use category was not statistically significant.

NON STEP-DOWN MEASURES

The Uses any type of childcare measure was not in the hypothesised direction.

Table 2.7 - Results for High and Low Treatment Groups: Childcare and Service Use

Variable	N	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size d
Childcare Use sample									
Hours per week in childcare	58	(27/31)	22.22	(8.55)	20.92	(8.15)	ns	ns	0.16
Age started childcare	58	(27/31)	10.31	(5.79)	10.03	(4.73)	ns	ns	0.05
* Uses grandmother care	59	(27/32)	0.26	(0.45)	0.25	(0.44)	ns	ns	0.02
Uses formal childcare	59	(27/32)	0.56	(0.51)	0.66	(0.48)	ns	ns	0.21
Childcare cost per hour	43	(19/24)	1.60	(1.02)	2.20	(2.04)	ns	ns	0.37
Satisfaction with childcare	59	(27/32)	0.74	(0.45)	0.88	(0.34)	s~	ns	0.35
Service Use									
Family Services	153	(80/73)	1.03	(0.64)	0.90	(0.63)	ns	ns	0.19
Residents Associations' Services	153	(80/73)	0.06	(0.37)	0.03	(0.16)	ns	ns	0.12
Community Information Services	153	(80/73)	0.91	(1.20)	0.75	(1.36)	ns	ns	0.12
* Emergency Services	153	(80/73)	0.20	(0.54)	0.25	(0.49)	ns	ns	0.09
Total no. of services	153	(80/73)	5.98	(3.32)	5.92	(3.84)	ns	ns	0.02
Other Services	153	(80/73)	0.66	(0.48)	0.67	(0.47)	ns	ns	0.02
Health Services	153	(80/73)	2.08	(1.20)	2.15	(1.44)	ns	ns	0.06
Employment/Adult Education Services	153	(80/73)	0.49	(0.86)	0.55	(0.96)	ns	ns	0.07
Childcare Services	153	(80/73)	0.56	(0.67)	0.63	(0.72)	ns	ns	0.10
Non Step-down Measures									
Uses any type of childcare	153	(79/74)	0.34	(0.48)	0.43	(0.50)	ns	-	0.19

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) *p* value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) *p* value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.10 Household Factors & SES

Factors associated with the household and socio-economic status (SES) have been shown to have profound effects on child development and well-being (Bradley & Corwyn, 2002; Letourneau, Duffet-Leger, Levac, Watson & Young Morris, 2011). The mediational role of household and socio-economic factors such as household composition, lone parent status, parental education, parental employment, parental relationship status and family finances on child development have been well established in the literature and are discussed extensively in the six month report. The impact of these factors on child outcomes, including academic attainment, begins in early infancy as they can determine the extent and quality of parent-child interaction (Bradley & Corwyn, 2002).

A large body of research provides support for early childhood interventions as a means of closing the SES gap in children's skills and competencies at school entry (see Ramey & Ramey, 2004 for review). However there are few evaluations that measure the impact of home visiting interventions on household and socio-economic status at eighteen months. One study which measured family economic self-sufficiency at seventeen months failed to find a positive effect (Silowsky et al., unpublished).

2.10.1 Household Factors & SES Instruments

HOUSEHOLD COMPOSITION, LONE PARENT STATUS, AND SIBLINGS

Participants were asked several questions related to their household composition including how many people live in the household and whether or not the child's grandparent lives in the household. Additionally, the participant reported her current relationship status from a list of seven options. This information was used to generate two separate binary indicators denoting 1) whether the participant was currently in a relationship (married, cohabitating, or boyfriend) or 2) married only. Furthermore, participants were asked if their current partner was the child's father and if this was the same partner they were with when the child was twelve months old.

MATERNAL AND PARENTAL EMPLOYMENT

Several questions assessed the current work status of both the mother and the father. If there had been a change in work status since the twelve month interview, participants were asked to select their current work status from a list of options including currently in paid work, in work but on leave, unemployed, student, looking after home/family, retired, not able to work due to disability/sickness, paid FÁS training, or unpaid FÁS training. Responses to this question were dichotomised to represent the proportion of mothers and fathers in paid work versus not in paid work, and the proportion of mothers and fathers currently unemployed. Unemployed individuals were asked for how many months they have been without paid work. A binary variable denoting long term unemployment (greater than twelve months) was created. Participants also reported on whether they worked in full or part time employment and the approximate annual income of both parents.

FAMILY FINANCES

Participants' perception of financial difficulty was assessed by asking them to consider the total income of their household, and to rate on a seven point scale, ranging from with great difficulty to very easily, how difficult it was for the household to make ends meet. Responses to this variable were used to generate a binary variable indicating whether the participants make ends meet with difficulty or not. Participants were also asked to compare their financial situation to twelve months ago and a binary was created indicating whether their financial situation had got better or worse. Finally, they were asked to predict how they thought their financial situation would change in the next twelve months, and a binary was created indicating whether they expected it to get better or worse.

Participants were asked whether or not they saved money on a regular basis, and were also asked for a detailed account of any social welfare payments currently received by any household member, from a list of 39 potential payments. Participants also stated the household's weekly income from all sources,

selecting from a scale where the lowest range was less than €50, and the highest was €1500 or more. As households differ in the number of people and composition, it would be misleading to compare household income across participants without accounting for the number of people living in the household. To overcome this issue a variable representing the household equivalised weekly income was created. This was calculated by assigning a weight to each household member. A weight of '1' is assigned to the first adult in the household, 0.66 to each subsequent adult (aged 14+ years) and 0.33 to each child (aged less than 14 years). The sum of the weights in each household gives the household's equivalised size – the size of the household in adult equivalents. The household equivalised weekly income is the reported household weekly income divided by the equivalised size of the household.

DIFFICULT LIFE CIRCUMSTANCES

The Difficult Life Circumstances scale (DLC; Johnson, Booth, & Barnard, 1989) identifies parents' perceptions of the existence of stressors and problems which are caused by factors such as substance, physical or emotional abuse, finances, community support and housing. *PFL* uses 15 items from this measure (α=0.69) and participants responded Yes or No as to the presence or absence of each problem. The total score was calculated by summing all items, providing a range of scores from 0 to 15. Difficulties were also grouped into 4 domains: difficulty with partner, health difficulty, housing difficulty, and financial difficulty. Scores for each domain represent the number of difficulties experienced by participants in that domain.

MATERIAL DEPRIVATION INDEX

Material deprivation was assessed using eleven deprivation indicators (α=0.81), taken from the EU Survey on Income and Living Conditions (EU-SILC, 2008). Participants indicated whether family members experienced a lack of any of the following items, and whether this was due to a lack of money or for another reason: Household heating (in the last year); a morning, afternoon, or evening out (in the last fortnight); two pairs of strong shoes; a roast meal (once a week); a meal with meat, chicken or fish (every second day); new (not second-hand) clothes; a warm, waterproof coat; keeping the home adequately warm; replacing any worn out furniture; having family or friends for a drink or meal (once a month); and buying presents for family or friends (at least once a year). Responses to these questions were recoded to represent the proportion of mothers who indicated enforced deprivation on at least one item. Enforced deprivation was defined as experiencing a lack of material goods due to financial reasons. Additionally, these eleven indicators were combined to create a continuous measure indicating the total number of items on which the mother noted deprivation.

2.10.2 Household Factors & SES Results

HOUSEHOLD FACTORS

One of the four measures in the Household factors category was in the hypothesised direction, however, none indicated a statistically significant difference between the high and low treatment groups. In addition, the step-down test showed that the joint effect of the four measures in the Household Factors category was not statistically significant.

MATERNAL EMPLOYMENT

Two of the three measures in the Maternal Employment category were in the hypothesised direction, and one indicated a statistically significant difference between the high and low treatment groups. 24% of mothers in the high treatment group were unemployed compared with 35% of the low treatment group (p<.10, d=.24). The step-down test showed that the joint effect of the three measures in the Maternal Employment category was not statistically significant.

PATERNAL EMPLOYMENT

None of the three measures in the Paternal Employment category were in the hypothesised direction, or statistically significant. In addition, the step-down test showed that the joint effect of the three measures in the Paternal Employment category was not statistically significant.

FINANCES

Seven of the eight measures in the Finances category were in the hypothesised direction, however none of the effects indicated a statistically significant difference. There was one measure that was significant in the non hypothesised direction. 91% of the high treatment group were in receipt of social welfare compared to 81% of the low treatment group ($p<.05$, $d=.30$). The step-down test showed that the joint effect of the eight measures in the Finances category was not statistically significant.

DIFFICULT LIFE CIRCUMSTANCES

One of the five measures in the Difficult Life Circumstances category was in the hypothesised direction, yet was not statistically significant. There was one significant measure in the non hypothesised direction. 41% of the high treatment group reported a financial difficulty, compared with 28% of the low treatment group ($p<.10$, $d=.27$). The step-down test showed that the joint effect of the five measures in the Difficult Life Circumstances category was not statistically significant.

NON STEP-DOWN MEASURES

Four of the nine measures which were not included in the above Step-down categories were in the hypothesised direction and one was statistically significant. 97% of the high treatment group reported that their partner was their child's father, compared with 89% of the low treatment group ($p<.10$, $d=.29$). There was also a difference in the non hypothesised direction, the high treatment group reported a higher number of difficult life circumstances, 2.21, compared with 1.58 in the low treatment group ($p<.05$, $d=.30$).

Table 2.8 - Results for High and Low Treatment Groups: Household Factors and SES

	Variable	N	(n_{HIGH}/n_{LOW})	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	Individual Test p^1	Step-down Test p^2	Effect Size d
Household Factors										
	Married	153	(79/74)	0.18	(0.38)	0.15	(0.36)	ns	ns	0.08
	Household size	153	(79/74)	4.62	(1.94)	4.70	(1.94)	ns	ns	0.04
	Has a partner	153	(79/74)	0.73	(0.44)	0.76	(0.43)	ns	ns	0.05
*	Resides with grandparent	153	(79/74)	0.29	(0.46)	0.23	(0.42)	ns	ns	0.14
Maternal Employment										
*	Mother unemployed	149	(78/71)	0.24	(0.43)	0.35	(0.48)	$p<.10$	ns	0.24
	Mother in paid employment	148	(77/71)	0.36	(0.48)	0.35	(0.48)	ns	ns	0.02
	Mother improvement in work status (between 12 and 18 months)	146	(76/70)	0.05	(0.22)	0.06	(0.23)	ns	ns	0.02
Paternal Employment										
	Father improvement in work status (between 12 and 18 months)	131	(69/62)	0.06	(0.24)	0.06	(0.25)	ns	ns	0.03
	Father in paid employment	131	(69/62)	0.49	(0.50)	0.55	(0.50)	ns	ns	0.11
*	Father unemployed	132	(69/63)	0.43	(0.50)	0.37	(0.49)	ns	ns	0.14
Finances										
	Saves regularly	152	(78/74)	0.47	(0.50)	0.42	(0.50)	ns	ns	0.11
*	Improvement in household financial situation over the next 12 months	149	(78/71)	0.86	(0.35)	0.83	(0.38)	ns	ns	0.08
	Improvement in household current financial situation compared to 12 months ago	151	(78/73)	0.71	(0.46)	0.67	(0.47)	ns	ns	0.07
*	Unemployment Benefit	154	(80/74)	0.30	(0.46)	0.32	(0.47)	ns	ns	0.05
	Equivalised weekly household income	139	(70/69)	239.68	(105.07)	234.51	(110.56)	ns	ns	0.05
*	Difficulty making ends meet	151	(78/73)	0.28	(0.45)	0.29	(0.46)	ns	ns	0.01
*	Material Deprivation Index	154	(80/74)	1.03	(1.78)	1.04	(1.63)	ns	ns	0.01
*	In receipt of Social Welfare	154	(80/74)	0.91	(0.28)	0.81	(0.39)	s~	ns	0.30
Difficult Life Circumstances										
*	Difficulty with neighbourhood	154	(80/74)	0.14	(0.35)	0.15	(0.36)	ns	ns	0.03
*	Difficulty with partner (past or present)	154	(80/74)	0.24	(0.43)	0.20	(0.40)	ns	ns	0.08
*	Health difficulty	154	(80/74)	0.38	(0.49)	0.32	(0.47)	ns	ns	0.11
*	Housing difficulty	154	(80/74)	0.35	(0.48)	0.27	(0.45)	ns	ns	0.17
*	Financial difficulty	154	(80/74)	0.41	(0.50)	0.28	(0.45)	s~	ns	0.27
Non Step-down Measures										
	Partner is the child's father	114	(58/56)	0.97	(0.18)	0.89	(0.31)	$p<.10$	-	0.29
	Same partner as 6 months ago	113	(58/55)	0.95	(0.22)	0.96	(0.19)	ns	-	0.07
*	Mother long-term unemployed	147	(77/70)	0.14	(0.35)	0.21	(0.41)	ns	-	0.19
	Mother in part-time employment	52	(27/25)	0.67	(0.48)	0.60	(0.50)	ns	-	0.14
*	Father long-term unemployed	129	(67/62)	0.22	(0.42)	0.19	(0.40)	ns	-	0.07
*	Materially Deprived (on at least one item)	154	(80/74)	0.41	(0.50)	0.45	(0.50)	ns	-	0.07
	Father's annual wage	50	(25/25)	24487	(10703)	25482	(12834)	ns	-	0.09
	Mother annual wage	19	(9/10)	23537	(8462)	25205	(12387)	ns	-	0.16
*	* Difficult Life Circumstances Total	154	(80/74)	2.21	(2.47)	1.58	(1.60)	s~	-	0.30

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 100,000 replications. [2] one-tailed (right-sided) p value from a Step-down permutation test with 100,000 replications. * indicates the variable was reverse coded for the testing procedure. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. *'s~'* indicates that the variable was significant in a left-sided test. The variables are reported in order of the largest to the smallest T statistic within each Step-down category.

2.11 Main Results Summary: High & Low Treatment Groups

Consistent with the programme evaluation literature, limited significant findings were expected to be observed between the high and low treatment groups at eighteen months. At this early stage of programme implementation, there has been an average of 27 visits by programme staff to each *PFL* family. While there were few statistically significant differences between the groups, many of the outcomes were in the hypothesised direction with the high treatment group reporting somewhat better outcomes than the low treatment group. Despite these limitations, there were some significant findings.

CHILD DEVELOPMENT

Children in the high treatment group and children in the low treatment group did not differ significantly across many of the child developmental domains including problem solving, communication and socio-emotional well-being. However, the following significant differences were identified:

- Children in the high treatment group scored higher than children in the low treatment group and were less at risk of being developmentally delayed on the ASQ Gross Motor scale.
- Children in the high treatment group were less likely to be at risk of being developmentally delayed on the ASQ Personal-Social Scale.
- Children in the high treatment group scored higher on the DP-3 scale of cognitive development than children in the low treatment group.

CHILD HEALTH

Children in the high treatment group and children in the low treatment group did not differ significantly across many child health domains including breathing problems, immunisations, and current weight amongst others. However, the following significant differences were identified:

- Children in the high treatment group were less likely to have been hospitalised than children in the low treatment group.
- Children in the high treatment group were more likely to have better health than children in the low treatment group.
- Children in the high treatment group were more likely to eat greater amounts of protein and dairy, but less grains, than children in the low treatment group.

PARENTING

Mothers in the high treatment group and mothers in the low treatment group did not differ significantly across many of the parenting domains including parenting daily hassles and maternal separation anxiety. However, the following significant differences were identified:

- Mothers in the high treatment group reported more interaction with their child than mothers in the low treatment group.
- More mothers in the high treatment group reported being worried about their child's language development compared to mothers in the low treatment group.

HOME ENVIRONMENT AND SAFETY

A number of significant findings were observed on the home environment domain including:

- Parents in the high treatment group were less likely to demonstrate restrictive behaviours towards their child than parents in the low treatment group.
- Parents in the high treatment group were more likely to demonstrate acceptance of negative behaviours than parents in the low treatment group.
- Children in the high treatment group were more likely to have a clean and safe home environment than children in the low treatment group.
- Mothers in the high treatment group reported more interaction with their child than mothers in the low treatment group.
- Children in the high treatment group were more likely than children in the low treatment group to have learning materials available to them in their home.
- Families in the high treatment group were more likely to have electrical socket covers in their homes.
- Children in the high treatment group were less likely to be exposed to cigarette smoke than children in the low treatment group.
- Families in the high treatment group were less likely to use safety gates in their homes than those in the low treatment group.

MATERNAL HEALTH

Mothers in the high treatment group did not differ significantly from mothers in the low treatment group across health domains such as general health, substance abuse, self-concept and mental health and post-natal depression. However, a number of significant differences between the two groups were identified:

- Mothers in the high treatment group were more likely to use hospital services, and use health services in general, than mothers in the low treatment group.
- Mothers in the high treatment group were less likely to report binge drinking at least twice a week.
- More mothers in the high treatment group were pregnant at the time of the eighteen month interview.

MATERNAL SOCIAL SUPPORT

Mothers in the high treatment group did not differ significantly from mothers in the low treatment group in terms of social support across such domains as father support, support from friends, relatives or voting behaviour. However, one significant difference was identified:

- Mothers in the high treatment group were more likely to receive a lot of support from their parents than the low treatment group.

CHILDCARE AND SERVICE USE

Families in the high treatment group did not differ significantly from families in the low treatment group in terms of childcare type and use, the number of hours per week the child was enrolled in childcare, and age in which child was placed in childcare. Also, there were no significant differences between the high and low treatment groups in utilisation of education, employment, health and other available community services. There was one significant difference between the high and low treatment group in this domain:

- The high treatment group reported less satisfaction with childcare than the low treatment group.

HOUSEHOLD FACTORS AND SES

Families in the high treatment group did not differ significantly from families in the low treatment group in terms of household size, marital status, paternal employment or material deprivation. There were a number of significant differences between the high and low treatment group in this domain:

- Mothers in the high treatment group were less likely to be unemployed than those in the low treatment group.
- Families in the high treatment group were more likely to be in receipt of social welfare payments and were more likely to report financial difficulties than families in the low treatment group.
- Mothers in the high treatment group were more likely to report that their partner was their child's father.
- Families in the high treatment group reported more difficulties in their life circumstances than families in the low treatment group.

SUMMARY

Overall, 152 outcome measures were assessed at eighteen months. Of these one-tailed tests, 88 (58%) were in the hypothesised direction such that the high treatment group had better outcomes than the low treatment group, and 21 (14%) of these differences were statistically significant. These differences were found across all domains except childcare and service use. 60 (40%) of the measures were in the non-hypothesised direction, such that the low treatment group had better outcomes than the high treatment group, and 9 (6%) of these were statistically significant. These differences were found across all domains. Most effects were found in the doimans of home environment and child health. Of the 27 step-down measures, 5 were significant, child health in the last 6 months and appropriate food, both in the child health domain, interaction with child in the parenting domain and HOME scores in the home environment domain.

Chapter Three

Comparison Group and Dynamic Results Summary

This chapter presents summaries of additional results comparing the eighteen month outcomes of the low treatment group to the comparison group and the eighteen month dynamic analysis results which examines change in child and parent outcomes over time for the high and low treatment group. The purpose of these analyses is to explore different aspects of the data not captured in the main analysis.

3.1 Low Treatment and Comparison Group Analyses

This section presents the results comparing the eighteen month outcomes of the low treatment group to the external comparison group. As the *PFL* community is small, the purpose of the comparison group is to have an outside community sample who are not at risk of contaimination from the high treatment group. Comparing the outcomes of the low treatment group to the comparison group allows us to ascertain if there are systematic differences between the two. If the low treatment group outperforms the comparison group it may be an indication that the low treatment group has been contaminated by the high treatment group and thus is not a viable comparison group for determining the impact of the *PFL* programme.

3.1.1 Hypotheses

We hypothesise that there will be statistically significant differences between the *PFL* low treatment group and the *LFP* community comparison group in both the hypothesised and non-hypothesised direction. Controlling for the baseline differences between the groups, a finding that the low treatment group have outperformed the comparison group at eighteen months suggests that the low treatment group may be receiving some *PFL* supports.

3.1.2 Key Findings: Low Treatment Group & Comparison Group

Of the 143 items included in the analysis, there were findings in the hypothesised direction for 38 measures (27%) such that the low treatment group outperformed the comparison group. There were positive significant differences between the low treatment group and the comparison group on 9 of these measures (6%), with most effects in the domains of child development, health and childcare. However, only two of these effects remained significant in the multiple hypothesis analysis, child development and health. In addition, there were 104 differences in the non-hypothesised direction such that the comparison group outperformed the low treatment group, and 22 of these were statistically significant (15%). These findings were in all areas except childcare. These results are detailed below.

CHILD DEVELOPMENT

Children in the low treatment group and children in the comparison group did not differ significantly across many of the child developmental domains including social, emotional and cognitive development scores. However, the following significant differences were identified:

- Children in the low treatment group scored higher for communication skills, but lower for gross motor skills than children in the comparison group.
- More children in the low treatment group could combine words and use communicative gestures than children in the comparison group. The communicative development step-down category was significant as a result of these findings.

CHILD HEALTH

Children in the low treatment group and children in the comparison group differed significantly across many child health domains, including:

- Children in the low treatment group were more likely to have had a chest infection and asthma in the last 6 months than children in the comparison group.
- Children in the low treatment group were more likely to have been taken to the GP, health service or casualty, and be hospitalised.
- Fewer children in the low treatment group were reported to have had good health.
- Children in the low treatment group were more likely to have been vaccinated against swine flu.
- Children in the low treatment group were more likely to consume grains, treats and less likely to consume formula than children in the comparison group.

PARENTING

Mothers in the low treatment group and mothers in the comparison group did not differ significantly across many of the parenting domains including the frequency and type of parenting daily hassles and maternal separation anxiety. However, the following significant differences were identified:

- Mothers in the low treatment group were more likely to report reading to their child than mothers in the comparison group.
- Mothers in the low treatment group were less worried about their child's language development than mothers in the comparison group.

HOME ENVIRONMENT AND SAFETY

Family home environments in the low treatment group and the comparison group did not differ significantly across some of the measured domains including child outings, parental involvement, toys available and safety amongst others. However, a number of significant differences were identified:

- Children in the low treatment group were less likely to have a clean and safe home environment than children in the comparison group.
- Children in the low treatment group were less likely to have learning materials available to them than children in the comparison group.
- Parents in the low treatment group were less likely to demonstrate acceptance of negative behaviour than parents in the comparison group.
- Parents in the low treatment group were more likely to demonstrate restrictive behaviours towards their child during the research interview than parents in the comparison group.
- Families in the low treatment group used less safety items in their homes than those in the comparison group.

MATERNAL HEALTH

Mothers in the low treatment group did not differ significantly from mothers in the comparison group across most health domains such as health in the previous 6 months, substance use, smoking habits and pregnancy status. However, a number of significant differences between the two groups were identified:

- Mothers in the low treatment group were more likely to report post natal depression than mothers in the comparison group.
- Mothers in the low treatment group scored lower than mothers in the comparison group on a measure of self-control.
- Mothers in the low treatment group were less likely to have changed their drinking habits compared to mothers in the comparison group.

MATERNAL SOCIAL SUPPORT

Mothers in the low treatment group did not differ significantly from mothers in the comparison group in terms of social support across the majority of domains such as father support, support from friends, social support or voting behaviour. However, one significant difference was identified:

- Mothers in the low treatment group were less likely to receive a lot of support from their parents than the comparison group.

CHILDCARE AND SERVICE USE

Families in the low treatment group did not differ significantly from families in the comparison group in terms of childcare use, the number of hours per week the child was enrolled in childcare, and age in which child was placed in childcare. However, there were a number of significant differences between the low treatment and comparison groups in this domain:

- The low treatment group were more likely to use formal childcare and less likely to use grandmother care than the comparison group.

HOUSEHOLD FACTORS AND SES

Families in the low treatment group did not differ significantly from families in the comparison group in terms of household factors, employment or difficult life circumstances. There were a number of significant differences between the low treatment and comparison groups in this domain:

- Less families in the low treatment group received unemployment benefit than families in the comparison group.
- In the low treatment group, fewer mothers were in a relationship with the child's father when compared to the comparison group.
- Mothers in the low treatment group reported lower wages than mothers in the comparison group.
- Families in the low treatment group were more likely to report being deprived than families in the comparison group.

Overall, the mixed results of the low treatment group and comparison group analysis support the study design as they suggest that the low treatment group is not systematically better than the comparison group across most domains. As the comparison group outperform the low treatment group on many more items than the low treatment group outperforms the comparison group, it suggests that the low treatment group is not receiving the services and supports designed for the high treatment group.

3.2 Dynamic Analysis – Analysing Change over Time

A number of standardised instruments used to evaluate the *Preparing For Life* programme are collected at multiple time points. This allows us to compare the responses for the same participants over time in order to track changes in child and parent outcomes. It also allows us to examine changes in outcomes across the high treatment and low treatment groups.

Table 3.1 lists the instruments collected at multiple time points between baseline and the eighteen month data collection point. Two child development instruments (ASQ & ASQ:SE) were used at the six, twelve and eighteen month data collection points, and three child development instruments (CDI, BITSEA & DP-3) were used at twelve and eighteen months. One maternal health measure was available at six and eighteen months (EPDS) and one was available at baseline and eighteen months (Rosenberg). There are also four measures of the environment which were available at two time points. The HOME, FSS, and Interactions with Baby scale were available at six and eighteen months, and the MDI was available at baseline and eighteen months.

Table 3.1 - Instruments included in the dynamic analysis

	Measure	Baseline	6 Month Interview	12 Month Interview	18 Month Interview
Child outcomes	Ages & Stages Questionnaire (ASQ)		X	X	X
	Ages & Stages Questionnaire (ASQ) Social/Emotional		X	X	X
	MacArthur-Bates Communicative Development Inventory (CDI)			X	X
	Brief Infant Toddler Social and Emotional Assessment (BITSEA)			X	X
	Developmental Profile 3 (DP-3)			X	X
Maternal Health	Edinburgh Postnatal Depression Scale (EPDS)		X		X
	Rosenberg Self-Esteem Scale	X			X
Environment	Home Observation for Measurement of the Environment (HOME)		X		X
	Framingham Safety Survey (FSS)		X		X
	Maternal Deprivation Index (MDI)	X			X
	Interaction with Baby		X		X

This section briefly describes the statistical methods which are used to compare changes in these outcomes across groups over time and then presents the results of the analysis and concludes.

The methodology adopted to evaluate change in parent and child outcomes over time is the Differences-in-Differences method. This method, adapted from Ashenfelter and Card (1985), is used to account for any underlying trends within the data and reduce the probability of producing a biased estimate of programme impact. A simple two-period comparison can be conducted by subtracting the pre-post difference in the treatment group from the pre-post difference in the comparison group, and testing whether those differences are statistically significant. For a detailed explanation of the Differences–in-Differences method please see the report 'Assessing the impact of *Preparing For Life* at twelve months' at http://geary.ucd.ie/preparingforlife.

3.2.1 Dynamic Analysis Results

CHILD DEVELOPMENT

The ASQ Scores were standardised to a mean of 100 and standard deviation of 15 to ensure comparability amongst the time points. All the other child development measures are comparable across time and thus are not standardised. The comparison of the standardised ASQ scores found a statistically significant difference in the Fine Motor skills of the high and low treatment groups between six to twelve months. The fine motor skills of the high treatment group increased between six and twelve months, while the fine motor skills of the low treatment group decreased during this time point. There were no significant differences on any of the other child development measures.

MATERNAL HEALTH & WELL-BEING

The comparison of the high and low treatment groups on measures of maternal health and well-being revealed no significant differences over time.

Overall, the dynamic analysis results using the Differences-in-Differences method were limited. Three of the 43 measures measured (7%) over three domains were significant. As such, these results are in line with the single time point analyses which also report limited effects.

HOME ENVIRONMENT & INTERACTIONS WITH CHILD

The comparison of the HOME scores over time identified two significant differences between the high and low treatment group. Specifically, differences were found on the restriction sub-domain, which measures levels of inappropriate physical and verbal punishment, and the acceptance sub-domain, which reflects the avoidance of unnecessary punishment in response to child behaviour. In both instances, scores on these sub-domains between six and eighteen months declined for both the high and low treatment groups. However, in each case scores between the two groups were similar at six months but the high treatment group had significantly higher scores than the low treatment group at eighteen months. In other words, the high treatment group did not decline as much as the low treatment group, such that between six and eighteen months the high treatment group had significantly higher HOME restriction and HOME acceptance scores. There were no significant differences on any of the other home environment or interaction with child measures.

Chapter Four

Implementation Analysis

Experimental evaluations of early childhood programmes are considered the optimal means of identifying whether a programme has a causal impact on the participating families. However, deviations from the programme protocol can compromise the evaluation and bias the results. The issues of attrition and engagement from home visiting programmes and the implications for evaluations of such programmes are discussed in detail in Chapter 4 of '*Preparing for Life* Early Childhood Intervention: Assessing the Early Impact of *Preparing for Life* at Six Months'. This chapter describes and analyses *PFL* implementation practices regarding participant attrition, engagement, and potential contamination between programme intake and when the *PFL* child was eighteen months of age.

4.1 *PFL* Attrition up to Eighteen Months of Age

Attrition occurs when participants withdraw from a programme before its completion. It is important to investigate the extent of programme attrition from *PFL* as the existence of systematic attrition may break the key rationale underlying the randomisation process and lead to biased results. This section investigates the level and determinants of attrition in the *PFL* sample between baseline and the eighteen month survey.

4.1.1 Attrition/Disengagement in *PFL*

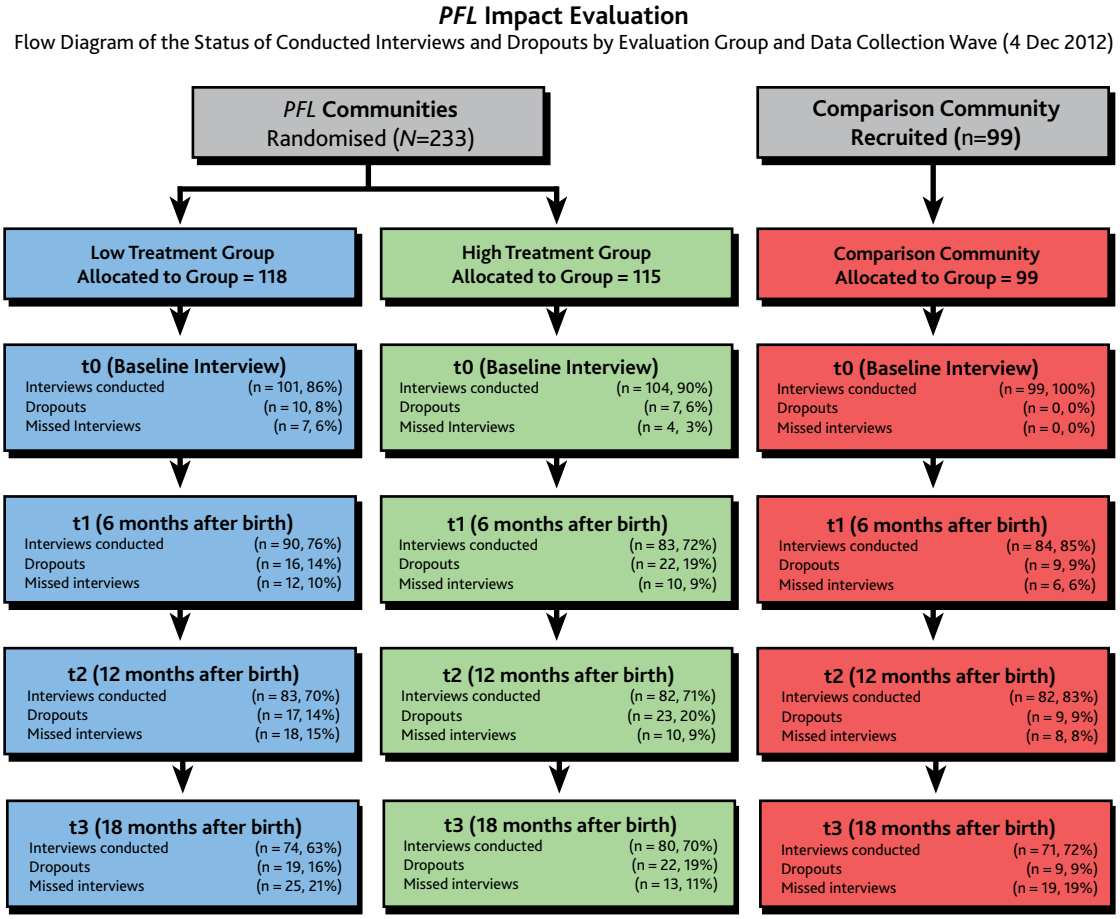
The Consort Diagram (Figure 4.1) describes the progression of the participants between programme entry and eighteen months. In total, 225 eighteen month interviews (n*High* = 80; n*Low* = 74; n*LFP* = 71) were completed. These 225 participants represent 68% of the original sample recruited into the study (n*High* = 115; n*Low* = 118; n*LFP* = 99). The eighteen-month completion rate was similar for the high treatment group (70%) and the comparison group (72%), and lowest for the low treatment groups (63%).

Dropout participants are defined as those who actively told the *PFL* programme staff or the evaluation team that they wanted to leave the programme. On average, 15% of the sample were classified as official 'dropouts' between baseline and eighteen months, with the highest dropout rate experienced among the high treatment group at 19%, while the low treatment group experienced a dropout rate of 16%. 9% of the comparison group dropped out of the evaluation after completing the baseline interview, but prior to completing an eighteen month interview. The dropout rate between twelve and eighteen months was minimal however. None of the comparison group or the high treatment group dropped out during this period, and only two of the low group participants dropped out between twelve and eighteen months. Indeed there was one participant in the high treatment group who reengaged with the programme at eighteen months after originally dropping out. The most frequently cited reason given by those who left the programme prior to eighteen months was time constraints. Many former participants felt that their busy schedules restricted them from participating. A number of former participants also suggested that their children did not need the programme, that the interview questions were too personal and that a five year commitment was too long.

In addition to those who dropped out, 17% of the sample did not complete an eighteen month interview as either the interview could not be scheduled at a suitable time during the appropriate interview window or the participants disengaged from the study. Disengaged participants (those who missed interviews) are those who did not respond to repeated attempts by the evaluation team to be contacted or those who declined to be interviewed. The rates across the high and low treatment groups were 11% and 21% respectively between baseline and eighteen months, and the corresponding rate for the comparison group was 19%. The extent of missed interviews between twelve and eighteen months was highest among the comparison group, rising from 8% to 19%. It is possible that some of these participants will re-engage at later data collection waves. Overall, the level of attrition is higher among the high treatment group and the level of disengagement is higher among the low treatment group, however the total level of attrition/disengagement is relatively similar across the two samples (*High* = 30%; *Low* = 37%) from randomisation to the eighteen month interview, with the majority of attrition/disengagement occurring prior to the six month interview.

[1]Please see the following website under publications http://geary.ucd.ie/preparingforlife

Figure 4.1 - Eighteen Month Consort Diagram



Note: Dropout participants include both voluntary and involuntary dropouts.

4.1.2 Analysis of Attrition/Disengagement before Eighteen Months

It is important to examine whether the attrition and disengagement/missed interviews has led to systematic differences which may bias the outcome results. The analysis below compares the baseline characteristics of participants who completed an eighteen month interview to those who did not complete an eighteen month interview. Thus, the analysis of 'attritors' includes those who have officially dropped out of the programme between baseline and eighteen months and those who missed the eighteen month interview during the appropriate time window and/or disengaged from the programme during this period. These baseline characteristics were chosen based on the literature presented in '*Preparing For Life* Early Childhood Intervention: Assessing the Early Impact of *Preparing For Life* at Six Months'. The high treatment group, low treatment group and comparison group are analysed separately.

Table 4.1 reports the baseline characteristics of the high treatment group by attrition status and tests for significant differences between the attrition sample and the non-attrition sample based on each characteristic. It shows that of the 21 maternal characteristics examined, statistically significant differences were found for three measures. Specifically, high treatment group mothers who did not complete an eighteen month interview were less likely to be employed at baseline ($p<.05$), had lower levels of cognitive resources ($p<.10$), and were less likely to have consumed alcohol during pregnancy ($p<.10$).

Table 4.1 - Comparison of Baseline Characteristics between Attrition/Disengaged and Non-attrition/Engaged sample: High Treatment Group

Variables	Attrition/Disengaged			Non-Attrition/Engaged			Individual Test
	N	*Mean*	*SD*	*N*	*Mean*	*SD*	*p*
Weeks in pregnancy at programme entry	24	20.46	7.61	80	21.93	7.93	ns
Mother's age	24	23.92	5.46	80	25.93	5.91	ns
Partnered	24	0.75	0.44	80	0.79	0.42	ns
Married	24	0.08	0.28	80	0.16	0.37	ns
Living with parent(s)	24	0.67	0.48	80	0.54	0.50	ns
First time mother	24	0.58	0.50	80	0.53	0.50	ns
Low education	24	0.46	0.51	80	0.30	0.46	ns
Mother employed	24	0.17	0.38	80	0.43	0.50	$p<.05$
Saves regularly	24	0.42	0.50	80	0.49	0.50	ns
Social housing	23	0.57	0.51	80	0.55	0.50	ns
Cognitive resources (WASI)	11	75.09	12.65	79	83.32	12.35	$p<.10$
Vulnerable attachment (VASQ)	24	19.04	3.14	80	18.00	3.92	ns
Self efficacy (Pearlin)	24	2.69	0.74	80	2.80	0.60	ns
Self esteem (Rosenberg)	24	12.33	3.06	80	12.96	2.58	ns
Knowledge of infant development (KIDI)	24	71.55	9.04	80	74.5	7.16	ns
Positive parenting attitudes (AAPI)	24	5.15	1.84	80	5.28	1.22	ns
Physical health condition	24	0.75	0.44	80	0.75	0.44	ns
Mental health condition	24	0.33	0.48	80	0.26	0.44	ns
Smoking during pregnancy	24	0.50	0.51	80	0.51	0.50	ns
Drinking during pregnancy	24	0.13	0.34	80	0.29	0.46	$p<.10$
Drug ever used	24	0.08	0.28	80	0.15	0.36	ns

Note: *N*=sample size, *M*=mean, *SD*=standard deviation. *p-values* were obtained from two-sided t tests based on permutation testing with 1000 replications. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively.

Table 4.2 reports the baseline characteristics of the low treatment group by attrition status and tests for significant differences between the attrition sample and the non-attrition sample based on each characteristic. It shows that of the 21 maternal characteristics examined, statistically significant differences were found on four measures. Specifically, low treatment group mothers who did not complete their eighteen month interview had lower levels of cognitive resources ($p<.05$), a more vulnerable attachment style ($p<.05$), lower self-efficacy ($p<.05$), and less knowledge of child development ($p<.05$).

Table 4.2 - Comparison of Baseline Characteristics between Attrition/Disengaged and Non-attrition/Engaged sample: Low Treatment Group

Variables	Attrition/Disengaged			Non-Attrition/Engaged			Individual Test
	N	*Mean*	*SD*	*N*	*Mean*	*SD*	*p*
Weeks in pregnancy at programme entry	28	21.39	7.88	73	21.32	6.61	ns
Mother's age	28	24.61	5.76	73	25.56	6.10	ns
Partnered	28	0.89	0.32	76	0.82	0.39	ns
Married	28	0.25	0.44	73	0.15	0.36	ns
Living with parent(s)	28	0.46	0.51	73	0.47	0.50	ns
First time mother	28	0.57	0.50	73	0.47	0.50	ns
Low education	28	0.54	0.51	73	0.34	0.48	ns
Mother employed	28	0.36	0.49	73	0.41	0.50	*ns*
Saves regularly	28	0.46	0.51	73	0.53	0.50	ns
Social housing	28	0.61	0.50	73	0.53	0.50	ns
Cognitive resources (WASI)	18	73.33	14.36	73	82.14	12.21	$p<.05$
Vulnerable attachment (VASQ)	28	19.43	4.65	73	17.21	3.54	$p<.05$
Self efficacy (Pearlin)	28	2.66	0.48	73	2.96	0.62	$p<.05$
Self esteem (Rosenberg)	28	12.68	2.57	73	12.82	2.97	ns
Knowledge of infant development (KIDI)	28	66.94	7.06	73	70.92	8.37	$p<.05$
Positive parenting attitudes (AAPI)	28	4.74	1.66	73	5.27	1.30	ns
Physical health condition	28	0.61	0.50	73	0.63	0.49	ns
Mental health condition	28	0.18	0.39	73	0.26	0.44	ns
Smoking during pregnancy	28	0.50	0.51	73	0.47	0.50	ns
Drinking during pregnancy	28	0.25	0.44	73	0.27	0.45	*ns*
Drug ever used	28	0.21	0.42	73	0.12	0.33	ns

Note: *N*=sample size, *M*=mean, *SD*=standard deviation. *p-values* were obtained from two-sided t tests based on permutation testing with 1000 replications. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively.

Table 4.3 reports the baseline characteristics of the comparison group by attrition status and tests for significant differences between the attrition/disengaged sample and the non-attrition/engaged sample based on each characteristic. It shows that of the 21 maternal characteristics examined, three statistically significant differences were found. Specifically, comparison group mothers who did not complete their eighteen month interview joined the programme later in pregnancy ($p<.10$), were more likely to be living with their parents at the time of the baseline interview ($p<.10$), and had lower levels of self-efficacy ($p<.05$).

Table 4.3 - Comparison of Baseline Characteristics between Attrition/Disengaged and Non-attrition/Engaged sample: Comparison Group

Variables	Attrition/Disengaged			Non-Attrition/Engaged			Individual Test
	N	*Mean*	*SD*	*N*	*Mean*	*SD*	*p*
Weeks in pregnancy at programme entry	28	27.04	6.86	71	24.42	6.00	*p*<.10
Mother's age	28	25.82	6.23	71	27.86	6.14	ns
Partnered	28	0.79	0.42	71	0.90	0.30	ns
Married	28	0.14	0.36	71	0.20	0.40	ns
Living with parent(s)	28	0.46	0.51	71	0.27	0.46	*p*<.10
First time mother	28	0.39	0.50	71	0.42	0.50	ns
Low education	28	0.36	0.49	71	0.21	0.41	ns
Mother employed	26	0.31	0.47	71	0.48	0.50	*ns*
Saves regularly	25	0.60	0.50	71	0.55	0.50	ns
Social housing	27	0.52	0.51	71	0.39	0.49	ns
Cognitive resources (WASI)	17	83.12	15.33	71	89.35	13.33	*ns*
Vulnerable attachment (VASQ)	28	17.36	3.75	71	16.73	3.54	ns
Self efficacy (Pearlin)	28	2.60	0.73	71	2.95	0.66	*p*<.05
Self esteem (Rosenberg)	28	12.50	2.57	71	13.25	3.27	ns
Knowledge of infant development (KIDI)	28	71.79	7.85	71	73.36	9.03	ns
Positive parenting attitudes (AAPI)	28	5.41	1.61	71	5.83	1.30	ns
Physical health condition	28	0.75	0.44	71	0.63	0.49	ns
Mental health condition	27	0.44	0.51	71	0.34	0.48	ns
Smoking during pregnancy	28	0.39	0.50	71	0.32	0.47	ns
Drinking during pregnancy	28	0.21	0.42	71	0.34	0.48	*ns*
Drug ever used	28	0.14	0.36	71	0.16	0.36	ns

Note: *N*=sample size, *M*=mean, *SD*=standard deviation. *p-values* were obtained from two-sided t tests based on permutation testing with 1000 replications. '*p*<.01', '*p*<.05' and '*p*<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively.

4.1.3 Key Findings

The level of official attrition from *PFL* between baseline and eighteen months was quite low at 15% across the whole sample. Importantly, the level of official attrition was minimal between the twelve and eighteen month interview rounds, with no attrition experienced in the high treatment group or the comparison group and only 2% attrition in the low treatment group. Overall official attrition between programme intake and eighteen months is slightly higher among the high treatment group (19%) than among the low treatment group (16%) who were less intensively engaged in the *PFL* programme. As the high treatment group were more regularly in contact with the *PFL* programme staff they had more opportunities to officially inform the staff of their desire to drop out from the programme. Indeed, a greater proportion of the low treatment group (21%) was classified as disengaged or missed their eighteen month interview when compared with the high treatment group (11%). Thus it is possible that many of the participants who were missed during the eighteen month survey represent participants who are less engaged with the programme and more inclined to drop out. Total non-completion (attrition & disengaged) at eighteen months is highest among the high treatment group (37%), followed by the low treatment group (30%), and lowest among the comparison group (28%). However, it is important to note that the proportion of the comparison group who did not participate at eighteen months rose considerably between twelve and eighteen months compared to previous waves.

In order to test for non-random attrition, we compared the baseline characteristics of those who participated in the eighteen month survey to those who did not. Overall, there is weak evidence that there are systematic differences between these groups. In general, we found that more disadvantaged participants were difficult to contact or had dropped out of the programme by eighteen months. For example, in the low treatment group, those who did not participate in this survey had lower levels of psychological resources regarding cognition, self-efficacy, and attachment style. They also had less knowledge of infant development. Mothers in the high treatment group who did not participate in the survey were less likely to be employed and had lower levels of cognitive resources, but they were less likely to have consumed alcohol during pregnancy. For the comparison group, mothers who did not complete an eighteen month survey had lower levels of self-efficacy and were more likely to be living with their parents. However, as shown in previous reports, the majority of individual characteristics were not associated with attrition from the programme. It will be important to examine the attrition rate at each subsequent survey wave in order to understand whether truly systematic patterns emerge.

4.2 Participant Engagement up to Eighteen Months of Age

Engagement refers to the amount of treatment an individual receives during the programme, such as the duration of a prescribed activity or information session, or the frequency with which a participant meets with her mentor. Reviews of home visiting programmes report that, among families who have not dropped out, approximately half of all prescribed home visits are not received (Gomby et al., 1999; Rapoport & O'Brien-Strain, 2001). This is a significant issue as increased frequency of home visits is associated with better child outcomes (Kahn & Moore, 2010; Lyons-Ruth & Melnick, 2004; Nievar, et al., 2010; Sweet & Appelbaum, 2004). A number of individual, programme and community factors have been identified as important predictors of engagement in home visiting programmes. This section investigates the level of participant engagement and the determinants of engagement in the *PFL* sample between baseline and the eighteen month survey.

4.2.1 Instruments

Information on participant engagement within *PFL* was gathered from two sources – the *PFL* database maintained by the *PFL* mentors and survey responses from participants at the eighteen month interview.

MENTOR DATA

Participant engagement using the mentor data was measured in three ways: a) the number of home visits a participant received from entry into the programme until their child was eighteen months old, b) the percentage of prescribed home visits delivered between intake and eighteen months (calculated by dividing the number of visits delivered by the number of prescribed visits for this period), and c) the total duration in hours of all delivered home visits between intake and eighteen months. As there were participants who were randomised into a treatment condition but never engaged with the programme, we examined these measures by restricting the sample to those who have received at least one home visit, although they may have subsequently dropped out of the study. Given that the mentors worked solely with those in the high treatment group, the analysis of engagement was restricted to participants in the high treatment group.

PARTICIPANT DATA

The frequency of meetings that a participant has with their mentor (high treatment group) or information officer (low treatment group) was measured using a single question which asked how often the participant meets with their mentor/information officer. Possible responses were once a week, twice a month, once a month, less than once a month, or other.

4.2.2 Participant Engagement from Mentor Records

Table 4.4 provides a summary of participant engagement in the *PFL* programme between programme entry and eighteen months of age for the high treatment group. The analysis is disaggregated into the prenatal period, birth to six months, six to twelve months, twelve to eighteen months, and total engagement up to eighteen months, and includes any participant who received at least one home visit in any period. Thus, the analysis includes those who may have dropped out of the programme before eighteen months. The *PFL* manual initially set guidelines of weekly home visits during the pre and postnatal period; however, the implementation team moved to fortnightly visits soon after the programme began as weekly visits were not feasible to the majority of the *PFL* participants. Thus, the figures below are estimated based on prescribed fortnightly visits.

The prescribed number of prenatal home visits was dependent on when the participant joined the programme. Thus, based on average entry into the programme, the prescribed number of home visits between programme entry and eighteen months was 49 home visits. Table 5.4 shows that on average, participants in the high treatment group received 27 home visits between programme entry and eighteen months. The minimum number of visits received was 1 and the maximum was 66. The average number of home visits in the pre-natal period was 6.2 and the average number of visits in the subsequent periods was quite similar at 7.6, 6.9 and 6.3 for each six month period after birth. Thus, the number of home visits delivered has fallen slightly in the twelve to eighteen month period. Figure 4.2 displays the variation in the number of home visits over the entire period.

These figures were used to calculate the proportion of prescribed home visits actually delivered. Table 4.4 shows that based on a fortnightly prescribed visit, 55% of visits were delivered on average. The proportion is relatively similar in the different phases of the programme, however a smaller proportion of visits were delivered in the most recent period, compared to previous periods.

Table 4.4 also reports the average and total duration of all home visits. These times are based on the amount of time the mentor spent with the participant during the home visit. On average, each visit was 56.5 minutes long, with the shortest visit lasting 5 minutes and the longest visit lasting an hour and a half. The duration of home visits was similar across the different time periods. On average, the high treatment group spent 26.5 hours participating in home visits. The minimum duration spent in home visits was 5 minutes and the maximum was 57 hours in total. Figure 4.3 displays the variation in the duration of home visits over the entire period.

Table 4.4 - Participant Engagement in Home Visits in *PFL* up to 18 Months of Age

	Prenatal – Birth	Birth - 6 Months	6 Months – 12 Months	12 Months – 18 Months	Total
Prescribed no. of home visits (based on bi-monthly visits)	10	13	13	13	49
Delivered no. of home visits	6.2 (4.3) 0-21	7.6 (4.2) 0-19	6.9 (4.3) 0-17	6.3 (4.1) 0-21	27.0 (14.5) 1-66
% of prescribed home visits delivered (based on bi-monthly visits)	67.3 (45.5) 0-350	58.0 (32.0) 0-146	53.0 (33.2) 0-131	48.2 (31.8) 0-162	55.1 (28.8) 2-137
Mean duration of home visits (mins)	55.1 (17.6) 5-111	59.1 (11.9) 33-91	57.8 (12.5) 15-90	59.9 (11.0) 36-105	56.5 (11.1) 5-82
Total duration of home visits (hours)	5.8 (4.1) 0-18	7.6 (4.6) 0-19	6.8 (4.4) 0-18	6.3 (4.3) 0-19	26.5 (15.1) 0.1-57
N	96	96	96	96	

Note: The table presents the mean, standard deviation in parentheses, and the minimum and maximum values. These statistics were calculated for participants who received at least one home visit during the prenatal to eighteen month period. However, for the mean duration, the sample size varies depending on the time period under examination as an average cannot be calculated for participants who received zero visits during the restricted time period.

Figure 4.2 - Variation in Number of Home Visits from Programme Entry to 18 Months

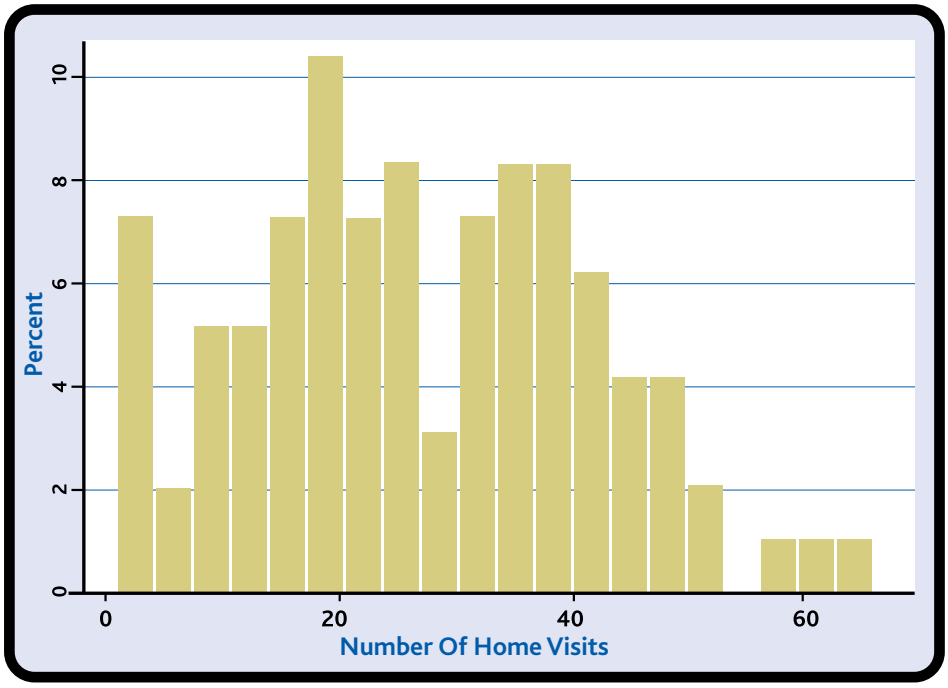
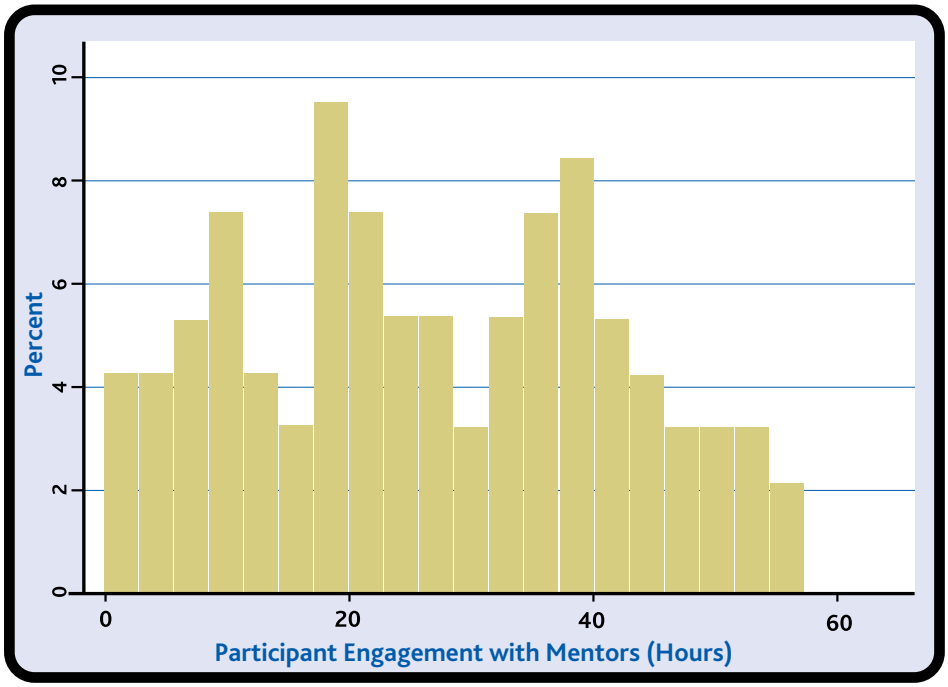


Figure 4.3 - Variation in Duration of Home Visits from Programme Entry to 18 Months



4.2.3 Participant Engagement from Participant Interviews

HIGH TREATMENT GROUP

Based on participant responses to the eighteen month interview, 6% of participants in the high treatment group reported meeting with their mentor once a week, 69% reported meeting twice a month, 19% reported meeting once a month, and 5% reported meeting their mentor less than once a month. Thus the majority of participants reported meeting their mentor fortnightly. The *PFL* mentor database finds that zero participants received weekly visits, 6% received fortnightly visits, 55% received monthly visits and approximately 39% received home visits less than once a month on average. These differing engagement figures suggest that the participants may be over-reporting how often they meet with their mentor.

LOW TREATMENT GROUP

Based on participant responses to the eighteen month interview, 5% of participants in the low treatment group reported meeting the Information Officer (IO) more than once a month and 95% reported meeting less than once a month. This corresponds to the *PFL* manual which states that the low treatment group should not receive any scheduled meetings. Rather, participants may schedule a meeting with the IO at their discretion.

4.2.4 Factors Associated with Engagement in Home Visiting

As described above, participants in the high treatment group were exposed to different degrees of treatment dosage and intensity as defined by the number of home visits they received and the length of contact time with mentors. In this section we examined the factors associated with participant engagement in the home visiting sessions between programme entry and eighteen months. Specifically, we examined the relationships between participant engagement and a range of socio-demographic and maternal psychosocial factors collected at the baseline assessment. This allowed us to test whether the characteristics of the participants who engaged in more home visits were different from those who received less home visits.

Table 4.5 reports the relationship between maternal characteristics measured at baseline and the total number and duration of home visits for the high treatment group. It shows that only two maternal characteristics had a significant impact on the frequency and duration of home visits. Specifically, mothers who joined the programme earlier in pregnancy ($p<.10$) and mothers with higher cognitive resources ($p<.05$) had more home visits since joining the programme and had home visits of longer durations.

Table 4.5 - OLS Regression Model of Frequency & Duration of Home Visits Between Programme Entry and Eighteen Months

Dependent Variables	Frequency of Visits	Duration of Visits
	Prenatal - 18M	Prenatal - 18M
Weeks in pregnancy at programme entry	**-0.43* (0.22)**	**-0.42* (0.22)**
Mother's age	0.24 (0.46)	0.37 (0.47)
Partnered	3.64 (4.52)	4.92 (4.58)
Married	-5.32 (5.57)	-5.69 (5.65)
Living with parent(s)	0.31 (4.11)	-0.34 (4.17)
First time mother	-0.21 (4.74)	1.31 (4.81)
Low education	3.19 (4.01)	2.09 (4.06)
Mother employed	0.79 (3.75)	0.72 (3.80)
Saves regularly	-3.18 (3.54)	-4.28 (3.59)
Social housing	2.58 (3.53)	2.52 (3.58)
Cognitive resources (WASI)	**0.33** (0.16)**	**0.38** (0.16)**
Mental well-being (WHO5)	0.34 (0.39)	0.40 (0.39)
Vulnerable attachment (VASQ)	0.20 (0.50)	0.12 (0.51)
Self-efficacy (Pearlin)	0.71 (3.71)	1.49 (3.76)
Self-esteem (Rosenberg)	0.44 (0.86)	0.31 (0.87)
Knowledge of child development (KIDI)	0.01 (0.24)	-0.01 (0.25)
Positive parenting attitudes (AAPI)	-0.76 (1.63)	-0.63 (1.65)
Physical Health Condition	-1.58 (4.25)	-2.39 (4.31)
Mental Health Condition	1.38 (3.86)	0.80 (3.91)
Smoking during pregnancy	-6.06 (3.85)	-4.90 (3.90)
Drinking during pregnancy	0.04 (3.84)	0.28 (3.89)
Drug ever used	2.39 (4.61)	1.74 (4.67)
Constant	-8.99 (26.74)	-16.78 (27.10)
N	95	95

Note: Regression coefficients, standard errors and *p-values* obtained from an OLS regression. N=95 sample size. *** indicates that the test is statistically significant at the 1% level, ** at the 5% level, and * indicates statistical significance at the 10% level.

4.2.5 Key Findings

The analysis of participant engagement found that families in the high treatment group received an average of 27 home visits by the *PFL* mentors between programme entry and eighteen months, representing 55% of prescribed home visits when based on prescribed fortnightly visits. Thus, over half of all home visits were delivered between programme entry and eighteen months, which translates into about one home visit a month on average. This is consistent with the majority of home visits programmes which typically finds that over half of prescribed home visits are not delivered. The average number of home visits delivered during the first six months (7.6), the second six months (6.9), and the third six months (6.3) were broadly similar, suggesting that a regular pattern of visits has been established between the mentors and participants. The

average duration of home visits was in line with the *PFL* manual which recommended that each visit lasts between 30 minutes and two hours. The average duration of home visits during the twelve to eighteen month period was just less than one hour, which was similar to the average duration experienced at earlier stages of the programme. Thus, the duration of home visits appears to have remained constant over time.

The results of the implementation analysis also indicate fidelity regarding the low treatment group, with the majority of participants reporting that they met the information officer less than once per month. This is in line with the original *PFL* model which states that the information officer is a resource which participants can avail of, if needed, and the information officer should not play the same role as a mentor.

The analysis regarding the relationship between the level of engagement and maternal characteristics between programme entry and eighteen months indicates that relatively few individual participant characteristics were associated with engagement. Two factors were associated with both the frequency and duration of home visits – the timing of programme entry and cognitive resources. As expected, mothers who entered the programme earlier in pregnancy had more home visits and subsequently spent more time in the programme. The results also show that mothers with higher cognitive resources, as measured by the Weschler Abbreviated Scale of Intelligence (WASI) at three months, experienced more home visits and had visits of a longer duration. The relationship between engagement and cognitive resources has received little in-depth attention in the literature. Cognitive resources are important, as time management skills, the ability to make and keep appointments, participant motivation and an understanding of the regular commitment home visitation entails can contribute to engagement levels (Baker et al., 1999; Kitzman, Cole et al., 1997). That mothers in the *PFL* sample with higher cognitive resources participated in more home visits and had visits of a longer duration suggest that engagement also may be related to the mother's ability to understand the programme materials and recognise the need for the programme in their lives. By contrast, an evaluation of the Nurse Family Partnership found that the number of home visits decreased as the level of psychological resources increased, measured by intelligence (Shipley Scales of Adaptive Living), mental health, coping skills, self-efficacy, and active coping (Olds & Korfmacher, 1998).

Overall, we found little evidence to suggest that factors which are often identified as determinants of engagement in the literature are present in this sample. For example, factors such as age, marital status, employment status, and socio-emotional functioning were not associated with engagement in *PFL*. In addition, the level of engagement was not associated with socioeconomic factors, (i.e. education, employment) or parenting behaviour. This analysis was restricted to engagement from programme entry to eighteen months; it is possible that the individual factors associated with engagement may change over time. However, much of these findings are consistent with the analysis of engagement reported in the six and twelve month reports, with very few individual characteristics associated with engagement at either time point. The findings regarding the role of the timing of programme entry and cognitive resources are consistent in both the six and twelve month analyses. Future reports will continue to analyse and monitor engagement patterns.

4.3 Contamination in Preparing for Life

Contamination occurs when individuals assigned to the control group either actively or passively receive all or part of the services designed for the treatment group (Cook & Campbell, 1979). Contamination may arise for multiple reasons including administrative error, deliberate subversion by programme staff, or an exchange of information between the treatment and control groups. While contamination may occur in any intervention or trial, it is much more prevalent in social or educational interventions aimed at behavioural change (Cook & Campbell, 1979), as the information is more readily transferable. Contamination is particularly undesirable in experimental evaluations as it may bias the results by reducing the mean differences between the treatment and control groups (Torgerson, 2001). Thus the reliability of the evaluation results, which are based on observations from a contaminated control group, may be questionable.

4.3.1 Measuring Contamination in *PFL*

The aim of this section is to discuss and measure potential contamination across the high and low *PFL* treatment groups between programme intake and eighteen months. Contamination may have occurred if the high treatment group engaged in cross-talk and shared materials with participants in the low treatment group. If substantial contamination occurred during this period it would impede the ability to identify programme effects for the eighteen month outcomes. The potential for contamination in *PFL* is quite high as it is operating in a very small community with a population of <7,000 and participants were randomly assigned to two different treatment conditions at the individual level. Therefore it is very likely that participants in the two treatment groups may be neighbours, friends, colleagues or even members of the same family. On the other hand, contamination between the high and low treatment groups may be low as *PFL* is a complex intervention which aims to change the behaviour of participants by building relationships between mentors and participants in the high treatment group. As it is often difficult to achieve behavioural change, even if contamination between the two treatment groups exists, it may not be enough to significantly affect the results.

4.3.2 Indirect Measures of Contamination

Information to track contamination indirectly was collected from participants during the eighteen month interview. Specifically, participants reported how many people they know in the *PFL* programme, with possible response options of zero, 1-3, 4-6, 7-10, or 10+. These questions were used to create yes/no binary variables. A binary variable was also used to indicate whether participants in the high and low treatment groups share their *PFL* materials with anyone else. The results of this analysis are presented in Table 4.6 below.

Table 4.6 - Comparison of Indirect Contamination Responses across Groups

Variable	M_{HIGH}	(SD_{HIGH})	M_{LOW}	(SD_{LOW})	M_{LFP}	(SD_{LFP})	*High – Low* *p*	*High – LFP* *p*	*Low – LFP* *p*
Knows people taking part in *PFL*	0.66	(0.48)	0.62	(0.49)	0.11	(0.32)	ns	$p<.01$	$p<.01$
Shares *PFL* material with others	0.80	(0.40)	0.64	(0.48)	~	~	$p<.05$	~	~

Notes: *'N'* indicates the sample size. *'M'* indicates the mean. *'SD'* indicates the standard deviation. [1]two-tailed *p* value from an individual permutation test with 1,000 replications. *'ns'* indicates the variable is not statistically significant. '$p<.01$', '$p<.05$' and '$p<.10$' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively.

The first indirect measure of contamination shows that two-thirds of the high treatment group and the low treatment group know other neighbours who are participating the *PFL* programme, and there is no statistical difference across the two groups. However as expected, a very low proportion of the comparison group know people taking part in the programme, such that both the high treatment group ($p<.01$) and low treatment group ($p<.01$) know a significantly greater number of people in the programme than the comparison group. Thus, there was an opportunity for contamination between the high and low treatment groups as participants across the two groups may interact with each other. The analysis also shows while a large proportion of the high (80%) and low (64%) treatment groups share their *PFL* materials with others, a significantly greater proportion of the high treatment group share the information they receive as part of the *PFL* programme with other parents in the community ($p<.05$). As the high treatment group received substantially more information and materials from the *PFL* programme than the low treatment group, this result is as expected and suggests that there was a potential for contamination across the groups, although we do not know who they shared their material with.

4.3.3 Key Findings

Overall, the contamination analysis revealed two findings. First, the indirect measures of contamination indicated that the potential for contamination in the *PFL* programme was high as participants in both the high and low treatment groups reported knowing multiple neighbours in the *PFL* programme and stated that they regularly share material from the programme with each other. While there were no statistical differences across the high and low treatment group regarding the proportion of each group knowing neighbours in the programme, the proportion reporting sharing their *PFL* information was higher in the high treatment group. This result is as expected as the high treatment group receive more materials from the programme than the low treatment group.

Second, the indirect measures of contamination validate the use of the comparison group as a safeguard against contamination as a relatively small proportion of the comparison group stated they knew other people in the programme. These findings suggest that the comparison group is a suitable comparison group for evaluating the impact of the *PFL* programme if contamination between the high and low treatment groups emerges in the future.

Contamination will continue to be monitored in all future evaluation reports.

Chapter Five

Report Summary & Conclusion

5.1 Overview

This report presented the results on the effectiveness of the *Preparing for Life* programme between programme entry and when the *PFL* child was approximately eighteen months of age. It included an analysis of the quantitative information derived from interviews with *PFL* participants and implementation data from *PFL*'s database. Overall, the eighteen month evaluation suggests the results are in line with evaluations of other home visiting programmes, which typically identify limited significant effects at eighteen months. Table 5.1 compares the significant findings from the home visiting literature with the significant findings from *PFL* at six, twelve and eighteen months.

Table 5.1 - Summary Comparing *PFL* Findings with Findings from Home Visiting Literature

Domain	Six Months		Twelve Months		Eighteen Months	
	Studies w/ Favourable Outcomes	*PFL* Favourable Outcomes	Studies w/ Favourable Outcomes	*PFL* Favourable Outcomes	Studies w/ Favourable Outcomes	*PFL* Favourable Outcomes
Child Development	✔			✔	✔	✔
Cognition, Communication, Problem Solving	✔					✔
Physical Development				✔		✔
Socio-emotional Development	✔			✔	✔	
Child Health	✔	✔	✔	✔	✔	✔
Immunisations, Hospitalisations	✔	✔	✔	✔	✔	✔
Medical care	✔					
Physical Health	✔		✔	✔		✔
Health Behaviours (Sleeping, Eating)				✔	✔	✔
Parenting	✔	✔	✔		✔	✔
Risk Factors for Maltreatment		✔	✔		✔	
Parental Knowledge			✔			
Parenting Behaviours	✔	✔	✔			✔
Home Environment	✔	✔	✔		✔	✔
Maternal Health & Wellbeing	✔	✔	✔	✔	✔	✔
Physical Health	✔	✔				
Mental Health	✔		✔			
Health Behaviours			✔	✔	✔	✔
Social Support		✔		✔		✔
Childcare	✔	✔	✔	✔		
Household Factors & SES			✔			✔
Household Composition						
Parental Employment, Finances			✔			✔

The majority of the relationships in the analysis were in the hypothesised direction, with the high treatment group reporting better outcomes than the low treatment group. Overall, 152 outcome measures were assessed at eighteen months. 88 (58%) were in the hypothesised direction, and 21 (14%) of these differences were statistically significant. Of the 27 step-down measures, 5 were significant. As outlined in Chapter 1, we hypothesised that treatment effects would be found in the domains of home environment, child health and parenting. The results suggest support for our hypothesis as significant findings were found in all these domains. Consistent with the literature, there were limited significant findings in the child development and maternal health domains at eighteen months. Moreover, significant effects were found for physical development and child communication while other evaluations of home visiting programmes failed to find significant findings in these realms at eighteen months. The programme appeared to have little significant impact on childcare. Counter to our hypothesis, significant treatment effects were found in the domain of social support. This is noteworthy, as other studies of home visiting programmes do not report effects in this domain at eighteen months. These results differed from the twelve months results but were consistent with the positive effects found at six months. One potential explanation for the differences between findings at six, twelve and eighteen months is that many of the measures which were significant at six months were also included in the eighteen month survey (e.g. the HOME). Therefore, comparing changes in significance on the same measures over time may be a more appropriate means of monitoring changes in the effectiveness of the programme than comparing the percentage of significant results at each time point. There were findings in the non-hypothesised direction in the areas of child health, home environment, maternal health and childcare. At eighteen months, 6% of the variables measured were statistically significant in the non-hypothesised direction, such that the low treatment group were outperforming the high treatment group on these measures.

The results comparing the low treatment groups to the comparison community can be interpreted as confirming the main treatment results, as well the integrity of the RCT design. In some cases different effects were found in the main analysis and the community comparison analysis. For example, analyses of the low treatment group and comparison group suggest that parents in the low treatment group read more to their children than those in the comparison group, while no significant difference was found in reading between the high and low treatment groups. This is consistent with findings from the twelve month report. Similarly, the low treatment groups reported better child use of combined words than those in the comparison group, while no differences were detected on this measure between the high and low treatment groups. These findings suggest that some common programme components, particularly the developmental and reading packs may have an impact on both high and low treatment group participants. However, there were more significant results in the non-hypothesised direction than in the hypothesised direction suggesting that the low treatment group is not doing systematically better than the comparison group overall. These findings suggest that the low treatment group is an appropriate comparison group.

The dynamic analysis captures changes in the outcomes of the participants over time. Overall, few significant differences were found between the high and low treatment groups (7%) regarding changes in outcomes between time points. Significant results were found regarding child fine motor skills between six and twelve months, but not between twelve and eighteen months. Significant differences were also found in the home environment domain between the high and low treatment groups on measures of inappropriate physical and verbal punishment, and the avoidance of unnecessary punishment in response to child behaviour. In both instances, scores between six and eighteen months declined for both the high and low treatment groups, however the decline in scores was less pronounced for the high treatment group. These findings are consistent with the literature as few studies identify significant dynamic effects during this stage of programme delivery.

With regards to dosage and timing, the average number of home visits was broadly similar over time, suggesting that a regular pattern of visits has been established between the mentors and participants. In total, the participants in the high treatment group received an average of 27 visits between recruitment at the 22nd week of pregnancy and when the infant turned eighteen months. This represents just over half of all prescribed visits delivered and is consistent with the majority of home visiting programmes which typically find that 50% of visits do not take place. The level of official attrition from *PFL* between

baseline and eighteen months was quite low at 15% across the whole sample. Importantly, the level of official attrition was minimal between the twelve and eighteen month interview rounds, with no attrition experienced in the high treatment group or the comparison group and only 2% attrition in the low treatment group. As the high treatment group were more regularly in contact with the *PFL* programme staff they had more opportunities to officially inform the staff of their desire to dropout from the programme. Indeed, a greater proportion of the low treatment group (21%) missed their eighteen month interview when compared with the high treatment group (11%). Thus it is possible that many of the participants who were missed during the eighteen month survey represent participants who are less engaged with the programme and more inclined to dropout. The contamination analysis suggests that despite the high risk of contamination within the community between the high and low treatment groups, contamination was not a significant issue at eighteen months into the study. As the programme progresses, we will continue to test for potential contamination between the treatment groups.

The purpose of this concluding chapter is to discuss and interpret the main results comparing the high and low *PFL* treatment groups in the context of the larger report content. As such this chapter uses all the information contained within this report such as the dynamic results, relevant research literature, and implementation results to explain the main findings. The sections below discuss the main results for each of the eight key domains.

5.2 Child Development

While there were no effects for the majority of the child development variables, the results are promising as many home visiting interventions similar to *PFL* do not find effects on children's development at eighteen months. Only the evaluation of Early Head Start reported programme effects at eighteen months; and this was in the socio-emotional realm. Specifically, children in the treatment group demonstrated more secure attachment behaviours than those in the comparison group (Roggman et al., 2009).

Within *PFL*, treatment effects were found for gross motor skills, personal-social competence and cognitive development. In terms of gross motor skills, children in the high treatment group were more likely to display developmentally appropriate movement skills. By eighteen months of age most children are able to walk steadily and stop safely, even while carrying an object. Motor ability is particularly important as increased mobility allows toddlers to gain a sense of independence and exert control over their environment (Meggit, 2007). However there is still huge variation in physical development among children at this age. The second finding, that the high treatment group were less at risk of personal-social delay is important as this refers to a child's ability to engage effectively in social interactions, to perceive and interpret social cues accurately, and to regulate emotional responses which can have effects on the ability to form and maintain friendships later in life (Denham et al., 2003). The third finding indicates that high treatment children showed fewer signs of cognitive delay than those in the low treatment group. Although, it is difficult to provide milestones for cognitive development as children's acquisition of concepts depends on their experiences and individual patterns of development (Tassoni et al., 2002), cognitive functioning is important as it is associated with academic performance later in life and is a key component of school readiness. Importantly, no other home visiting evaluations found cognitive effects at eighteen months.

These programme effects may be a result of the *PFL* Tip Sheets and mentor coaching. Between six and twelve months the Tip Sheets focused on child development including cognitive development, movement, hand-eye co-ordination and social-emotional development. It is possible that the information provided at those time points increased parental awareness of developmental milestones or encouraged parents to act as role models for their infants and that these gains continued to be evident at eighteen months. This may indicate that efforts made early in the programme may have lasting effects as the child continues to develop. Indeed, developmental effects were also found at twelve months, although in somewhat different realms.

5.3 Child Health

Child Health is an important element of school readiness, as health problems can affect child development physically as well as limit the child's exposure to everyday experiences. The results for the child health domain at eighteen months are comparable to the findings of other home visiting evaluations where results are typically mixed (Wiggins et al., 2004). Findings from the literature are generally limited to immunisation rates and other health related behaviours such as number of doctor visits and dentist registration (Larson, 1980; MacKenzie et al., 2004; Wiggins et al., 2004). Although programme effects were found at six and twelve months for immunisation rates, no programme effects were found at eighteen months. However, more children in both the high and low treatment groups were found to have had a swine flu vaccination at eighteen months when compared to the comparison group indicating that a shared aspect of the programme, such as facilitated access to a health care providers, was effective in encouraging mothers to get their children vaccinated on-time.

Specific *PFL* programme effects at eighteen months in the child health domain include fewer hospital stays and better child health as reported by the mother. Furthermore, programme effects were found for eating appropriate foods such as protein and dairy. Low treatment children were significantly more likely to have been hospitalised than those in the high treatment group. Consistent with this finding, more parents in the high treatment group rated their child's overall health as good compared to those in the low treatment group. This is noteworthy as no other home visiting programmes find effects on child physical health at eighteen months.

At six months infant breathing difficulties were more likely to be reported by mothers in the high treatment group than the low treatment group, while at twelve months those in the high treatment group were less likely to report that their child had chest infections. There were no significant findings for respiratory illness at eighteen months. However, 19% of the low treatment group reported that their children had asthma which is consistent with the Irish population childhood asthma rate of 20% (Asthma Society of Ireland), whereas the high treatment group reported slightly lower asthma rates at 14%. Although not significant, this is a trend in a promising direction given the high rates of smoking in this sample. Positive health findings may be due to the the Tip Sheets which focus significantly on child health and safety between six months and two years. Indeed, in the home environment domain there is a significant programme effect for child exposure to cigarette smoke, indicating that despite high rates of smoking, parents in the high treatment group are taking care to smoke less around their children.

The finding that high treatment children were eating more protein and dairy is promising as good nutrition is critical for maintaining good physical development and health, not only in infancy, but also in adulthood, and good nutritional habits started in early childhood can have lifelong effects (Grantham-McGregor et al., 2000). However, there was a difference in the non-hypothesised direction for how often the child eats grains. More children in the low treatment group ate an appropriate amount of grains. It may be that children in the high treatment group were eating more protein as they were eating fewer grains. These findings are consistent with evaluations of other home visiting programmes which generally find modest positive effects on child nutrition at this time point. The transition to solid foods is a topic covered in the Tip Sheets from six to twelve months. However, there are no Tip Sheets directly devoted to healthy eating habits from twelve to eighteen months. This may be an area for future improvement of programme materials.

5.4 Parenting

Evidence from evaluations of other home visiting programmes suggest that home visiting may have some impact on parenting at eighteen months; however the evidence regarding which aspects of parenting are affected is inconsistent. Larson (1980) reported an improvement in maternal behaviour and Caughy et al. (2003) reported favourable outcomes for parental discipline style. In an evaluation of Healthy Steps, Caughy et al. (2004) did not report positive findings for parental involvement or parenting skills at eighteen months.

Parenting findings at eighteen months in *PFL* were limited. However, similar to six months, programme effects were found for parent-child interactions at eighteen months. Positive parent-child interaction is an important measure as it is associated with life-long socio-emotional and language development (Tamis-laMonda, Bornstein, & Baumwell, 2001). This finding was particularly robust as it remained significant in the step down analysis. This finding is unique to *PFL*, as no other studies of home visiting find positive results in parental behaviour at eighteen months. High treatment parents were also more likely to worry about their child's language development at eighteen months than those in the low treatment group. This may be seen as a positive programme effect as it is likely to reflect parental knowledge about child development.

Although no significant differences were found between the high and low treatment groups in the number of mothers who read to their children, the low treatment mothers were significantly more likely to read to their children than those in the comparison group. This finding is consistent with the twelve month results where similar findings were reported. Given that both high and low treatment families receive developmental book packs from *PFL*, this result may be directly related to programme influence. Early reading is important as evidence suggests that early shared reading is related to later scholastic achievement (Bus et al., 1995; Scarborough, Dobrich & Hager, 1991). We may begin to see patterns emerge as to which factors of parenting might be most affected by the programme as data collection continues.

5.5 Home Environment

Although not all measures in the home environment domain were significant, consistent with the home visiting literature and our hypothesis, there were several significant programme effects. Similarly, other evaluations in the home visiting literature report several significant effects such as better parent-child interactions and home environment quality at eighteen months (Black et al., 1994; Larson, 1980; Mackenzie et al., 2004). In the *PFL* evaluation, significant programme effects were found in measures of physical punishment and scolding, variety of activities and people available to the child, cleanliness and safety in the home, parental warmth and responsiveness, and availability of learning materials. Findings in all domains except availability of learning materials were particularly robust as they remained significant in the step down results. There were also significant programme effects for safety items such as presence of electrical socket covers and child's exposure to cigarette smoke. These findings are consistent with the six month results, which is the last time point when the HOME measure was used. Interestingly, there were somewhat different findings at six months. Most notably appropriateness of playing materials and adequacy of childcare were significant findings at six months but not at eighteen months. These findings at different time points may reflect aspects of the home environment which might be more salient at various developmental stages. For instance, levels of physical punishment and scolding may not be as easily observable when the child is six months old whereas at eighteen months children are more mobile and apt to explore.

The dynamic results revealed few differential results over time. However, between six and eighteen months significant differences were found between the high and low treatment groups on levels of inappropriate physical and verbal punishment, and the avoidance of unnecessary punishment in response to child behaviour. In both instances, scores declined over time for both the high and low treatment groups. Although scores between the two groups were similar at six months, the high treatment group parents were significantly less likely to use inappropriate punishment and respond inappropriately to child

behaviour between six and eighteen months. The decrease in HOME scores is difficult to interpret as other studies have reported a positive, but not significant, increase in HOME scores over this time period (Larson et al., 1980; Wasik et al., 1990) and these studies found either positive results (Barnard et al., 1988; Barrera et al., 1986; Field et al., 1982; Olds et al., 1986) or no differences in HOME scores (Osofsky et al., 1988). Furthermore, other home intervention studies have found no effect or that their control groups have outperformed the intervention groups on the HOME (e.g. Caughy et al., 2004; Marcenko & Spence, 1994; Wagner & Clayton, 1999). Given the mixed findings in the literature, we will continue to monitor HOME results at future time points.

There was one difference in the non-hypothesised direction. The low treatment group reported having more safety gates than those in the high treatment group. Although child safety was emphasised in the Tip Sheets, there was no specific focus on safety gates between twelve and eighteen months. In contrast, both the high and low treatment groups were given electrical socket covers as part of the developmental packs, yet the high treatment group families were more likely to have used them in their homes. This may indicate that the combination of mentor instruction and Tip Sheet information had some impact on safety behaviour.

5.6 Maternal Health & Wellbeing

The home visiting literature contains many measures of maternal health and wellbeing, however few report differences as a result of the intervention at eighteen months (Koniak-Griffin et al., 2002; Mitchell-Herzfeld et al., 2005) and those that do, find effects in the area of maternal health behaviours, such as reductions in substance use.

Consistent with the literature, there was only one effect found for maternal health at eighteen months. Mothers in the high treatment group were less likely than those in the low treatment group to engage in binge drinking. Although no other programme effect was found for maternal substance abuse, it is important to note that maternal substance abuse can have profound effects on child development (Pattenden et al., 2006).

Maternal physical health is also an important determinant of child developmental outcomes. There were two findings in the non-hypothesised direction in maternal physical health. The low treatment group were less likely to utilise the hospital and other health services. This may indicate that the high treatment group were more likely to seek medical attention when appropriate; however there is no way to ascertain this information from the data collected. The evaluation continues to find few effects on maternal health and well-being at each evaluation point.

5.7 Maternal Social Support

Social support continues to play a protective role in the second year of a child's life, particularly in relation to maternal wellbeing, parenting and mother-child interaction. Few evaluations of home visiting interventions measure the impact on social support, and to our knowledge, none report any positive effects between twelve and eighteen months. Of note, one significant social support effect was found. Mothers in the high treatment group were more likely to report support from their parents. This sense of support may be influential to the quality of parenting and attachment particularly in the presence of stress (Crnic et al., 1986; Crockenberg, 1981).

At six and twelve months there were effects found on the two voting measures in this domain. However there were no significant programme effects on voting at eighteen months. Further information is required to determine what factors of the mentoring intervention might or might not be associated with increased democratic participation.

5.8 Childcare

Few home visiting evaluations measure childcare outcomes at eighteen months. Of those that do, none report findings at this time point. Consistent with the literature there were no significant programme effects for childcare at eighteen months. There was one significant result in the non-hypothesised direction. Parents in the low treatment group were more likely to report satisfaction with their children's care than those in the high treatment group. This may reflect a change in the high treatment group's expectations. As a result of engaging in *PFL*, parents may have more knowledge of developmentally appropriate care, and therefore expect more from their day care or crèche. However, it is difficult to ascertain what might be driving this finding, most notably, since at twelve months the high treatment group were significantly more likely to report satisfaction with childcare. Future data collection efforts may reveal a pattern in satisfaction over time.

5.9 Household Factors & SES

There were few differences between the high and low treatment groups in regards to demographics and socio-economic factors. There were only two significant findings at eighteen months. Mothers in the low treatment group were more likely to be unemployed long-term than those in the high treatment group. This effect was consistent with the twelve month results. However, there were no other treatment effects found on any other financial or employment measures. This is in line with other research on the effects of early childhood intervention on household factors. Of the studies that do measure household economic variables, most do not report intervention effects (Anisfeld et al., 2004; LeCroy & Crysik, 2011; Olds et al., 2002; Wagner et al., 1996). The second significant finding was that for the high treatment group, the mother's partner was more likely to be the child's father. Although there is limited research on the influence of the parental relationship on young children's lives, there is some evidence to suggest that a consistent positive relationship with a father is beneficial to child development (Lamb, 1975).

In the non-hypothesised direction, families in the low treatment group were less likely to be in receipt of social welfare, to report financial difficulty and to report difficult life circumstances. At this stage of the evaluation there is no clear accounting for these findings.

The limited findings in the household factors and SES domain indicate that the randomisation has been, on the whole, maintained at eighteen months.

5.10 Further Work & Future Reports

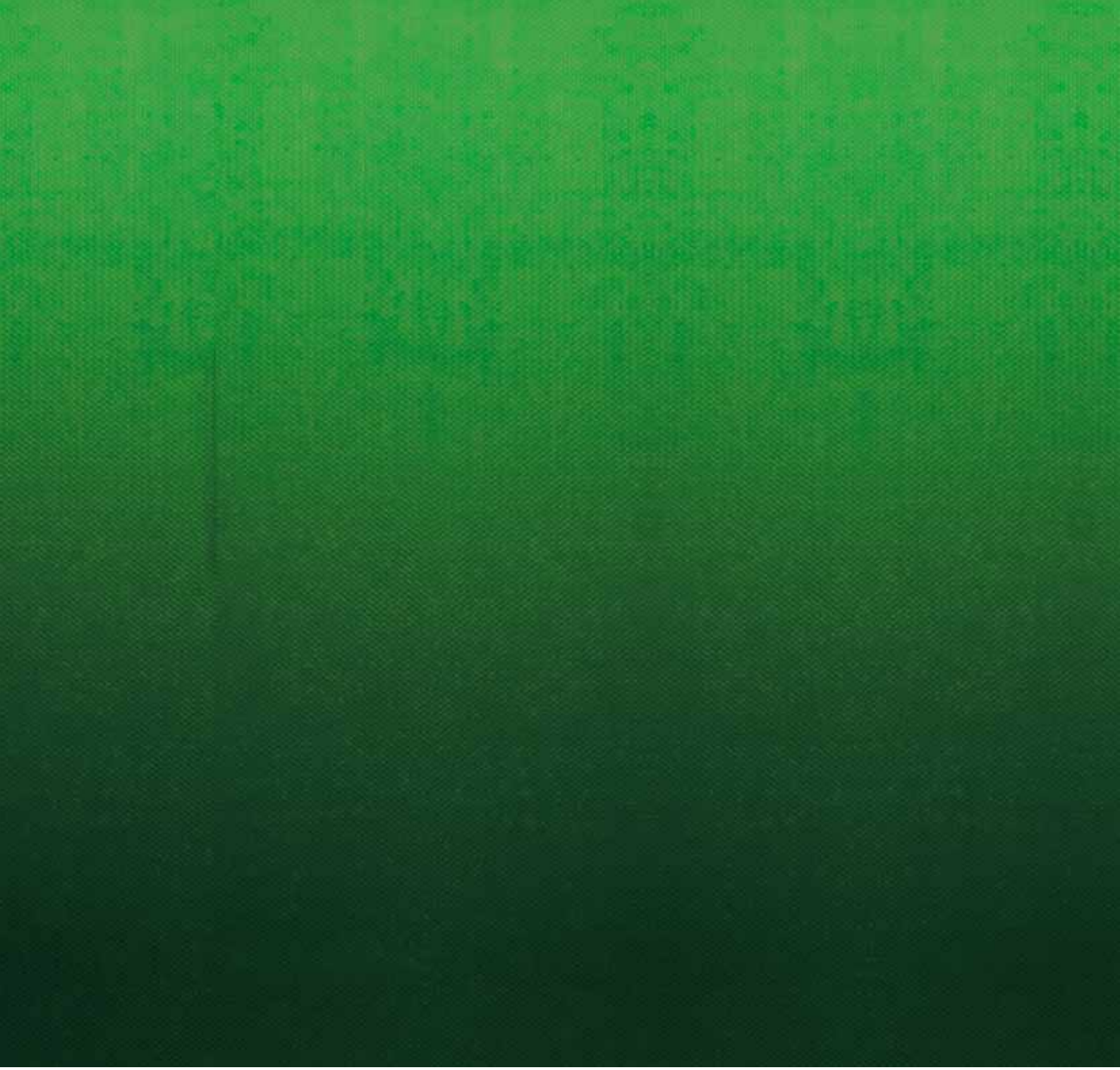
Overall treatment effects found at eighteen months were consistent with six month results when similar measures were used. Future waves of data collection will not only capture treatment effects when the programme has been running for a longer amount of time, but will also be able to track changes for treatment families at multiple time points. Therefore, we will begin to form a more in-depth picture of what kinds of factors are most affected by the programme. In addition, as more data is gathered, we will be able to expand the dynamic analysis to compare the developmental trajectories of the children over time.

Future reports will continue to track the effectiveness of the *Preparing For Life* programme when the *PFL* cohort is twenty-four, thirty-six, and forty-eight months of age. Thus, this is the third of six reports analysing the effectiveness of the programme and should be interpreted in this context.

References

Please see the following website for the reference list:

http://geary.ucd.ie/preparingforlife/



UCD DUBLIN

preparing for life
planning together for our children

The ATLANTIC Philanthropies

An Roinn Leanaí agus Gnóthaí Óige
Department of Children and Youth Affairs

northside partnership