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The Healthy Incentive for Pre-schools Project

Technical Report

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The Healthy Incentive for Pre-schools Project

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Foreword

The Healthy Incentive for Pre-schools Project (subsequently referred to as the HIP project) is an intervention project which took in place the midland counties of Laois, Offaly, Longford and Westmeath, in the Republic of Ireland (ROI), with preparatory pilot work in Co. Wicklow. The project was supported by ***safe***food in association with the Health Service Executive (HSE).

The role of nutrition in known to be vital for the healthy development of children and it has been found that the health related habits learned early in life track into adulthood. Because of this many experts have recommended that preventative health measures should focus on children in their early years. Many children worldwide spend much of their time in child-care and ROI has, in recent years, followed this model. While many children in full day childcare spend a significant proportion of their time out of the home environment, little is known of the food provided in this setting in ROI, and this information is necessary to inform early childhood education and health policy makers.

The objectives of the project were to devise and validate a scored nutrition evaluation form for use in the full day care pre-school setting. The project consisted of six stages: 1. Development, pilot and validation of the Scored Evaluation Form; 2. Baseline audit of all full day care pre-schools enrolled in the project in the Midlands using the Scored Evaluation Form; 3. Development of a tailored nutrition and healthy eating resource pack to accompany the scored nutrition evaluation form; 4. Delivery of training on use of the Scored Evaluation Form and resource pack to two groups: 'minimal intervention' (manager only training) and 'intervention' (manager and staff training); 5. Measurement of change in practice post intervention using the Scored Evaluation Form and 6. Investigation of an appropriate reward model to act as motivation and incentive to participate in the programme. Two additional phases were also completed: the development of a Food Serving Size Atlas and the investigation of the Voice of the Child in the full day care pre-school setting. The project began in February 2008 with data collection commencing in June 2008 and finishing in April 2012.

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1 Introduction

Young children have micronutrient requirements that are, relative to their energy needs, much higher than that of adults. Therefore it is necessary that the nutrient density of their diet is high (1). During infancy and early childhood, a supply of adequate energy and nutrients is essential to ensure the normal growth and development of the child (2-4). Many publications and resources outline recommendations for dietary intake in infants and young children (4-6) and studies have demonstrated the role of good nutrition at an early age in healthy physical, psychological and social development (7, 8). Food related experience in the first two years of life has been shown to influence dietary variety in school aged children (9). Healthy nutrition (10, 11) and physical activity (12) habits developed in childhood have been found to track into adolescence and beyond, while evidence also exists that exposure to poor practice may lead to unhealthy habits that persist into adulthood (13).

Many international (14-16) and national (4, 5, 17) resources and publications outlining the recommendations for dietary intake for infants and young children are available. However, there is evidence that young children's diets are low in vitamin A, vitamin C, iron and zinc and that their diets contain high quantities of salt and sugar.

'*Pre-school children continue to be nutritionally vulnerable although their growth rates are slower than that in infancy'* (18). In the United Kingdom (UK), intakes of iron, zinc and vitamin D below the Reference Nutrient Intake (RNI) level was observed in young children (19). A correlation was also noted between fat and other nutrient intake in this age group, with an increased risk of suboptimal zinc and retinol intake with lower fat intakes and the consumption of iron and vitamin C falling as fat intake increased (20). Data from the UK National Diet and Nutrition Survey (NDNS) showed that few pre-school aged children had diets that were adequate with only one per cent meeting five RNIs for iron, zinc, vitamin A, vitamin C and non-milk extrinsic (NME) sugar, and 15.6 per cent meeting none of the recommendations. Only 12.5 per cent had intakes of NME sugars with the levels recommended. The youngest age group had the poorest iron intake with 15.9 per cent of 1-3 year old children not meeting this RNI. Ability to meet recommendations was related to socio-economic measures, most notably maternal education levels (21).

In a Canadian study which compared the diets of pre-school aged children (3.5 to 4.5 years) to Canada's Food Guide to Healthy Eating it was found that the mean number of servings from the four main food groups came close to that recommended but that less than 2 per cent of children met the dietary guidelines for all four food groups at the same time (22). While a study of American Indian pre-school

children aged 2-5 years found that Food Pyramid recommendations for fruit and vegetable intake were not being met while intakes of added sugar exceeded those recommended (23).

Evidence suggests that, in ROI, primary school aged children's diets are low in vitamin A, vitamin C, iron and zinc and that their diets contain high quantities of salt and sugar (24). In the summary report of the National Pre-school Nutrition Survey (25) intakes were deemed to be inadequate by the determination of the percentage of children with intakes of vitamins and minerals below the UK Estimated Average Requirements (EAR). While it was found that that majority of pre-school children had adequate vitamin and mineral intake it was estimated that 14-22 per cent of 2-4 year olds had an inadequate intake of vitamin A and 23 per cent of 1 year olds, ten per cent of 2 year olds and 11 per cent of 3 year olds were estimated to have an inadequate iron intake. The study authors report that in the absence of consensus regarding EAR for vitamin D, 70-84 per cent of 1-4 years had intakes of vitamin D less than 5µg and 17-25 per cent had intakes less than 1µg, indicating, according to the authors, '*that a significant proportion of children may be at risk of inadequate intakes of vitamin D, particularly in winter'*.

Many parents are now relying 'on child care providers to share parents' traditional role of 'gatekeeper' on their children's nutrient intake' (16). While parents play a valuable role, and have a powerful influence on their children's eating habits, serving as a model in choosing foods, determining food availability, planning meals, and in the socialisation involved in eating (16) and it is recommended that parents are involved in all areas of their child's childcare programme, including the planning of their meals, evidence would suggest that this is not happening (26). As many people worldwide are now accessing and using out of home childcare, experts have called for research that will allow '*an understanding of current practices relevant to nutrition and physical activity in child-care settings'* (27).

The National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD) in the United States reported that the average time spent by 4 ½ year old children in non-maternal care was 27 hours per week (28). As a child who attends pre-school on a full time basis could potentially spend ten hours every day, five days per week and forty–eight weeks of the year in care, responsibility has to be placed on childcare facilities to provide sufficient nutrition and a conducive environment to encourage healthy food habit formation (29). Recommendations have been outlined regarding the role of the pre-school provider in relation to food provision in the childcare setting: '*The caregiver/ facility has a responsibility to follow feeding practices that promote optimum nutrition that supports growth and development in infants, toddlers and children. Child care providers / facilities who fail to follow best feeding practices even when parents wish such counter practices to be followed negate their basic responsibility of protecting a child's health, social and emotional wellbeing'* (14). With this in mind the need to ensure best practice in relation to nutrition and physical activity is paramount. The American Dietetic Association notes that *'childcare regulations represent*

minimum standards, or "the floor". Actual practice of child-care programs should exceed standards put forth in state regulations' (30).

'Toddlers and pre-school children require a physical and social environment that supports their physical growth as well as their emotional, intellectual and motor skill development' (18). It has been noted that the child-care setting has the potential to be a successful vehicle for obesity prevention (31, 32). In 2009, Kaphingst and Story (31) noted that '*in contrast to the extensive research policy, and advocacy efforts regarding nutrition and physical activity in the school setting, the child care setting has been largely overlooked in the childhood obesity discussion'.* Furthermore, Flynn *et al.* (8), in reviewing best practice in reducing obesity and related chronic disease in children and young people, noted that there are few such interventions in the pre-school setting and recommended that funding should be directed to develop prevention programmes in this setting.

In the US (33) as in ROI (6) it would appear that the environment of the child care facility is mainly evaluated for safety, with less focus being placed on nutrition and the food service environment; somewhat surprising when one considers that the nutrition environment plays a 'critical' role in the food habit development of the pre-school age child (34).

While a small number of studies give us insight into such practice in ROI (35, 36), it would appear that in many other countries poor nutrition and physical practice have also been documented; in the UK (37, 38), the US (39-42); Australia (43) and Holland (44). Although there is much cross-sectional research outlining practice (37, 40) little data are available in relation to intervention studies, with, to our knowledge no evidence of intervention research in this area in ROI. Although many studies rely on reported practice information (45), few are based on researcher observation of practice in the childcare setting which would be considered the 'gold standard' (46).

The placement of children in care outside the home has increased rapidly in ROI in recent years; between 2002 and 2007 an increase of 42-48 per cent was reported in the number of households using out-of home care (47).National policy encourages more women to enter the workforce thus increasing the need for non-parent care in the community and in the latter part of the decade 2000-2009 just over sixty per cent (60.8 per cent) of women were in the workforce in ROI (48). With the increase in demand for childcare places, successive governments have directed funding to the creation of childcare places in the community (not for profit) and private (for profit) sectors; the National Childcare Strategy 2006-2010 (49) aimed to develop the childcare infrastructure in Ireland; with a budget of €575 million, an increase of 50,000 childcare places was estimated.

In ROI, a full day care (FDC) pre-school service is defined as '*a pre-school service offering a structured day care service for pre-school children for more than 5 hours per day; and which may include a sessional pre-school service for pre-school children not attending the full day care*'; while a sessional

pre-school service is *'a pre-school service offering a planned programme to pre-school children for a total of not more than 3.5 hours per session*' (6).

Currently, in ROI, Childcare regulations (6) govern the provision of out-of-family care and inspections of childcare premises are made on a regular basis, however little else is known about the nutrition and health related practices in these settings. There is no uniform formal training for pre-school providers on nutrition and healthy food provision, nor does the legislation to enforce such training exist. 'Food & Nutrition Guidelines for pre-schools' (4) are available but are not mandatory, which would suggest that methods to encourage the provision of nutritious food in this setting must be pursued. To this end, a multi-stakeholder local expert group in the Midlands which includes community dietitians; a pre-school inspector; a training officer; a child minding advisory officer and a pre-school services manager, developed an intervention scheme (Healthy Incentive for Pre-schools project) aiming to incentivise pre-schools to improve their nutrition practices. A National Project Advisory Group was created to advise on the HIP project and to monitor its progress. The National Advisory Group consisted of representatives from a number of different agencies: ***safe***food; Healthy Food for All; Early Childhood Ireland, Dublin Institute of Technology and the HSE. The Advisory Group met each year on two occasions, March and October, from 2008 to 2012.

Three preliminary studies were undertaken prior to commencement of the main project process (2006-2007); these were overseen by a local multidisciplinary working group comprising of HSE Dublin Mid-Leinster (Midland Area) personnel with a remit for pre-schools (community dietitians, pre-school services' personnel, environmental health officers, public health nurses). Findings from these preliminary studies informed the development of the HIP Project.

2 Project Aims and Objectives

Overall aim

- To develop a validated Scored Evaluation Form to improve the quality of food provision in the pre-school setting.
- To develop, deliver and evaluate a nutrition training programme to accompany the Scored Evaluation Form in the pre-school setting.

Key objectives

Phase 1

- Devise and validate a Scored Evaluation Form for use in the pre-school setting which is based on the Food and Nutrition Guidelines for the Pre-school Setting and has the potential to be a motivational tool in a future incentive scheme.
- Carry out a baseline audit of all full day care pre-schools registered with HSE Dublin Mid-Leinster in the Midland region using the Scored Evaluation Form.

Phase 2

- To develop a nutrition and healthy eating resource pack to accompany the Scored Evaluation Form, including appropriate support materials as identified by the previous needs assessment.
- To investigate and develop an appropriate reward model that will act as motivation and incentive to participate in the programme.
- To deliver training on the Scored Evaluation Form and the resource pack to Pre-schools registered with HSE Dublin Mid-Leinster in the Midland region, ensuring adequate representation from disadvantaged pre-schools.
- To measure change in practice post intervention using the validated Scored Evaluation Form.

Project tasks

Task 1 - Work Activity 1

Initial audit of food service and commitment to project

Three preliminary studies took place prior to the commencement of the HIP project as they were deemed necessary to ensure the need for such a project and the commitment of pre-schools to becoming involved in the HIP process.

In 2004 an initial study was undertaken to explore the feasibility of a healthy food incentive scheme in the pre-school setting in the midlands region (50). A structured telephone questionnaire was used to obtain the views of the Health Service Executive's pre-school multidisciplinary working group team and pre-school providers (*n* 17) on a healthy food incentive scheme. The pre-school working group questioned included environmental health officers (*n* 4), public health nurses (*n* 2), pre-school training officer (*n* 1), child minding advisory officers (*n* 4), and the pre-school services manager (*n* 1) and the group oversees nutrition interventions in the pre-school setting. The pre-school providers are predominantly the care assistants directly involved with the daily care of the children.

Following on from the work carried out in preliminary study 1, the pre-school nutrition working group advised that the meals and snacks being provided by pre-schools and parents of pre-school children, in the midlands, should be investigated as this had never been done previously. Commitment by pre-schools to participation in a future nutrition incentive scheme was also needed. A structured telephone questionnaire was used to obtain the views and a report of practice from preschool providers based in the midland region (*n* 89) (51).

The third preliminary study aimed to evaluate pre-school nutrition practices, using a Scored Evaluation Form based on agreed best practice that was created by the pre-school nutrition working group. 19 pre-school childcare facilities in the counties Laois and Offaly were invited to take part in a pilot evaluation of their current nutritional practices using the Scored Evaluation Form devised (52). The aims of preliminary study 3 were to determine if the SEF devised was user friendly, understandable and practical; whether it was successful as a motivational tool; the time required to carry out the evaluation; problems associated with the evaluation from the perspective of the childcare facility; and the weighting of the scores assigned to each criterion within the evaluation.

The evaluation was administered by first observing mealtime practices during the main meal of the day. The researcher then went through each criterion on the list with the owner or manager to get their feedback. The feedback focused on four main areas i.e. whether each criterion was fully understood; did staff agree with a need for improvement as part of each criterion; exploring the feasibility of

implementing improvements in each criterion area; and any issues regarding resources and staffing for each criterion.

Validation of Scored Evaluation Form (SEF) through various methodologies

While it was possible to undertake some validation of the Scored Evaluation Form, academia advised that full validation could not take place until both the baseline and follow-up data collection phases had been completed.

Scored Evaluation Form criterion and best practice validation

Following completion of the preliminary studies, the Scored Evaluation Form was modified and tested in a pilot sample of FDC pre-schools in a geographical area outside that which was to be tested in the HIP project.

Scored Evaluation Form modification

Each criterion on the original Scored Evaluation Form (refer to Table 1) was checked to ensure no overlap between, or within, criteria existed, and a comprehensive literature review was carried out on each criterion to establish that all criteria were based on evidence of effectiveness. A review of the scientific literature on each criterion in the Scored Evaluation Form was carried out to determine best practice and compare all aspects of the form to the published literature, to ensure the form measured best practice. This was then defined for each criterion on the Scored Evaluation Form. If it was not possible to identify best practice, then a common sense approach was taken to define the criterion.

Comparison was made between the Scored Evaluation Form and the standardised national inspection tool (6) used by the Pre-school Inspection Team to ensure there was no overlap between the two tools. The Scored Evaluation Form was also reviewed to ensure that there was no overlap of issues within its questions.

Table 1 - Scored Evaluation Form and criteria (phase 1)

Scored Evaluation Form categories	Scored Evaluation Form criteria
Environment	1. Whole school policy 2. Healthy reward scheme 3. Education activities 4. Planned physical activity 5. Outside in the day 6. Praised for eating
Children under 12 months	1. Consistency of weaning foods 2. Weaning food appropriate 3. Feeding selves encouraged 4. Iron rich foods 5. Drinks for infants 6. Unlidded cup
Children over 12 months	1. Providers sitting with children 2. Help when eating 3. Protein portion @ main meal 4. Starch portion @ main meal 5. Dairy portion @ main meal 6. Vegetables portion @ main meal
Snacks	1. Fruit as snack 2. Water with meals & snacks 3. Water between meals & snacks 4. Only milk or water offered 5. Milk offered other times during day 6. Snacks low in fat and sugar only

The Scored Evaluation Form was broken down into subsections for ease of use; this included sections on: the environment (all ages); weaning (6-12 months only); weaned children (over 12 months); and snacks for weaned children (over 12 months). Each section contained six criteria.

An altered scoring system was devised based on the literature (46, 53); following the literature review, the original scoring system used in the preliminary studies was revisited and the scoring system for each criterion was changed from a yes/ no system to a 'three way' value system (0; 1; 3). Services would be able to attain one of three possible scores: 'does not meet standard' (zero points scored); 'partially meets standard' (one point scored); 'completely meets standard' (three points scored). HIP project criterion standards were created to clarify and explain the scoring system, and a classification range for the scoring system was determined: Participation (Score 0-24); Bronze (Score 25-49); Silver (Score 50 - 74), Gold (Score 75-99); Platinum (Score 100-120). Reliability of scoring was defined as achieving a score within the same range – i.e. Gold, Silver etc.

Additional pilot work

Drafts of the Scored Evaluation Form were sent to Pre-school Inspection Team members and pre-school nutrition working group members throughout its redevelopment phase.

The Pre-school Inspection Team was requested to use the Scored Evaluation Form during one pre-school inspection visit. In preparation for this visit a multiple choice questionnaire was developed in order to determine the Inspection Team's knowledge level, and possible training needs, prior to their use of the Scored Evaluation Form (refer to Appendix 1); this questionnaire contained a series of questions, related to nutrition and health practice; each question having three separate answers, one correct, based on best practice, and two incorrect answers. An information session, based on needs identified from administration of the multiple choice questionnaire, was then provided to the Inspection Team. Following their use of the Scored Evaluation Form during one inspection visit the Team's views and feedback were collected on its practical use.

Additional data collection tools

Pertinent background information and characteristics of the pre-schools and their populations were collected using a specially developed Characteristic Collection Form (refer to Appendix 2). This form aimed to gather information on: number of children and staff; food provided by the pre-school and timing of meals and snacks.

To ensure that all observations could be recorded during a pre-school visit it was determined that a tool was developed to enable collection of all relevant observation data. This tool would then be used during pre-school visits in tandem with the Scored Evaluation Form. The tool that was developed was named the Detailed Assessment Tool (refer to Appendix 3) and its question content mirrored that of the Scored Evaluation Form. Each criterion from the Scored Evaluation Form (refer to Appendix 4) is evident on the Detailed Assessment Tool and each criterion is accompanied by a series of questions especially designed to allow collection and extrapolation information relevant to ensure that sufficient evidence is gathered to enable the assignment of the criterion score. In short, the Detailed Assessment Tool was used to collect more in-depth information on each of the criteria in the Scored Evaluation Form, for future validation purposes.

Criterion scores achieved during each pre-school visit are based on the observations made and recorded, and subsequent comparison of these to the criterion standards developed for the project. An overall HIP Project score is then assigned to each pre-school service by totalling all criterion scores on the Scored Evaluation Form.

Sample population Scored Evaluation Form criterion and best practice validation

All eligible FDC pre-schools in one county in ROI, (Wicklow) (*n* 34), were contacted by the researcher and invited to take part in the modified Scored Evaluation Form pilot study. Pre-schools with any previous contact with the HSE Dublin Mid-Leinster Community Nutrition and Dietetic Service in the Midland Area, the service that was carrying out the study, were excluded. Twelve pre-schools agreed to participate. Permission to carry out the study in each school was initially obtained by telephone; written informed consent was also received from each pre-school manager, on the day of the study visit, before commencement of the study.

Scored evaluation form testing – practical validation

Data were collected in each pre-school service using direct observation, noted as the gold standard for accuracy in measuring food in childcare (46). Appointments to visit were made with each pre-school provider, at least two weeks in advance. One full day was spent in each pre-school carrying out observation of all aspects of food and nutrition and health related practice. Pre-school characteristics and background information, using the Characteristic Collection Form, were collected on each pre-school at the beginning of their visit. Meal and snack times were noted. Food and fluid given; portion sizes provided; the eating environment established for children; and physical activity practices undertaken in each service were observed and documented using the Detailed Assessment Tool. Each criterion on the Scored Evaluation Form was subsequently completed using this accompanying documentation and a total score on the Scored Evaluation Form was assigned to each pre-school visited.

Scored evaluation form testing results

The use of this observation methodology provided a powerful tool to gain in-depth and rich data on individual practices in each service (46, 53) and it also gave some initial insight into the nutrition and health related issues that needed to be addressed in the pre-school setting.

The pilot testing of the Scored Evaluation Form indicated that changes needed to be made to its format and the results obtained informed the revisions that were made.

It was noted that the direct observation of the plating of food, before distribution, was vital to allow determination of portion sizes accurately, and that the development of a food portion atlas and list of household measures for portion sizes would be necessary components of an educational resource to accompany the Scored Evaluation Form. It was apparent that pre-school providers needed education on portion sizes appropriate for pre-school children of different ages if it was hoped to change current practice.

While considerable revision of the Scored Evaluation Form was undertaken prior to this investigation; this phase 1 study noted that the sections included in the previously revised Scored Evaluation Form needed further amendment to ensure it could be used in all services regardless of the age of child attending. While many pre-schools did not have children aged less than 12 months, it became apparent that a number of issues which should be relevant only to children aged under 12 months were also pertinent to toddlers over the age of 12 months i.e. provision of: age appropriate consistencies; iron rich food; two handled un-lidded beaker; chair versus high chair; or self-feeding versus being fed.

It was also noted that the phrasing of some criteria needed alteration to avoid misinterpretation, for example, the necessity to indicate quantity i.e. a glass / portion / 200 mL milk. Measurement of the utensils used by children needed be recorded; as until that point only 'cup' usage was documented. This pilot study also demonstrated that provision of plates, cutlery and bottles needed to be assessed in all age groups.

A number of criteria needed to be excluded as it was not possible to observe and record their practice adequately, i.e. hand washing by staff, or because the recording of data was too subjective i.e. the provision of praise by the childcare provider.

Many guidelines refer to the educational and health benefits of 'family style service' (see sections 5 & 8). The inclusion of criteria that measured 'family style food service' was also deemed to be necessary; i.e. to measure the number of pre-school providers sitting with children and the amount of time allocated to meal and snack times, as the pre-school practice observed in this area was poor, with meals tending to be rushed and children being told to hurry up, cleaning taking place, and children leaving the table and being allowed to play while other children were still eating. From the results of this phase of the study, it was obvious that in the majority of cases pre-schools in ROI, did not provide 'family style food service' or adequate time for meals or snacks; did not allow self-service and did not provide adequate age appropriate cutlery, plates or drinking vessels for infants and children.

Phase 1 was important as it highlighted that further changes were needed to be captured and rated in the Scored Evaluation Form before phase 2 baseline data collection could commence.

Further SEF modification pre- Phase 2

Based on the phase 1 findings, further adjustments were made to the Scored Evaluation Form (refer to Appendix 5). All revisions made were reviewed by the local expert Health Service Executive pre-school working group and the National Project Advisory Group. The Scored Evaluation Form revision involved the modification of the four criteria subject headings so that the four criteria sections would pertain to all age groups within the pre-school setting; a number of criteria in each section were also altered based on the results of the pilot study and each section included six separate criteria (refer to table 2). Slight

adjustment was made to the terminology of scoring: 'no score' (zero points scored), 'minimum standard' (one point scored) and 'best standard' (three points scored). Due to these modifications, the classification system was revised with the classification range for the scoring system determined as: participation (score 0-19), bronze (score 20-39), silver (score 40-54), gold (score 55-64) and platinum (score 65-72).

Table 2 - Scored Evaluation Form and criteria (phase 2 & 5)

Scored Evaluation Form categories	Scored Evaluation Form criteria
Environment	Whole pre-school health policy Education related activities Planned physical activity Outside in the day Evidence food used as reward / treat Number of meals and snacks
Food service	Staff sitting with children at food times Staff eating same food as children at food times Practice of 'family style food service' Adequate allocation of time for meal/snack times Adequate encouragement appropriate self-feeding Age appropriate feeding & drinking utensil used
Meals	Appropriate serving protein at main meal Appropriate serving starch at main meal Appropriate serving dairy at main meal Appropriate serving of vegetables at main meal Meals offered in self-service style Iron rich food provision at main meal
Snacks	Fruit at least once other than main meal Foods offered from top shelf of Food Pyramid Dairy at least once other than main meal Tap water and milk only with snacks Tap water, milk or appropriately diluted juice with meals Tap water or milk offered between meals and snacks

The Characteristic Collection Form (refer to Appendix 6) and Detailed Assessment Tool (refer to Appendix 7) were also further modified after phase 1 to reflect the changes made to the Scored Evaluation Form and to gather other important and relevant characteristic information i.e. detailed information on food provided by parents; childcare fees; cost of food; participation in state schemes such as the school milk scheme; menu types; policies relating to health; and education resources used.

Inter-rater validation: It was planned that inter-rater validation would be undertaken in two ways in this study: through pre-school providers undertaking self-assessment and by members of the Pre-

school Inspection Team carrying out Scored Evaluation Form assessment of pre-schools that had been evaluated by the researcher. While self-assessment was undertaken by the majority of pre-school providers (*n* 30), no Pre-school Inspection Team assessment was carried out.

Work Activity 2 - Input of data collection.

Data collection continued and data input was commenced. All data were inputted to Statistics Package for the Social Sciences (SPSS), Windows, Version 20 (SPSS Inc., Chicago, IL, USA). Each service's SPSS data record was reviewed to develop a feedback report for the individual service.

Work Activity 3 - Administration of SEF to all pre-schools enrolled in the study.

A list of all FDC pre-schools eligible to participate in the project (*n* 100) was obtained from the Pre-schools' Service of the HSE Dublin Mid-Leinster (Midland Area). The HSE Pre-schools' Service deemed pre-schools ineligible to participate if they were not in substantial compliance with the Childcare (Pre-school Services) (No2) Regulations 2006 (6), the European Communities (Hygiene of Foodstuffs) Regulations 2006 (54), or the Public Health (Tobacco) Acts 2002 (55) and 2004 (56); if they were not registered as food premises with the HSE; if they had not had an inspection by the Pre-school Inspection Team subsequent to notification of the service to the HSE, or if they did not have a potable water supply. In addition the Pre-school Inspection Team outlined that to be eligible pre-schools should not be *'subject to outstanding issues'* under investigation by a separate HSE Department, and that the on-going process of inspection and monitoring could influence a pre-school's continued participation in the incentive scheme, depending a pre-school's compliance with the national pre-school regulations (6).

Of the 100 pre-schools eligible to participate in the project, 76 pre-schools applied. Four were deemed ineligible by the Pre-school Inspection Team, ten did not respond and ten did not wish to participate. Due to the time lapse between the initial invitation to apply and commencement of baseline data visits, there was a fall in pre-schools progressing with the project for a number of reasons: change in their circumstances and felt they could not participate (*n* 9); deemed ineligible by the Pre-school Inspection Team (*n* 4); premises closure (*n* 1). Baseline data collection visits took place in 62 pre-schools across the midland region. As a result of issues that only became apparent during data collection visits, data from 4 of the pre-school visits were excluded from the baseline database; these were data from services that did not provide written consent (*n* 2); did not provide a main meal as no children remained in the service at main meal time (*n* 1); provided care only for children with intellectual disabilities (*n* 1).

Data collection in phase 2 (baseline) commenced in November 2008 using the modified Scored Evaluation Form (refer to Appendix 5), Characteristic Collection Form (refer to Appendix 6), and Detailed Assessment Tool (refer to Appendix 7). Project visits were undertaken on 3 days per week. Data were collected during periods that coincided with academic term time to ensure maximum child and staff attendance at each pre-school. Phase 2 data collection was completed in November 2009.

Allocation of status score to each pre-school

The Scored Evaluation Form evaluated practice applicable to all age groups within the pre-school setting (36) under four section headings; each section containing six separate criteria (36) (refer to Table 2.). Scores were defined as: 'not minimum standard' (zero points scored), 'minimum standard' (one point scored) and 'best practice' (three points scored). The classification range used was: participation (score 0-19), bronze (score 20-39), silver (score 40-54), gold (score 55-64) and platinum (score 65-72).

Data were collected in all pre-schools by one Research Dietitian. Each service was contacted by telephone at least two weeks in advance of the proposed meeting to arrange a convenient time and date to visit; written confirmation of visit details was subsequently sent to each service. Each pre-school visit began approximately forty-five minutes to one hour before the first food service time in that pre-school. Detailed pre-school characteristics were collected from each pre-school manager using the specifically designed pre-school characteristic collection tool.

All aspects of nutrition practice were directly observed and recorded in each pre-school over a full day using the Detailed Assessment Tool and Scored Evaluation Form. Data were collected on all days of the week (Monday to Friday). Each meal and snack time was observed. This involved spending time in the kitchen before the meal / snack time, to determine the food serving size of the food being plated, if this was the practice in the service. A description of all foods offered was recorded using household measures. A photographic food atlas developed specifically for the HIP project, using food serving sizes recommended for pre-school children (2, 4) and recipes from the Irish Health Service Executive '3-week menu plan – a resource for pre-schools' (57), was used to aid data collection (58).

Practice was observed in each room of the service, regarding foods and fluids served; the meal time experience for children; staff / child interaction during the food time; and the room environment. All observations were detailed on the Detailed Assessment Tool. Using this tool, each criterion from the Scored Evaluation Form is characterised by a series of questions, especially designed for that criterion, which collect background information on the particular criterion, to ensure that evidence for the criterion score is gathered. Criterion scores achieved during each pre-school visit were based on observations made and comparisons of these to the criterion standards developed for the project. An overall score was then assigned to each pre-school service using the Scored Evaluation Form.

Division of pre-schools into intervention and control groups

In the original project protocol, it had been planned to randomise the participating pre-schools into two groups. It was envisaged that once baseline data were collected in each pre-school, randomisation would be undertaken and pre-schools would be either assigned to a control group that would receive no feedback on the practice observed during their pre-school visit nor any information regarding how best to improve practice; or randomised to an intervention group in which they would get feedback from their baseline visit and would also get a staff training session on how to improve their practice.

Following baseline data collection, however, it was felt that it would be unethical to fail to provide any information to the control group. Therefore, it was decided that the control group should be renamed the 'minimal intervention' group, with pre-schools in this group being provided with 'manager only' feedback and information.

Following completion of all pre-school baseline visits, pre-schools were randomly assigned using a random box grid number table to minimal intervention (*n* 30) and intervention (*n* 31) groups; one pre-school had closed prior to randomisation occurring. Figure 2 outlines the randomisation process progression.

Development, focus test and finalise information resource pack and training to dovetail with SEF

Two Education Resource Pack booklets (refer to Appendix 10): a 'Best Practice Guide' and an 'Hints and Tips Pack' were specifically developed for the HIP project with their contents based on nutrition and health related needs identified in the baseline data collection phase of the project.

The 'Best Practice Guide' describes the Scored Evaluation Form that is used in the HIP project to identify and measure nutrition and health related practice and provides a simple set of instructions on how to achieve best practice scores. The booklet is divided into 4 sections following the format of the Scored Evaluation Form (Environment; Food Service; Meals and Snacks). A detailed explanation of childcare practices that would achieve 'No score'; 'Minimum Standard score' or 'Best Standard score' is provided. Reference page numbers are included in each 'Best Practice Guide' criterion section, which directs readers to the appropriate part of the 'Hints and Tips pack' for more detailed and background material on the topic area.

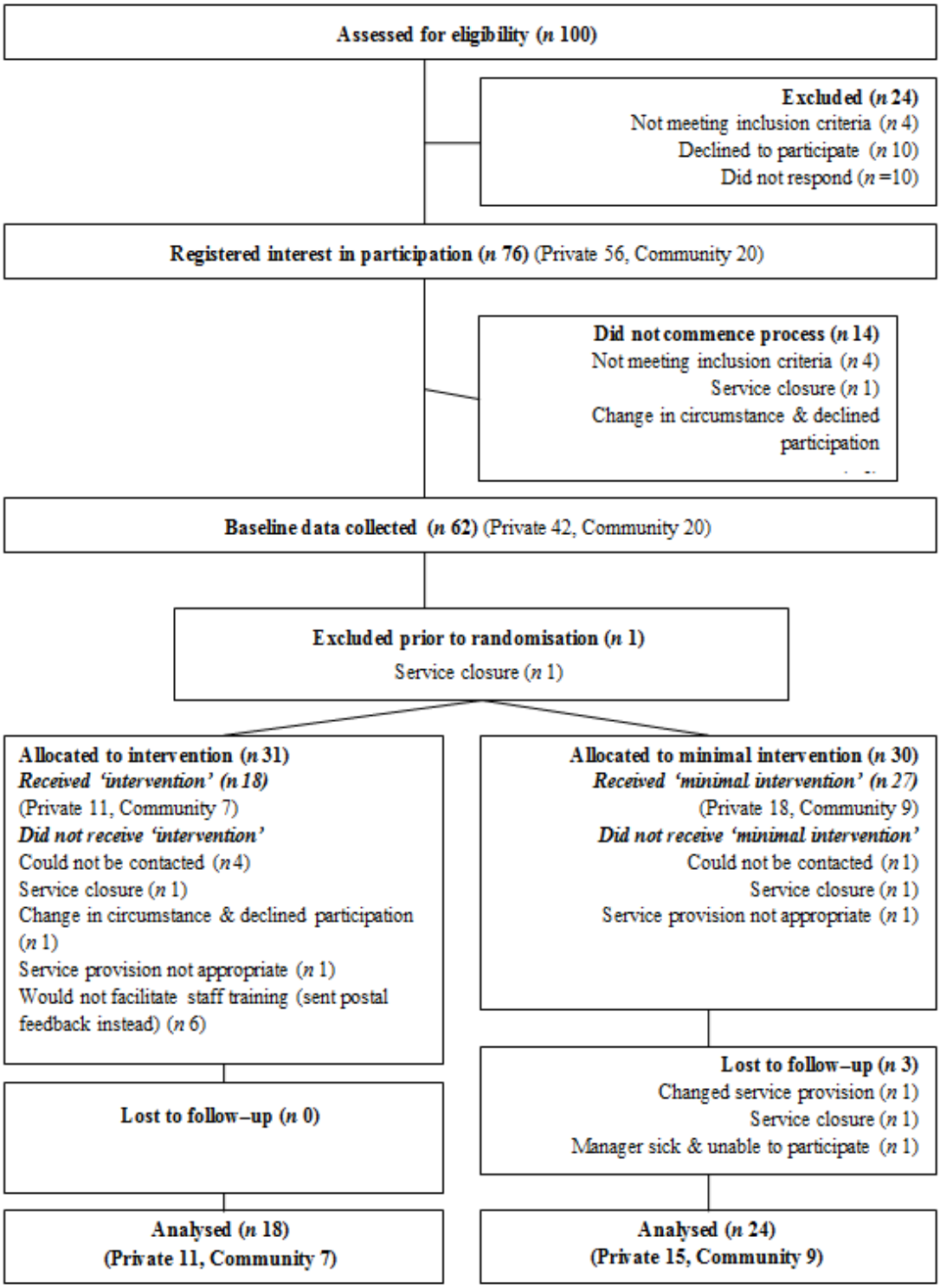
The 'Hints and Tips' pack provides pre-schools with more in-depth information on best practice points and includes reference to other useful resources such as the 'Food and Nutrition Guidelines for Pre-schools' (4), the '3 Week menu plan – a resource for pre-schools'(57) and 'Eating well for under 5's in childcare: practical and nutritional guidelines' (2). The pack includes information on meals and snacks;

food serving sizes; iron; healthy snacks; drinks and fluids; 'family style food service'; fussy/picky eating; eating utensils; food and budgeting; health promotion policy development; food and education; physical activity; and outdoor time.

The Education Resource Pack and accompanying training pack was literacy proofed with community dietitians, the local nutrition working group membership and piloted with local child-minders.

Once the Education Resource Pack were completed and printed, pre-school services were contacted in order to commence phase 4; the feedback / training phase of the project. Contact by telephone was made with each pre-school manager and an appointment made to provide feedback to them solely (minimal intervention group) or feedback and staff training (intervention group). Appointments and training sessions were confirmed in writing.

Figure 1 - Flow diagram of the parallel study phases of the HIP project.



Task 2 - Work Activity 1

In-house parent / staff information evenings for intervention group on incentive scheme

In-house training of pre-schools in intervention group on SEF and information resource pack on a cluster basis

The original Tasks (*In-house parent/staff information evening for intervention group on incentive scheme & In-house training of pre-schools in intervention group on SEF and information resource pack ono a cluster basis)* were altered during the project process due to the need to change the randomisation of pre-schools. Rather than providing two different formats of training to only the intervention group (as original protocol had not envisaged the provision of training to the control group), it was decided to provide manager feedback only to the minimal intervention group and manager feedback plus staff training to the intervention group, so endeavouring to determine whether the addition of staff training would have any impact on practice when re-evaluated at follow-up.

Phase 4 (training / feedback phase) was implemented between July 2010 and February 2011. In phase 4, pre-schools received information about their baseline practice, as measured by the Scored Evaluation Form, and information on how to achieve best practice using the Education Resource Pack in accordance with the study design. Prior to each visit a detailed written feedback record was generated through review of SPSS file and records.

Minimal intervention feedback involved the research Dietitian meeting on a one-to-one basis with the pre-school manager and explaining in detail the pre-school's baseline scoring using the Education Resource Pack and the detailed written feedback record. Feedback sessions were approximately 1 hour in duration. During this time the researcher outlined: the work to date; the next project steps; the resources available; and the detailed written feedback record. Each Scored Evaluation Form criterion score achieved was discussed with reference to the Best Practice Guide and the Hints and Tips pack. An Education Resource Pack for each staff member was provided to the manager to enable them to distribute amongst all staff. Managers were asked to relay all information given to their staff members.

Minimal intervention feedback was arranged for twenty seven of thirty of the minimal intervention group; reasons for non-participation included: inability to contact pre-school manager (*n* 1); service provision not appropriate (*n* 1); closure of service (*n* 1).

The intervention feedback and training involved the researcher meeting with the pre-school manager for approximately 1 hour and carrying out the same feedback format as with the minimal intervention group managers; this was then followed, in each case, with a 1.5 hour information session for all staff. This training was adult learning based and involved the exploration of four key themes: the HIP project and the Scored Evaluation Form; meals, snacks, serving sizes and fluids; family style food service; and

health promotion policy development. Staff were introduced to the Hints and Tips pack and Best Practice guide, with each staff member receiving a copy of each book. Short presentations were given on each of the main topic areas using a flipchart desktop presenter; these were interspersed with break out group work sessions and total group discussion sessions.

Training and feedback was arranged with 18 of 31 intervention group services. There were a number of factors that led to this reduction in the intervention group: four could not be contacted; one declined to participate, citing a change in its circumstances; one provided a service that was not appropriate; and one had closed its service. In addition, a number of pre-schools had difficulties in co-ordinating training for staff, thus preventing participation in the intervention process; postal feedback was instead sent to these pre-schools (*n* 6). Although follow-up data were collected from these six pre-schools, following discussion with the National Project Advisory Group, this group was omitted from paired data analysis of the effectiveness of the intervention.

Focus investigation amongst pre-school providers regarding most appropriate reward scheme

The Delphi Technique was used to determine the providers' views on the type of incentive scheme they would find useful and attractive and that would motivate them to become involved in a project such as the HIP project.

There were a number of 'Rounds' in the Delphi Technique. The first round of the Delphi questionnaire process was sent to all managers whose services were in the project in December 2011. The question on Round one was qualitative and open ended '*As a manager of FDC pre-school what incentives would you choose for the HIP project that would make the project more attractive to you as a manager?*' Each service was followed up by telephone in January 2012 and the final response rate was 23 of 45 (51%).

The next step involved the grouping of ideas provided by managers through content analysis. Each provider who participated in Round One was then sent a list of all the responses and requested to rate each using a Likert scale. The sub panels used with 5 point Likert scale of choice, i.e. 1: very important; 5: unimportant. This was a quantitative evaluation. Feedback was collected (17 of 23; 74per cent) and analysed through SPSS to determine descriptive statistics and enable the ranking of ideas. Once 70 per cent consensus on ideas was reached the Delphi process was stopped. 70 per cent consensus was reached with sixteen incentive ideas.

Task 2 - Work Activity 2

Re-audit of pre-schools 6 months post-intervention

Data were collected in all pre-schools by one Research Dietitian (RD) six to nine months post HIP project intervention (2011). Phase 5 data collection commenced in mid-September 2011 and was completed at the end of November 2011.

An abstract was submitted and presented at the Annual Postgraduate Symposium, Faculty of Science, Dublin Institute of Technology 2011 entitled '*The development, validation and implementation of an Healthy Food Incentive Scheme in the Irish Full Day Care Pre-school setting*'.

Task 3 - Work Activity 1

Comparison of pre - & post intervention and intervention and control status

The Wilcoxon Signed Rank Test was used to test for differences between baseline and post-intervention Scored Evaluation Form scores within both the minimal intervention and intervention groups. Mann Whitney U tests were carried out to determine whether differences occurred between the two groups both at baseline and post-intervention. Results were considered significant at $P < 0.05$.

Task 4 - Work Activity 1

Data analysis

All data collected were coded and inputted in the Statistics Package for the Social Sciences (SPSS) for Windows , Version 20 (SPSS Inc., Chicago, Illinois, USA) and all statistical analysis was carried out using SPSS. Data were analysed for normality of distribution and descriptive statistics (frequencies) used to define the characteristics of the study pre-schools, their nutrition practices and food and beverage provision. The Wilcoxon Signed Rank Test was used to test for differences between baseline and post-intervention Scored Evaluation Form scores within both the minimal intervention and intervention groups. Mann Whitney U tests were carried out to determine whether differences occurred between the two groups both at baseline and post-intervention. Results were considered significant at $P < 0.05$.

Award / certification / acknowledgement of pre-schools in intervention group as appropriate

A feedback report was written for each service. At the beginning of the feedback phase, feedback was sent by post to each service; however it soon became apparent that services did not appreciate the context of their results and feedback. It was felt, on reflection, that it would be better to contact all

services by telephone, and then send out postal feedback. Pre-schools seemed to prefer this method. All services who had previously received postal feedback were followed up by telephone to ensure that they understood the feedback that had been given to them.

A time defined year's award certificate: Participation, Bronze, Silver, Gold or Platinum was sent to each service, as appropriate, together with the written feedback. A year end HIP project newsletter was sent to all services in June 2012 thanking them for their involvement and encouraging them to continue with their best practice work. Each service was advised that they would be contacted again in the autumn of 2012 to enable them to be revisited thus enabling resubmission for maintenance of their award level or consideration for a new level.

3 Results

Phase 1 Pilot Study

Pre-school service characteristics

Eleven of the pre-schools visited were privately run and one was a 'not for profit' community based pre-school. Table 3 outlines the characteristics of the pre-schools involved in the phase 1 pilot in Co. Wicklow.

Table 3 - Phase 1 Pre-school characteristics (n 12)

	n	%	Median (IQR)	Range
No. of carers	*12*	100	7 (4)	3-12
No. of children	*12*	100	29 (20)	15-65
No. of boys	*4*	33	15 (11)	7-20
No. of girls	*4*	33	8 (8)	7-17
No. of children < 12 m	*11*	92	0 (1)	0-5
No. of children 12-24 m	*11*	92	5 (6)	0-30
No. of children 25-36 m	*10*	83	10 (6)	3-30
No. of children > 36 m	*10*	83	16 (21)	6-49
No. of rooms in facility	*12*	100	3 (2)	1-4
Daily care charge to parents (€); when services provide food	*6*	50	44 (22)	20 (55)
Weekly expenditure on food (€); when services provide food	*5*	42	85 (120)	50-200

n, number of pre-schools; %, percentage, IQR, Interquartile Range; m, month; €, euro; No., number.

Modification of the Scored Evaluation Form

The Scored Evaluation Form was transformed from its original format. Criteria were grouped into sub-sections and each criterion was based on best practice evidence. The scoring system included three possible scores and a categorisation format for overall scores was developed.

While considerable revision of the Scored Evaluation Form was undertaken prior to this investigation; this study noted that the sections included in the revised Scored Evaluation Form needed further amendment to ensure it could be used in all services regardless of the age of child attending. While many pre-schools did not have children aged less than 12 months, it became apparent that a number of

issues which should be relevant only to children aged under 12 months were also pertinent to toddlers over the age of 12 months i.e. provision of: age appropriate consistencies; iron rich food; two handled un-lidded beaker; chair versus high chair; or self-feeding versus being fed.

It was also noted that the phrasing of some criteria need alteration to avoid misinterpretation, for example, the necessity to indicate quantity i.e. a glass / portion / 200ml milk.

The inclusion of criteria that will measure 'family style food service' will also be necessary; i.e. to measure number of pre-school providers sitting with children; to determine amount of time allocated to meal and snack times.

The utensils used by children must also be measured; as until now only cup usage was documented. This study demonstrated that provision of plates, cutlery and bottles needed to be assessed in all age groups.

The scoring system

The overall score in each pre-school service was also determined using the Scored Evaluation Form. Services were divided into two categories for calculating the total score: services with infants less than twelve months: mean score 43 (SD 12.5); and services which had children over 12 months only: mean score 22.5 (SD 4.5).

A negative correlation was noted between: the number of children in the pre-school service and the overall score in services with infants less than twelve months ($r=-0.41$, $P<0.05$); and the number of children in the pre-school service and the overall score in services with children over 12 months only ($r=-.60$, $P<0.05$). Table 4 outlines the scores achieved by each service in each SEF sub-category.

Table 4 - Pre-school scores on the Scored Evaluation Form (phase 1)

Pre-schools	Environment section	< 12m section	> 12m section	Snack section	Overall score (<12m age group in service)	Overall score (>12m age group only in service)
1	12	6	8	3	29	n/a
2	10	12	16	15	53	n/a
3	8	n/a	4	7	n/a	19
4	10	n/a	8	12	n/a	30
5	7	n/a	8	6	n/a	21
6	10	n/a	7	10	n/a	27
7	8	n/a	8	3	n/a	19
8	4	n/a	9	12	n/a	25
9	5	n/a	3	9	n/a	17
10	n/o	n/o	n/o	n/o	n/o	n/o
11	4	n/a	8	10	n/a	22
12	13	14	8	12	47	n/a
Mean (SD)	8.27 (3.06)	10.66 (4.16)	7.90 (3.26)	9.00 (3.87)	43 (12.5)	22.5 (4.47)

n/a, not applicable; n/o, not observed; SD, standard deviation; M, month; <, less than >; greater than

Food and fluid provision

While the majority of pre-schools (*n* 10) provided food on the premises, outside catering companies also provided food (*n* 2), as did parents (*n* 7). No association was noted between adequate portion size provision and the source of the food provided i.e. pre-school, parental or outside catering food provision. Overall, it was noted that portion sizes provided to infants and toddlers were inadequate. The protein offered to children, at the main meal time, was observed to be less than one serving, in seven of the services visited. In eight services, the vegetable given was observed to be less than one serving; and in nine services no dairy food was provided at the main meal. Six services provided the recommended serving size of starchy food; with one pre-school providing less than one serving; and one providing a serving that was greater than that recommended.

A variety of snacks were provided to children, with fromage frais (*n* 6) and fruit (*n* 9) being the snacks offered with the greatest frequency. Whilst the majority of pre-schools are providing fruit, in most cases it was noted that the amount of fruit given did not constitute a portion. Associations were noted between parental food provision and snack type for some snacks. Significant positive association was noted between parental snack provision and provision of cheese as a snack (p=0.024) and some association was noted between parental snack provision and the provision of fromage frais as a snack (p=0.061).

While three services provided only milk or water to drink; all other services offered more drink types than this, and juice and dilutable fruit drinks were offered most often. In frequency terms, while seven preschools were noted to provide tap water to drink with meals and snacks; only one pre-school offered tap water outside these times.

Food environment

A lack of family style food service was apparent. In three services, providers sat at tables with older children; all children then waited to commence eating until every child at the table had been served their food. In two pre-schools, older children were expected to remain at the table until all children at the table had finished eating. The feeding of infants and young toddlers to speed up meal times was apparent; with the majority (*n* 8) of services giving assistance to children if they were eating slowly. Encouragement to self-feed was lacking in the majority of services, and in many cases infants and young toddlers who were at an age where they could be sitting at age appropriate tables and chairs, were placed in high chairs and spoon fed by providers, without encouragement to self-feed at any stage during the meal. When providers sat with children, and ate with children (*n* 4), the meal / snack was perceived by the researcher to be more pleasant and relaxed as it was noted that providers took time to talk to children about various issues, which was in contrast to those pre-schools where providers stood / knelt beside children and urged them to hurry up or offered to feed the children in an attempt to speed up the meal time.

Whole school nutrition policy

Few pre-schools had nutrition policies (*n* 6), and, if available, they had not been produced using the 'whole school' approach to policy development (4, 60). Only one service displayed their nutrition policy for parents and visitors to see.

Physical activity

Some form of physical activity was observed in the majority of services (*n* 8); however, in all but one service, outdoor activity was not observed if it was raining. Four services provided children with the recommended minimum amount of physical activity of 60 minutes (61) on the day that the service was visited.

Phase 2 Baseline data collection

Pre-school characteristics baseline data collection phase

76 per cent of 100 pre-schools eligible to participate registered to take part in the HIP project, with baseline data collected in 62% (62/100); 42 of these were privately owned and 20 were community (not for profit) services. Data from four of the baseline pre-school visits were excluded from the baseline database for analyses; these were data from services that did not provide written consent (*n* 2); did not provide a main meal as no children remained in the service at main meal time (*n* 1); provided care only for children with intellectual disabilities (*n* 1).

Baseline characteristics – total sample

Table 5 outlines the baseline characteristics the total eligible pre-school sample

Table 5 - Baseline characteristics of all eligible pre-schools (phase 2) (n 58)

	n	%	Median (IQR)	Range
Total number of staff	58	100	7.5 (8)	2-31
Number of full time staff	58	100	4(4)	0-26
Number of part time staff	58	100	3(5)	0-20
Total number of children attending service	57	98.3	38(42)	7-150
Number of FDC children	56	96.6	18.5(18.5)	2-100
Number of children attending pre-school for <5 hours	55	94.8	19(28)	1-122
Minimum age a child may enter pre-school service (in months)	56	96.6	4(3)	2.5-30
Actual age of entry in months	47	81	6.5(3.5)	2.5-30
Number of FDC <12M	50	86.2	1.5(2.0)	0-8
Number of FDC 12- 24M	47	81	4(6)	0-22
Number of FDC 24-36M	46	79.3	6(7)	0-22
Number of FDC > 36M	48	82.8	8(8)	0-59
Weekly cost of childcare (€) for FDC children < 12M	48	82.8	150(29)	15-200
Weekly cost of childcare (€) for FDC children 12-24M	57	98.3	150(25)	25-200
Weekly cost of childcare (€) for FDC children >24M-	58	100	150(25)	25-190
Cost of food provision (€) per week	51	87.9	200(160)	30-670
Cost of food provision (€) per week private	35	89.7	175(150)	40-510
Cost of food provision (€) per week community	16	82.4	255(238.75)	30-670
Total sample:				
Cost of food provision (€) <14 FDC	18	90	113.50 (83.75)	30-510
Cost of food provision (€) 15-25 FDC	16	84.2	162.50 (177.50)	40-350
Cost of food provision (€) >26FDC	15	88.2	250 (160)	85 – 670
Private :				
Cost of food provision (€) <14 FDC	13	86.7	120 (102.50)	80-510
Cost of food provision (€) 15-25 FDC	12	92.3	145 (130)	40-350
Cost of food provision (€) >26FDC	8	88.9	250 (40)	85-400
Community				
Cost of food provision (€) <14 FDC	5	100	107 (105)	30-160
Cost of food provision (€) 15-25 FDC	4	66.7	280 (190)	85-325
Cost of food provision (€) >26FDC	7	87.5	367 (200)	200-670

Baseline characteristics - pre-schools that proceeded to follow-up

Non-participation (*n* 17) and loss to follow up (*n* 3) resulted in data being collected both pre and post intervention in forty two pre-schools. Reasons for non-participation in the intervention phase of the study included service closure (*n* 3); inability to facilitate staff training (*n* 6); inability to contact despite repeated attempts (*n* 5); service provision no longer appropriate as defined by the PIT (*n* 2); service change and participation declined by manager (*n* 1).

Table 6 depicts the baseline characteristics of the pre-schools that proceeded to follow-up while Table 7 outlines the characteristics of this sample when divided into the 'minimal intervention' and

'intervention' groups. No statistically significant difference was noted between the 'minimal intervention' and 'intervention' group characteristics at baseline when measured with a Mann Whitney U test.

Table 6 - Baseline characteristics of pre-schools that progressed to follow-up

	n	%	Median (IQR)	Range
Total number of staff	42	100	8 (8.5)	2-30
Number of full time staff	42	100	4 (4.25)	2-16
Number of part time staff	42	100	3 (6.25)	0-20
Total number of children attending service	42	100	38.5 (42.25)	7-150
Number of full day care children	41	97.6	17 (21)	3 (53)
Number of children attending pre-school for <5 hours	41	97.6	20 (28.5)	1-122
Minimum age a child may enter pre-school service (in months)	40	95.2	4 (3)	3-24
Actual age of entry in months	34	81.0	6.25 (3.88)	3-24
Number of FDC <12M	37	88.1	1 (2)	0-8
Number of FDC 12- 24M	34	81.0	4 (5)	0-22
Number of FDC 24-36M	33	78.6	6 (6)	0-20
Number of FDC > 36M	35	83.3	7 (8)	0-19
Weekly cost of childcare for FDC children < 12M	36	85.7	150 (27.50)	15-195
Weekly cost of childcare for FDC children 12-24M	42	100	150 (21.25)	25-190
Weekly cost of childcare for FDC children >24M-	42	100	150 (17.50)	25-190
Cost of food provision (€) per week	37	88.1	200 (162.50)	30-670
Cost of food provision (€) per week private	23	88.5	175 (140)	40-350
Cost of food provision (€) per week community	14	87.5	275 (273.75)	30-670

n, number of pre-schools; %, percentage, IQR, Interquartile Range; M, month; €, euro; FDC, full day care

Table 7 - Baseline characteristics: minimal intervention & intervention groups

All study pre-schools at baseline that proceeded to follow-up									
Characteristics	**Minimal intervention (*n* 24)**				**Intervention (*n* 18)**				
	n (%)				*n* (%)				
Private	15 (62.5%)				11 (61.1%)				
Community	9 (37.5%)				7 (38.9%)				
	n	**%**	**Median (IQR)**	**Range**	***n***	**%**	**Median (IQR)**	**Range**	***P*value**
Total no. of carers	24	100	8 (9)	2-27	18	100	9 (7)	3-30	0.750 NS
No. of full-time carers	24	100	5 (7)	2-16	18	100	4 (2)	2-10	0.070 NS
No. of part-time carers	24	100	3 (4)	0-17	18	100	3 (6)	0-20	0.300 NS
Total no. of children	24	100	41 (51)	19-147	18	100	36 (42)	7-150	0.751 NS
No. of children >5 hr / day (FDC)	23	95.8	17 (18)	8-53	18	100	20 (27)	3-51	0.655 NS
No. of children < 5 hr / day	23	95.8	19 (29)	3-122	18	100	21 (31)	1-107	0.733 NS
No. of FDC children (< 12 M)	20	83.3	2 (3)	0-8	17	94.4	1 (2)	0-6	0.313 NS
FDC children (13-24 M)	19	79.2	4 (3)	1-22	15	83.3	2 (7)	0-13	0.272 NS
FDC children (25-36 M)	18	75	6 (5)	0 -20	15	83.3	6 (7)	0-14	0.478 NS
FDC children (> 36 M)	19	79.2	8 (9)	3-19	16	88.9	5 (8)	0-19	0.122 NS
Cost FDC (€) /wk < 12 M	24	100	148 (31)	99-195	14	77.8	150 (29)	25-195	0.553 NS
Cost FDC (€) / wk 13-24 M	24	100	150 (23)	110-175	18	100	150 (26)	25-190	0.878 NS
Cost FDC (€) / wk 25-36 M	24	100	150 (15)	110-175	18	100	150 (26)	25-190	0.868 NS
Cost FDC (€) / wk 36 M+	24	100	150 (15)	110-175	18	100	150 (26)	25-190	0.908 NS
Cost food provision (€) / wk	22	91.7	188 (170)	40-670	15	83.3	200 (180)	30-400	0.577 NS

n, number of pre-schools; %, percentage, IQR, Interquartile Range; M, month; €, euro; FDC, full day care; P, significance level(P <0.05), NS, not significant

Baseline characteristics - pre-schools that did not proceed to follow-up

16 pre-schools did not proceed to the follow-up phase of the HIP project. Table 8 outlines the baseline characteristics of these pre-schools that did not proceed to follow-up.

Table 8 - Baseline characteristics: pre-schools that did not proceed to follow-up

	n	%	Median (IQR)	Range
Total number of staff	16	100	6.5 (8.25)	3-31
Number of full time staff	16	100	3.5 (4.5)	0-26
Number of part time staff	16	100	2 (2.75)	0-11
Total number of children attending service	15	94	33 (42)	17 (121)
Number of full day care children	15	94	20 (18)	2 (100)
Number of children attending pre-school for <5 hours	14	88	16.5 (23.5)	3 (83)
Minimum age a child may enter pre-school service (in months)	16	100	5 (7.88)	2.5-30
Actual age of entry in months	13	81	7 (5)	2.5-30
Number of FDC <12M	13	81	2 (3)	0-6
Number of FDC 12- 24M	13	81	4 (8)	0-17
Number of FDC 24-36M	13	81	4 (9)	0-22
Number of FDC > 36M	13	81	8 (8.5)	0-59
Weekly cost of childcare (€) for FDC children < 12M	12	75	165 (31.25)	130-200
Weekly cost of childcare (€) for FDC children 12-24M	15	94	160 (25)	120-200
Weekly cost of childcare (€) for FDC children >24M-	16	100	157.50 (23.75)	120-180
Cost of food provision (€) per week	14	88	180 (153.50)	60-510
Cost of food provision (€) per week private	12	92.3	175 (157)	60-510
Cost of food provision (€) per week community	2	66.7	210 (-)	160-260

n, number of pre-schools; %, percentage, IQR, Interquartile Range; M, month; €, euro; FDC, full day care

Baseline health related practices

Table 9 outlines the health related practice of those pre-schools that proceeded to follow-and those that did not, while Table 10 depicts the 'food group' portion size provision per age group.

Table 9 - Key health related practices of pre-schools at baseline

	Proceeded to follow up (*n*, 42)	Baseline only (*n*, 16)
	n (%)	*n* (%)
Visible written healthy eating policy	3 (7)	0
Looking at whole pre-school environment	0	0
Parental or staff involvement in policy development	1 (2)	0
Activity timetable in hallway	2 (5)	2 (13)
Infants physical activity	4 (9)	0
12-24M physical activity	21 (50)	7 (44)
25-36M physical activity	27 (64)	12 (75)
> 36M physical activity	27 (64)	11 (69)
Seamless physical activity	4 (10)	3 (19)
Children outside overall	14 (33)	6 (38)
Infants outside	5 (12)	0
12-24M outside	17 (41)	7 (44)
25-36M outside	23 (55)	11 (69)
> 36M outside	25 (60)	10 (63)
Outdoor clothing	25 (60)	6 (38)
Wellies visible	3 (7)	1 (6)
Treat day Friday	18 (43)	7 (44)
Treat processed food on menu on Friday	20 (48)	12 (75)
Evidence of healthy reward scheme	5 (12)	2 (13)
Appropriate seats for providers on all rooms	5 (12)	1 (6)
Food and nutrition discussed at mealtimes all rooms	2 (5)	0
Stories told in all rooms	1 (2)	1 (6)
Stories told in some rooms	3 (7)	1 (6)
Children watching television	3 (7)	4 (25)
Older children waiting until all served	0	1 (6)
All children allowed to leave table before end of food time	19 (45)	7 (44)
Some rooms or food times children allowed to leave before end of food time	14 (33)	6 (38)
Meals & snacks perceived to be relaxed events	4 (10)	1 (6)
Clearing of dishes end of meal in all rooms	31 (74)	11 (69)
Clearing of dishes end of meal in some rooms only	8 (19)	5 (31)
Cleaning of table surfaces in all rooms at all meals	11 (26)	3 (19)
Cleaning of tables in some rooms at some meals only	5 (12)	3 (19)
Sweeping before end of meal	3 (7)	3 (19)
Children participate in meal in all rooms at all mealtimes	5 (12)	0
Children participate some meals in some rooms only	20 (48)	12 (75)
Cup unlidded < 12 M	1 (2)	0
Correct cutlery < 12M	1 (2)	1 (6)
Plates for all food < 12M	1 (2)	1 (6)
Cup unlidded 12-24M	3 (7)	1 (6)
Bottles with sports' top lids 12-24M	4 (10)	3 (19)
Plates for all snacks 12-24M	8 (19)	2 (13)

Correct cutlery 12-24M	1 (2)	1 (6)
Cups unlidded 25-36M	14 (33)	9 (56)
Bottles with sports' caps 25-36M	6 (14)	5 (31)
Plates for snacks 25-36M	12 (29)	2 (13)
Correct cutlery 25-36M	2 (5)	0
Unlidded beaker > 36M	36 (86)	12 (75)
Bottles with sports' caps > 36M	10 (24)	8 (50)
Plates for all snacks > 36M	12 (29)	3 (19)
Correct cutlery > 36M	1 (2)	0

n, number of pre-schools; %, percentage; < less than; >greater than

Table 10 - Baseline meal provision portion size in each age group

		Proceeded to follow up (n, 42)	Baseline only (n, 16)
		n (%)	n (%)
Food group & age	**Meal provision portion size**		
Protein			
< 12 M	Not applicable	14 (33)	7 (44)
	Parental food not –possible to identify	4 (10)	1 (7)
	No protein given	5 (12)	3 (19)
	1 portion	1 (2)	1 (6)
12M – 24 M	Not applicable	2 (5)	1 (6)
	Parental food not –possible to identify	2 (5)	3 (19)
	No protein provided	4 (10)	1 (6)
	1 portion	2 (5)	3 (19)
	Served and allowed to self-serve seconds	0	0
	Ad lib	0	0
25M- 36M	Parental food not –possible to identify	1 (2)	1 (6)
	No protein provided	1 (2)	0
	1 portion	4 (10)	3 (19)
	Served and self-serve seconds	1 (2)	0
	Ad lib	0	0
36M+	Parental food not –possible to identify	0	1 (6)
	No protein provided	0	0
	1 portion	6 (14)	0
	Served and self-serve seconds	1 (2)	0
	Ad lib	0	0
Carbohydrate			
< 12 M	Not applicable	15 (36)	7 (44)
	Parental food not –possible to identify	5 (12)	2 (13)

	1 portion	4 (10)	1 (6)
	1 – 1 ½ portions	1 (2)	1 (6)
	1 ½ - 2 portions	2 (5)	0
	2 – 3 portions	0	0
12M – 24 M	Not applicable	2 (5)	1 (6)
	Parental food not –possible to identify	2 (5)	1 (60
	1 portion	14 (33)	5 (32)
	2-3 portions	2 (5)	0
	Served and self-serve seconds	0	0
	Ad lib	0	0
25M- 36M	Parental food not –possible to identify	1 (2)	0
	1 portion	13 (31)	5 (31)
	Served and self-serve seconds	0	0
	Ad Lib	0	0
36M+	Parental food not –possible to identify	2 (5)	0
	1 portion	12 (29)	5 (31)
	Served and self-serve seconds	1 (2)	0
	Ad Lib	0	0
Dairy			
< 12 M	Not applicable	12 (29)	7 (44)
	Parental food not –possible to identify	3 (7)	1 (6)
	None	17 (40)	7 (44)
	1 portion	0	1 (6)
	Ad lib	1 (2)	0
12M – 24 M	Not applicable	2 (5)	1 (6)
	Parental food not –possible to identify	1 (2)	0
	No dairy provided	19 (45)	9 (56)
	1 portion	0	1 (6)
	Ad lib	1 (2)	0
25M- 36M	Parental food not –possible to identify	0	0
	No dairy provided	20 (48)	12 (75)
	1 portion	1 (2)	1 (6)
	Served and self-serve seconds	0	0
	Ad lib	1 (2)	0
36M+	Parental food not –possible to identify	0	0
	No dairy provided	20 (48)	11 (69)
	1 portion	3 (7)	1 (60
	Served and self-serve seconds	0	0
	Ad lib	1 (2)	0
	Vegetables		
< 12 M	Not applicable	15 (36)	7 (44)
	Parental food not –possible to identify	2 (5)	0
	None	1 (0)	0
	1 portion	1 (2)	2 (13)
12M – 24 M	Not applicable	2 (5)	1 (6)
	Not possible to identify	5 (12)	1 (6)
	1 portion	6 (14)	4 (25)
	Ad lib	0	0
25M- 36M	Not possible to identify	3 (7)	0

	1 portion	7 (17)	4 (25)
	Served and self-serve seconds	0	0
	Ad lib	0	0
36M+	Not possible to identify	2 (5)	0
	1 portion	7 (17)	4 (25)
	Served and self-serve seconds	0	0
	Ad lib	0	0

n, number of pre-schools; %, percentage; < less than; >greater than

Baseline section and overall scores achieved by pre-schools - total sample

The section and overall scores achieved at baseline by the total sample of eligible pre-schools are outlined in Table 11, while Table 12 outlines the section and overall scores achieved by those pre-schools that went on to progress to the follow-up phase of the project and Table 13 depicts the section and overall scores achieved by those pre-schools that did not progress to follow-up.

Table 11 - Section and overall scores for full baseline sample

	n	%	Median (IQR)	Range
Score for environment section SEF	58	100	3(2)	0-9
Score for food service section SEF	58	100	2(2)	0-11
Score for meals section on SEF	58	100	4(3.25)	0-13
Score for snacks section on SEF	58	100	6(5)	2-14
Overall score on SEF	58	100	14(7.25)	7-39

n, number of pre-schools; %, percentage, IQR, Interquartile Range.

Table 12 - Section and overall scores for pre-schools that proceeded to follow up

	n	%	Median (IQR)	Range
Score for environment section SEF	42	100	3(2)	0-9
Score for food service section SEF	42	100	2(2)	0-11
Score for meals section on SEF	42	100	4(3)	1-13
Score for snacks section on SEF	42	100	6(5)	2-14
Overall score on SEF	42	100	14(8)	7-39

n, number of pre-schools; %, percentage, IQR, Interquartile Range.

Table 13 - Section and overall scores for pre-schools that did not proceed to follow

	n	%	Median (IQR)	Range
Score for environment section SEF	16	100	3(2)	0-8
Score for food service section SEF	16	100	2(2.5)	0-6
Score for meals section on SEF	16	100	4(4.5)	0-8
Score for snacks section on SEF	16	100	4(2.75)	2-11
Overall score on SEF	16	100	15.5(8.25)	8-25

n, number of pre-schools; %, percentage, IQR, Interquartile Range.

76 per cent (*n* 44) of pre-schools in the total baseline sample (*n* 58) achieved a Participation classification level, while 24 per cent (*n* 14) achieved a Bronze classification level. Seventy four per cent (*n*, 31) of those pre-schools that proceeded to follow-up achieved a Participation classification level, while 26 per cent (*n* 11) were classified as Bronze, this compares to 81 per cent (*n* 13) of those pre-schools that did not proceed to follow-up achieving a Participation classification with 19 per cent (*n* 3) achieving a Bronze level.

Baseline criteria scores achieved by pre-schools

A Mann-Whitney U test tested criteria scores, section scores and overall scores for those services that proceeded to follow-up and those which did not. No significant difference was noted between the two sets of pre-schools except that the difference in scoring within the 'eating with children' criterion score (P = 0.084) the 'family style food service' criterion score (p=0.084) and the 'snack' section score (p=0.089) approached significance. Table 14 outlines the criteria, section and overall scores achieved in the two samples and significance levels.

Table 14 - Baseline scores of pre-schools which progressed to follow up (n 42) and those that did (n 16).

	Pre-schools which progress to follow-up phase	Pre-schools which participate in baseline phase only	
	Median (IQR) [Range] (*n* 42)	*Median* (IQR) [Range] (*n* 16)	*P* value
SEF Section Scores			
Environment	3(2) [0-9]	3(2) [0-8]	0.872 NS
Food service	2(2) [0-11]	2(2.5) [0-6]	0.691 NS
Meals	4(3) [1-13]	4(4.5) [0-8]	0.634 NS
Snacks	6(5) [2-14]	4(2.75) [2-11]	0.089 NS
Overall SEF Score	14(8) [7-39]	15.5(8.25) [8-25]	0.780 NS

	Pre-schools which progress to follow-up phase (*n* 42)			Pre-schools which participate in baseline phase only (*n* 16)			
SEF criteria scores	NMS *n* (%)	MS *n* (%)	BP *n* (%)	NMS *n* (%)	MS *n* (%)	BP *n* (%)	*P* value
Policy	39 (93)	3 (7)	0	16 (100)	0	0	0.276 NS
Education materials	15 (36)	26 (62)	1 (2)	4 (25)	10 (63)	2 (13)	0.244 NS
Planned Physical activity	8 (19)	34 (81)	0	4 (25)	12 (75)	0	0.620 NS
Outdoor time	14 (33)	26 (62)	2 (5)	5 (31)	11 (69)	0	0.934 NS
Food as reward	15 (36)	23 (55)	4 (10)	7 (44)	7 (44)	2 (13)	0.727 NS
Adequate number meals & snacks	40 (95)	1 (2)	1 (2)	15 (94)	1 (6)	0	0.838 NS
Staff sitting at food times	38 (91)	3 (7)	1 (2)	16 (100)	0	0	0.205 NS
Staff eating with children	35 (83)	7 (17)	0	16 (100)	0	0	0.084 NS
Family style food service	35 (83)	7 (17)	0	16 (100)	0	0	0.084 NS
Adequate time at meals & snacks	17 (41)	21 (50)	4 (10)	5 (31)	8 (50)	3 (19)	0.371 NS
All children actively encouraged to feed selves	5 (12)	35 (83)	2 (5)	4 (25)	10 (63)	2 (13)	0.650 NS
Appropriate feeding & drinking utensils	40 (95)	2 (5)	0	15 (94)	1 (6)	0	0.786 NS

Portion protein	21 (50)	19 (45)	2 (5)	6 (38)	9 (56)	1 (6)	0.405 NS
Portion starch	0	33 (79)	9 (21)	1 (6)	9 (56)	6 (38)	0.401 NS
Portion dairy	29 (69)	11 (26)	2 (5)	12 (75)	3 (19)	1 (6)	0.702 NS
Portion vegetables	14 (33)	21 (50)	7 (17)	7 (44)	5 (31)	4 (25)	0.843 NS
Self-service meals	35 (83)	7 (17)	0	14 (88)	2 (13)	0	0.698 NS
Iron rich foods	20 (48)	19 (45)	3 (7)	9 (56)	7 (44)	0	0.438 NS
Fruit as snack	3 (7)	27 (64)	12 (29)	14 (88)	2 (13)	0	0.470 NS
Top shelf foods	0	30 (71)	12 (29)	0	14 (88)	2 (13)	0.205 NS
Dairy other than main meal	5 (12)	20 (48)	17 (41)	15 (94)	1 (6)	0	0.119 NS
Drinks with snacks	33 (79)	6 (14)	3 (7)	9 (56)	5 (31)	2 (13)	0.102 NS
Drinks with meals	15 (36)	7 (17)	20 (48)	9 (56)	3 (19)	4 (25)	0.109 NS
Milk & water between meals	37 (88)	5 (12)	0	14 (88)	2 (13)	0	0.951 NS

n, number of pre-schools; %, percentage, IQR, Interquartile Range; M, month; €, euro; FDC, full day care P, significance level (P <0.05), NS, not significant.

Phase 3 - Education Resource Development

Two booklets were developed for the HIP project. These were the Hints and Tips Pack and the Best Practice Guide. All information contained in these booklets was based on best practice and served to explain the reasons for the criteria in the Scored Evaluation Form and how to achieved best practice through use of the Scored Evaluation Form.

Phase 4 - Training / Feedback

Median number of staff attending training session was nine the interquartile range of staff was 8 with minimum staff in attendance 1 and maximum 17; the majority of staff were trained in November and December 2010 and January 2011. The median number of staff in the intervention pre-school service group was 12 (interquartile range 8), minimum 3; maximum 30.

Full information session took place with 113 staff and truncated training took place with 18 staff (due to manager requesting shorter time due to bad weather). Ninety-five per cent (*n* 121) said they were satisfied with the training session while 6% (*n* 1) did not complete the questionnaire due to lack of time to answer and the question was not applicable in 3% (*n* 4) cases.

Satisfaction with 'level of opportunity to get involved' was expressed by 94 per cent (*n* 120), while satisfaction with 'level of group discussion' was expressed by 92 per cent (*n* 118). Table 15 outlines the staff participant feedback from the training sessions attended.

Table 15 - Participant feedback on Education Resource Pack training session

	Poor *n* (%)	Ok *n* (%)	Good *n* (%)	Very Good *n* (%)	Excellent *n* (%)	Not answered
Session notes	0	0	2 (2)	14 (11)	104 (82)	8 (6)
Session content	0	0	2 (2)	16 (13)	102 (80)	8 (6)
Presentation materials, i.e. desk top flipchart	0	0	2 (2)	11 (9)	106 (83)	9 (7)
Assistance & attention	0	0	1 (1)	11 (9)	107 (84)	9 (7)

n, number of pre-schools; %, percentage

Evaluation forms also requested qualitative feedback from the participants. Table 16 depicts the learning points expressed by staff on their training evaluation forms.

Table 16 - Key points learned by staff at training sessions

Key points reported to be learned at staff training	*n*
Serving sizes	42
Importance of letting children be involved in meals and the ways to get them involved	22
More knowledge of the nutritional value of food and healthy eating e.g. Food Pyramid	14
HIP project is more than just about food, about best practice, i.e. about outdoor time and physical activity	9
Healthiest drinks for teeth	8
What is a meal and a snack and planning a varied menu	7

Phase 5 – Pre-school Characteristics Follow up data with baseline matched pair analysis

The data collected during the 6-9 month post-intervention follow-up phase was matched with data collected from the same schools at baseline. Forty two sets of matched data were available for analysis. Table 17 outlines the characteristics of the minimal intervention and intervention groups at follow-up. No significant difference was noted between the groups using the Mann Whitney U Test.

Practices (matched pair analysis) baseline and follow-up

The health related practices observed in the minimal intervention and intervention groups, together with any change in these practices from baseline to follow-up, are outlined in Table 18. A positive change in practice was observed in both intervention groups in the majority of health related practice.

Table 17 - Post-intervention characteristics of minimal intervention and intervention pre-schools (n 42)

Characteristics	Minimal intervention (*n* 24)				Intervention (*n* 18)				
	n	%	Median (IQR)	Range	*n*	%	Median (IQR)	Range	*P* value
Total no. of carers	24	100	8 (8)	2-27	18	100	10 (11)	3-30	0.889 NS
Full time staff	24	100	6 (4)	2-16	18	100	4 (6)	2-20	0.337 NS
Part time staff	24	100	3 (6)	0-15	18	100	4 (7)	0-20	0.481 NS
Total no. of children	24	100	51 (32)	18-140	18	100	45 (44)	14-175	0.334 NS
No. of children >5 hr / day (FDC)	24	100	21 (21)	4-117	18	100	15 (12)	2-84	0.077 NS
No. of children < 5 hr / day	24	100	31 (35)	5-106	18	100	25 (24)	4-72	0.477 NS
FDC children (< 12 m)	18	75	1 (2)	0-6	16	88.9	1 (3)	0-4	0.957 NS
FDC children (13-24 m)	19	79.2	5 (3)	0-17	17	94.4	4 (7)	0-12	0.431 NS
FDC children (25-36 m)	18	75	5 (4)	1-15	18	100	4 (4)	0-13	0.363 NS
FDC children (> 36 m)	19	79.2	9 (6)	0-26	17	94.4	6 (14)	0-27	0.533 NS
Cost FDC (€) /wk < 12 mo.	24	100	153 (28)	100-195	15	83.3	150 (25)	127-195	0.633 NS
Cost FDC (€) / wk 13-24 mo.	23	95.8	150 (25)	100-175	17	94.4	150 (18)	127-190	0.575 NS
Cost FDC (€) / wk 25-36 m	24	100	150 (25)	100-175	17	94.4	150 (18)	127-190	0.631 NS
Cost FDC (€) / wk >36 m	24	100	150 (25)	100-175	17	94.4	150 (18)	127-190	0.689 NS
Cost food (€)/wk	22	91.7	200 (125)	70-645	18	100	169 (153)	100-475	0.989 NS

n, number of pre-schools; %, percentage, IQR, Interquartile Range; M, month; €, euro; FDC, full day care P, significance level (P <0.05), NS, not significant.

Table 18 - Key health practices of pre-schools at baseline and follow-up

	Minimal intervention only - (*n* 24)			Intervention only - (*n* 18)		
	Pre- *n* (%)	Post- *n* (%)	Change *n* (%)	Pre- *n* (%)	Post- *n* (%)	Change *n* (%)
Visible written healthy eating policy	1 (4)	15 (63)	+ 59%	2 (11)	12 (67)	+56%
Looking at whole pre-school environment	0	4 (17)	+ 17%	2 (11)	6 (33)	+22%
Parental or staff involvement in policy development	0	3 (13)	+ 13%	1 (6)	2 (11)	+ 5%
Activity timetable in hallway	1 (4)	13 (54)	+ 50%	1 (6)	6 (33)	+27%
Infants physical activity	1 (4)	5 (21)	+ 17%	3 (17)	4 (22)	+5%
12-24M physical activity	10 (42)	20 (83)	+ 41%	10 (56)	15 (83)	+ 27%
25-36M physical activity	12 (50)	20 (83)	+ 33%	14 (78)	16 (89)	+11%
> 36M physical activity	15 (63)	23 (96)	+ 33%	11 (61)	18 (100)	+ 39%
Seamless physical activity	2 (8)	4 (17)	+ 9%	2 (11)	4 (22)	+11%
Children outside	8 (33)	21 (88)	+ 55%	6 (33)	17 (94)	+61%
Infants outside	3 (13)	5 (21)	+ 8%	2 (11)	3 (17)	+ 6%
12-24M outside	8 (33)	19 (79)	+ 46%	9 (50)	14 (78)	+28%
25-36M outside	11 (46)	20 (83)	+ 37%	12 (67)	16 (89)	+22%
> 36M	14 (58)	21 (88)	+ 30%	11 (61)	17 (94)	+33%
Outdoor clothing	15 (63)	24 (100)	+ 37%	10 (56)	18 (100)	+44%
Wellies visible	1 (4)	10 (42)	+ 38%	2 (11)	4 (22)	+11%
Treat day Friday	9 (38)	10 (42)	+ 4%	8 (44)	5 (28)	+16%
Treat processed food on menu on Friday	10 (42)	7 (29)	- 13 %	10 (56)	3 (17)	+39%
Evidence of healthy reward scheme	5 (21)	8 (33)	+ 12%	5 (28)	2 (11)	-17%
Appropriate seats for providers on all rooms	3 (13)	6 (25)	+ 12%	2 (11)	8 (44)	+33%
Food and nutrition discussed at mealtimes all rooms	1 (4)	12 (50)	+ 46%	1 (6)	7 (39)	+33%
Stories told in all rooms	1 (4)	4 (17)	+ 13 %	0	0	-
Stories told in some rooms	0	3 (13)	+ 13%	3 (17)	2 (11)	-6%
Children watching television	1 (4)	0	- 4%	0	0	0
Older children waiting until all served	0	5 (21)	+21	0	1 (6)	+6%
All children allowed to leave table before end of food time	10 (42)	2 (8)	- 34%	9 (50)	4 (22)	-28%
Some rooms or food times children allowed to leave before end of food time	8 (33)	8 (33)	-	6 (33)	3 (17)	-16%

Meals & snacks perceived to be relaxed events	1 (4)	12 (50)	+ 46%	3 (17)	12 (67)	+50%
Clearing of dishes end of meal in all rooms	19 (79)	10 (42)	- 37%	9 (50)	10 (56)	+6%
Clearing of dishes end of meal in some rooms only	4 (17)	5 (21)	+ 4%	7 (39)	2 (11)	-28%
Cleaning of table surfaces in all rooms at all meals	5 (21)	1 (4)	- 17%	6 (33)	1 (6)	-27%
Cleaning of tables in some rooms at some meals only	5 (21)	2 (8)	- 13%	0	1 (6)	+6%
Sweeping before end of meal	10 (42)	2 (8)	- 34%	3 (17)	1 (6)	-11%
Children participate in meal in all rooms at all mealtimes	3 (13)	15 (63)	+ 50%	2 (11)	14 (78)	+67%
Children participate in some meals in some rooms only	9 (38)	6 (33)	- 5%	11 (61)	1 (6)	-55%
Cup unlidded < 12 M	0	1 (4)	+ 4%	1 (6)	0	-
Correct cutlery < 12M	0	4 (17)	+ 17%	1 (6)	3 (17)	+11 %
Plates for all food < 12M	0	3 (13)	+ 13%	1 (6)	3 (17)	+11%
Cup unlidded 12-24M	2 (8)	5 (21)	+ 13%	1 (6)	4 (22)	+16%
Bottles with sports' top lids 12-24M	3 (13)	10 (42)	+ 29%	4 (22)	2 (11)	-11%
Plates for all snacks 12-24M	4 (17)	12 (50)	+ 33%	4 (22)	8 (44)	+22%
Correct cutlery 12-24M	1 (4)	17 (71)	+ 67%	0	8 (44)	+44%
Cups unlidded 25-36M	8 (33)	18 (75)	+ 42%	6 (33)	13 (72)	+39%
Bottles with sports' caps 25-36M	5 (21)	10 (42)	+ 21%	5 (28)	5 (28)	-
Plates for snacks 25-36M	4 (17)	15 (63)	+ 46%	8 (44)	12 (67)	+23%
Correct cutlery 25-36M	2 (8)	10 (42)	+ 34%	0	10 (56)	+56%
Unlidded beaker > 36M	19 (79)	21 (88)	+ 9%	15 (83)	18 (100)	+17%
Bottles with sports' caps > 36M	8 (33)	16 (67)	+ 34%	6 (33)	10 (56)	+23%
Plates for all snacks > 36M	4 (17)	13 (54)	+ 37%	9 (50)	10 (56)	+6%
Correct cutlery > 36M	1 (4)	10 (42)	+ 38%	0	10 (56)	+56%

n, number of pre-schools; %, percentage, M, month; FDC, full day care; >, greater than; < less than; +, increase; - decrease

Meal portion size provision baseline and follow-up (matched pair analysis)

The main food group portion sizes provided to all ages at baseline and at follow-up are outlined in Table 19; minimal intervention group and intervention groups are compared to determine change in portion size provision for each age group. Overall these was an increase in the number of pre-schools in both groups that provided '1 portion' of the different food groups to each age group. Provision of foods in self-service manner increased in the majority of age groups and in both intervention groups.

Table 19 - Portion size provision and age group at baseline and follow-up.

		Minimal intervention (*n* 24)			Intervention (*n* 18)		
Food group and age	**Meal provision portion size**	**Pre- *n* (%)**	**Post- *n* (%)**	**Change *n* (%)**	**Pre- *n* (%)**	**Post- *n* (%)**	**Change *n* (%)**
Protein							
< 12 M	Not applicable	8 (33)	15 (63)	+ 7 (30)	6 (33)	13 (72)	+ 7 (39)
	Parental food not – possible to identify	3 (7)	6 (25)	+ 3 (18)	4 (22)	2 (11)	- 2 (11)
	No protein given	3 (13)	1 (4)	- 2 (11)	3 (17)	0	- 3 (17)
	1 portion	1 (4)	0	- 1 (4)	0	0	-
12M – 24 M	Not applicable	1 (4)	0	- 1 (4)	1 (6)	2 (11)	+ 1 (5)
	Parental food not – possible to identify	1 (4)	0	- 1 (4)	1 (6)	3 (17)	+ 2 (11)
	No protein provided	3 (13)	1 (4)	- 2 (9)	2 (11)	0	- 2 (11)
	1 portion	1 (4)	12 (50)	+ 11 (46)	1 (6)	3 (17)	+ 2 (11)
	Served and allowed to self-serve seconds	0	1 (4)	+ 1 (4)	0	2 (11)	+ 2 (11)
	Ad lib	0	0	-	0	2 (11)	+ 2 (11)
25M- 36M	Parental food not – possible to identify	1 (4)	0	- 1 (4)	0	0	-
	No protein provided	1 (4)	0	- 1 (4)	1 (6)	0	- 1 (6)
	1 portion	3 (13)	9 (38)	+ 6 (25)	1 (6)	4 (22)	+3 (16)
	Served and self-serve seconds	0	2 (8)	+ 2 (8)	1 (6)	3 (17)	+ 2 (11)
	Ad lib	0	2 (8)	+ 2 (8)	0	3 (17)	+ 3 (17)
36M+	Parental food not – possible to identify	0	0	-	0	0	-
	No protein provided	1 (4)	0	- 1 (4)	0	0	-
	1 portion	5 (21)	6 (25)	+ 1 (4)	1 (6)	2 (11)	+1 (5)
	Served and self-serve seconds	0	1 (4)	+ 1 (4)	1 (6)	2 (11)	+1 (5)
	Ad lib	0	3 (13)	+ 3 (13)	0	5 (28)	+ 5 (28)
Carbohydrate							
< 12 M	Not applicable	8 (33)	15 (63)	+ 7 (30)	7 (39)	13 (72)	+ 6 (33)
	Parental food not – possible to identify	4 (17)	6 (25)	+ 2 (8)	4 (22)	3 (17)	- 1 (5)
	1 portion	3 (13)	2 (8)	- 1 (5)	1 (6)	1 (6)	-
	1 – 1 ½ portions	2 (8)	0	- 2 (8)	2 (11)	0	- 2 (11)
	1 ½ - 2 portions	1 (4)	1 (4)	-	2 (11)	1 (6)	- 1 (5)
	2 – 3 portions	1 (4)	0	- 1 (4)	0	0	-
12M – 24 M	Not applicable	1 (4)	0	- 1 (4)	1 (6)	2 (11)	+ 1 (5)

	Parental food not – possible to identify	1 (4)	0	- 1 (4)	1 (6)	3 (17)	+ 2 (11)
	1 portion	10 (42)	13 (54)	+ 3 (12)	4 (22)	2 (11)	- 2 (11)
	2-3 portions	1 (4)	0	+ 1 (4)	1 (6)	0	- 1 (6)
	Served and self-serve seconds	0	2 (8)	+ 2 (8)	0	1 (6)	+1 (6)
	Ad lib	0	0	-	0	3 (17)	+ 3 (17)
25M- 36M	Parental food not – possible to identify	1 (4)	0	+ 1 (4)	0	0	-
	1 portion	9 (38)	8 (33)	- 1 (5)	4 (22)	6 (33)	+ 2 (11)
	Served and self-serve seconds	0	5 (13)	+ 5 (13)	0	4 (22)	+ 4 (22)
	Ad Lib	0	0	-	0	2 (11)	+ 2 (11)
36M+	Parental food not – possible to identify	1 (4)	0	- 1 (4)	1 (6)	0	- 1 (6)
	No carbohydrate provided	0	0	-	0	0	-
	1 portion	7 (29)	6 (25)	- 1 (4)	5 (28)	7 (39)	+ 2 (11)
	Served and self-serve seconds	0	5 (21)	+ 5 (21)	1 (6)	2 (11)	+ 1 (5)
	Ad Lib	0	0	-	0	5 (28)	+ 5 (28)
Dairy							
< 12 M	Not applicable	7 (29)	17 (71)	+ 10 (42)	5 (28)	13 (72)	+ 8 (44)
	Parental food not – possible to identify	1 (4)	2 (8)	+ 1 (4)	3 (17)	2 (11)	- 1 (6)
	None	11 (46)	3 (13)	- 8 (33)	6 (33)	1 (6)	- 5 (27)
	1 portion	0	1 (4)	+ 1 (4)	0	2 (11)	+ 2 (11)
	Ad lib	0	0	-	1 (6)	0	- 1 (6)
12M – 24 M	Not applicable	1 (4)	0	- 1 (4)	1 (6)	2 (11)	+ 1 (5)
	Parental food not – possible to identify	0	0	-	1 (6)	0	-
	No dairy provided	12 (50)	10 (42)	-2 (8)	10 (56)	10 (56)	-
	1 portion	0	3 (13)	+ 3 (13)	0	2 (11)	+ 2 (11)
	Ad lib	0	6 (25)	+ 6 (25)	1 (6)	2 (11)	+ 2 (5)
25M- 36M	Parental food not – possible to identify	0	0	-	0	0	-
	No dairy provided	12 (50)	9 (38)	- 3 (12)	10 (56)	9 (50)	- 1 (6)
	1 portion	0	3 (13)	+ 3 (13)	1 (6)	2 (11)	+ 1 (5)
	Served and self-serve seconds	0	0	-	0	0	-
	Ad lib	0	6 (25)	+ 6 (25)	1 (6)	4 (22)	+ 3 (16)
36M+	Parental food not – possible to identify	0			0	0	
	No dairy provided	12 (50)	7 (29)	- 5 (21)	10 (56)	9 (50)	- 1 (6)
	1 portion	3 (13)	2 (8)	- 1 (5)	1 (6)	2 (11)	+ 1 (5)
	Served and self-serve seconds	0	0	-	0	0	-

	Ad lib	0	8 (33)	+8 (33)	1 (6)	4 (22)	+ 3 (16)
Vegetables							
< 12 M	Not applicable	8 (33)	14 (58)	+ 6 (25)	7 (39)	13 (72)	+ 6 (33)
	Parental food not – possible to identify	5 (21)	6 (25)	+ 1 (4)	4 (22)	2 (11)	- 2 (11)
	None	0	0	-	1 (6)	0	- 1 (6)
	1 portion	1 (4)	1 (4)	-	0	3 (17)	+3 (17)
12M – 24 M	Not applicable	1 (4)	0	-1 (4)	1 (6)	2 (11)	+ 1 (5)
	Not possible to identify	3 (13)	1 (4)	- 2 (9)	2 (11)	3 (17)	+ 1 (6)
	1 portion	4 (17)	12 (50)	+ 8 (33)	2 (11)	5 (28)	+ 3 (17)
	Ad lib	0	1 (4)	+1 (4)	0	4 (22)	+ 4 (22)
25M- 36M	Not possible to identify	3 (13)	1 (4)	- 2 (9)	0	0	-
	1 portion	4 (17)	11 (46)	+ 7 (29)	3 (17)	8 (44)	+ 5 (27)
	Served and self-serve seconds	0	2 (8)	+ 2 (8)	0	0	-
	Ad lib	0	0	0	0	6 (33)	+ 6 (33)
36M+	Not possible to identify	2 (8)	1 (4)	- 1 (4)	0	0	-
	1 portion	4 (17)	8 (33)	+ 4 (16)	3 (17)	8 (44)	+ 5 (27)
	Served and self-serve seconds	0	3 (13)	+3 (13)	0	0	-
	Ad lib	0	0	-	0	7 (39)	+ 7 (39)

n, number of pre-schools; %, percentage, M, month; FDC, full day care; < less than; +, increase; - decrease

Store cupboard contents at follow-up

During the follow-phase a list was generated of all food stuffs available in pre-school store cupboards, fridges and freezers. Table 20 outlines the frequency of availability of various food stuffs in the setting. Pasta, cheese, breakfast cereal, milk, sugar, gravy granules baked beans, vegetables, flour and frozen vegetables were the ten foods observed most frequently.

Table 20 - Store cupboard item frequencies overall post-intervention (n 42)

	Store cupboard item	*n*	%
1.	Pasta	40	95
2.	Cheese	40	95
3.	Breakfast cereal	37	88
4.	Milk	35	84
5.	Sugar	34	81
6.	Gravy granules	32	76
7.	Baked beans	31	74
8.	Vegetables	31	74
9.	Flour	31	74
10.	Frozen vegetables	31	74
11.	Crackers	30	71
12.	Spread	29	69
13.	Fromage frais	28	67
14.	Fruit	28	67
15.	Cooked meat	27	64
16.	Tomato ketchup	26	62
17.	Frozen meat	25	60
18.	Stock cubes	23	55
19.	Packet soup	22	52
20.	Fish fingers	22	52
21.	Oil	22	52
22.	Jarred tomato based sauce	21	50
23.	Biscuits	20	48
24.	Other jarred sauces	20	48
25.	Salt	20	48
26.	Jam / marmalade	18	43
27.	Juice	18	43
28.	Rice pudding	18	43
29.	Potato waffles	18	43
30.	Sausages	17	41
31.	Eggs	17	40
32.	Chicken nuggets / burgers	16	38
33.	Jarred white / cream sauce	15	36
34.	Yoghurt	13	31
35.	Instant noodles	13	31
36.	Jelly	12	29
37.	No added sugar squash	12	29
38.	Meal mixes	11	26
39.	Chips	10	24
40.	Frozen fish	10	24
41.	Fruit canned in syrup	10	24
42.	Chocolate	10	24
43.	Pizza	9	21
44.	Sugar or chocolate coated cereal	6	14
45.	Squash	6	14
46.	Cakes / buns	5	12
47.	Canned soup	5	12
48.	Crisps	3	7
49.	Cereal bars	3	7
50.	Sugar free jelly	2	5

n, number of pre-schools; %, percentage.

Scored Evaluation Form scoring at baseline and follow-up

Table 21 outlines the frequency of criterion scores achieved by the pre-schools in the minimal intervention and intervention groups at baseline and at follow-up. The median section scores and overall scores are also outlined together with their respective ranges. The P values denote the level of significant difference in scores from baseline to follow-up as measured using the Wilcoxon Signed Rank Test. A significant difference was noted in all section and overall scores from baseline to follow-up in both intervention groups. A significant difference in the majority of criteria scores from baseline to follow-up in both groups is also apparent.

Pre-school classifications at baseline and follow-up (matched pair analysis)

At baseline the majority of services (*n* 31; 74 per cent) were classified as Participation level. At follow-up twenty four services had moved to the Bronze level (57 per cent), whilst another 13 services, or almost one third, moved to a Silver classification. While a small minority of services remained in Participation level (n 4; 10 per cent); one service achieved a Gold classification. Table 22 depicts the classifications that were achieved by pre-schools at baseline and at follow-up in both private and community services in the minimal intervention and intervention groupings.

Self-assessment and observation scoring

The Wilcoxon Signed Rank Test was used to compare self-assessment and observation scores within the minimal intervention group and within the intervention group. There was a significant difference noted between the self-assessment and observation section scores and overall scores within both intervention groups. Table 23 depicts the scores achieved by the two methodologies (observation and self-assessment) within the minimal intervention group and within the intervention group. P values indicate the level of difference between the two methods of scoring and whether this is significant.

The Mann Whitney U Test was used to determine whether being in the minimal intervention or intervention grouping had an impact on scores awarded by the two different methodologies employed in the project: observation and self-assessment.

Within the 'observed method' a significant difference between minimal intervention and intervention groups existed in three SEF criteria: 'portion of starch '(P=0.041*); 'self-service meals' (P= 0.045*) and 'provision of dairy other than at main meal' (P=0.042*). While use of the 'self-assessment' method led to a significant between minimal intervention and intervention groups in the scores of 'provision of appropriate utensils' (P=0.044*) and 'top shelf foods' (P=0.031*). Table 24 outlines the scores achieved and the *P* values of significance

Table 21 - Scored Evaluation Form criteria scores at baseline and at follow up in the minimal intervention and intervention groups

	Minimal intervention group (*n* 24)							Intervention group (*n* 18)						
SEF Scores			**Baseline** *Median* (range)			**Follow-up** *Median* (range)	***P*value** [b]			**Baseline** *Median* (range)			**Follow-up** *Median* (range)	***P*value** [b]
Environment			3 (0-9)			7.5 (2-16)	0.000***			3 (1-6)			7.5 (5-12)	0.000***
Food service			2 (0-6)			6.5 (0-14)	0.000***			2 (0-11)			6 (2-10)	0.004**
Meals			4 (2-11)			7.5 (2-15)	0.001**			3.5 (1-8)			9 (3-18)	0.001**
Snacks			5 (2-14)			12 (3-18)	0.000***			6.5 (3-12)			10.5 (6-16)	0.001**
Overall Score			13 (7-39)			34 (11-60)	0.000***			15 (8-32)			33.5 (18-48)	0.000***
			Baseline *n* (%)			**Follow-up** *n* (%)	**P-value**[b]			**Baseline** *n* (%)			**Follow-up** *n* (%)	**P-value**[b]
	NMS	MS	BP	NMS	MS	BP		NMS	MS	BP	NMS	MS	BP	
Policy	23 (96)	1 (4)	0	10 (42)	11 (46)	3 (13)	0.001**	16 (89)	2 (11)	0	6 (33)	11 (61)	1 (6)	0.002**
Education materials	11 (46)	12 (50)	1 (4)	1 (4)	12 (50)	11 (46)	0.001**	4 (22)	14 (78)	0	0	9 (50)	9 (50)	0.001**
Planned Physical activity	6 (25)	18 (75)	0	1 (4)	22 (92)	1 (4)	0.035*	2 (11)	16 (89)	0	0	18 (100)	0	0.157
Outdoor time	8 (33)	14 (58)	2 (8)	2 (8)	13 (54)	9 (38)	0.004**	6 (33)	12 (67)	0	1 (6)	12 (67)	5 (28)	0.004**
Food as reward	8 (33)	14 (58)	2 (8)	2 (8)	15 (63)	7 (29)	0.007**	7 (39)	9 (50)	2 (11)	1 (6)	15 (83)	2 (11)	0.313

Adequate number meals & snacks	22 (92)	1 (4)	1 (4)	18 (75)	4 (17)	2 (8)	0.059	18 (100)	0	0	11 (61)	2 (11)	5 (28)	0.014*
Staff sitting at food times	23 (96)	1 (4)	0	4 (17)	18 (75)	2 (8)	0.000***	15 (83)	2 (11)	1 (6)	1 (6)	17 (94)	0	0.005**
Staff eating with children	21 (88)	3 (13)	0	10 (42)	9 (38)	5 (21)	0.003**	14 (78)	4 (22)	0	7 (39)	11 (61)	0	0.020*
Family style food service	21 (88)	3 (13)	0	7 (29)	15 (63)	2 (8)	0.000***	14 (78)	4 (22)	0	1 (6)	17 (94)	0	0.000*
Adequate time at meals & snacks	10 (42)	12 (50)	2 (8)	3 (13)	11 (46)	10 (42)	0.002**	7 (39)	9 (50)	2 (11)	0	12 (67)	6 (33)	0.021*
All children actively encouraged to feed selves	3 (13)	21 (88)	0	1 (4)	12 (50)	11 (46)	0.001**	2 (11)	14 (78)	2 (11)	0	11 (61)	7 (39)	0.075
Appropriate feeding & drinking utensils	22 (92)	2 (8)	0	17 (71)	7 (29)	0	0.059	18 (100)	0	0	17 (94)	1 (6)	0	0.317
Portion protein	11 (46)	11 (46)	2 (8)	5 (21)	12 (50)	7 (29)	0.030*	10 (56)	8 (44)	0	3 (17)	8 (44)	7 (39)	0.003**
Portion starch	0	18 (75)	6 (25)	0	17 (71)	7 (29)	0.739	0	15 (83)	3 (17)	0	7 (39)	11 (61)	0.021*
Portion dairy	16 (67)	7 (29)	1 (4)	13 (54)	4 (17)	7 (29)	0.017*	13 (72)	4 (22)	1 (6)	11 (61)	3 (17)	4 (22)	0.222

Portion vegetables	7 (29)	12 (50)	5 (21)	2 (8)	10 (42)	12 (50)	0.024*	7 (39)	9 (50)	2 (11)	1 (6)	4 (22)	13 (72)	0.002**
Self-service meals	21 (88)	3 (13)	0	11 (46)	13 (54)	0	0.008**	14 (78)	4 (22)	0	5 (28)	8 (44)	5 (28)	0.005**
Iron rich foods	12 (50)	10 (42)	2 (8)	9 (38)	9 (38)	6 (25)	0.064	8 (44)	9 (50)	1 (6)	6 (33)	7 (39)	5 (28)	0.088
Fruit as snack	3 (13)	14 (58)	7 (29)	0	3 (13)	21 (88)	0.000***	0	13 (72)	5 (28)	1 (6)	3 (17)	14 (78)	0.008**
Top shelf foods	0	16 (67)	8 (33)	0	13 (54)	11 (46)	0.317	0	14 (78)	4 (22)	0	14 (78)	4 (22)	1.000
Dairy other than main meal	7 (17)	12 (50)	8 (33)	2 (8)	3 (13)	19 (79)	0.002**	1 (6)	8 (44)	9 (50)	0	0	18 (100)	0.004**
Drinks with snacks	20 (83)	2 (8)	2 (8)	9 (38)	10 (42)	5 (21)	0.034*	13 (72)	4 (22)	1 (6)	4 (22)	11 (61)	3 (17)	0.008**
Drinks with meals	10 (42)	5 (21)	9 (38)	2 (8)	4 (17)	18 (75)	0.005**	5 (28)	2 (11)	11 (61)	3 (17)	7 (39)	8 (44)	0.589
Milk & water between meals	21 (88)	3 (13)	0	8 (33)	11 (46)	5 (21)	0.000***	16 (89)	2 (11)	0	5 (28)	10 (56)	3 (17)	0.002**

n, number of pre-schools; %, percentage, *P*, significance level

NMS, Not Minimum Standard (Score=0); MS, Minimum Standard (Score = 1); BP, Best Practice (Score = 3)

[a]Scores range from 0-18 in each section; 0-72 as overall score

[b] Wilcoxon Signed Rank test, * *P*< 0.05; ** P<0.01; ***P<0.001

Table 22 - Classification of private and community pre-schools in minimal intervention and intervention groups at baseline and at follow-up

	Baseline (*n* 42)				Follow-up (*n* 42)			
	Minimal intervention (*n* 24)		Intervention (*n* 18)		Minimal intervention (*n* 24)		Intervention (*n* 18)	
	Private (*n* 15) *n* (%)	Community (*n* 9) *n* (%)	Private (*n* 11) *n* (%)	Community (*n* 7) *n* (%)	Private (*n* 15) *n* (%)	Community (*n* 9) *n* (%)	Private (n 11) n (%)	Community (n 7) n (%)
Participation	10 (67)	7 (78)	10 (91)	4 (57)	1 (7)	2 (22)	1 (9)	0
Bronze	5 (33)	2 (22)	1 (9)	3 (43)	9 (60)	4 (44)	7 (64)	4 (57)
Silver	0	0	0	0	4 (27)	3 (33)	3 (27)	3 (43)
Gold	0	0	0	0	1 (7)	0	0	0
Platinum	0	0	0	0	0	0		

n, number of pre-schools; %, percentage.

Table 23 - Minimal intervention and intervention group scores (observation and self-assessment) at follow-up

	Minimal intervention							Intervention						
SEF Scores	**Observation (*n* 24) median (range)**			**Self-assessment (*n* 16) median (range)**			***P* value [b]**	**Observation (*n* 18) median (range)**			**Self-assessment (*n* 11) median (range)**			***P* value [b]**
Environment	7.5 (2-16)			16 (6-18)			0.000***	7.5 (5-12)			16 (6-18)			0.003**
Food service	6.5 (0-14)			15 (9-18)			0.001***	6 (2-10)			16 (10-18)			0.003**
Meals	7.5 (2-15)			16 (12-18)			0.000***	9 (3-18)			16 (4-18)			0.010*
Snacks	12 (3-18)			16 (16-18)			0.001***	10.5 (6-16)			16 (4-20)			0.026*
Overall Score	34 (11-60)			63.5 (52-72)			0.000***	33.5 (18-48)			64 (24-72)			0.003**
	Observation (*n* 24) *n* (%)			**Self-assessment (*n* 16) *n* (%)**			**P-value[b]**	**Observation (*n* 18) *n* (%)**			**Self-assessment (*n* 11) *n* (%)**			**P-value[b]**
	NMS	MS	BP	NMS	MS	BP		NMS	MS	BP	NMS	MS	BP	
Policy	10 (42)	11 (46)	3 (13)	1 (6)	6 (38)	9 (56)	0.005**	6 (33)	11 (61)	1 (6)	1 (9)	2 (18)	8 (73)	.004**
Education materials	1 (4)	12 (50)	11 (46)	0	3 (19)	13 (81)	0.034*	0	9 (50)	9 (50)	0	4 (36)	7 (64)	0.257
Planned Physical activity	1 (4)	22 (91)	1 (4)	0	1 (6)	15 (94)	0.000***	0	18 (100)	0	0	1 (9)	10 (91)	0.002**
Outdoor time	2 (8)	13 (54)	9 (38)	0	6 (38)	10 (63)	0.102	1 (6)	12 (67)	5 (28)	0	2 (18)	9 (82)	0.025*
Food as reward	2 (8)	15 (63)	7 (29)	0	5 (31)	11 (69)	0.024*	1 (6)	15 (83)	2 (11)	3 (17)	2 (18)	6 (55)	0.068

Adequate number meals & snacks	18 (75)	4 (17)	2 (8)	0	4 (25)	12 (75)	0.001***	11 (61)	2 (11)	5 (28)	2 (18)	0	9 (82)	0.019*
Staff sitting at food times	4 (17)	18 (75)	2 (8)	0	3 (19)	13 (81)	0.001***	1 (6)	17 (94)	0	0	4 (36)	7 (64)	0.011*
Staff eating with children	10 (42)	9 (38)	5 (21)	5 (31)	3 (19)	8 (50)	0.196	7 (39)	11 (61)	0	3 (27)	5 (46)	3 (27)	0.071
Family style food service	7 (29)	15 (63)	2 (8)	0	6 (25)	10 (42)	0.004**	1 (6)	17 (94)	0	2 (11)	1 (6)	8 (44)	0.009**
Adequate time at meals & snacks	3 (13)	11 (46)	10 (42)	0	0	16 (100)	0.008**	0	12 (67)	6 (33)	0	2 (11)	9 (50)	0.046*
All children actively encouraged to feed selves	1 (4)	12 (50)	11 (46)	0	2 (13)	14 (88)	0.021*	0	11 (61)	7 (39)	0	0	11 (100)	0.005*
Appropriate feeding & drinking utensils	17 (71)	7 (29)	0	0	5 (31)	11 (69)	0.001***	17 (94)	1 (6)	0	0	0	11 (100)	0.001***
Portion protein	5 (21)	12 (50)	7 (29)	0	1 (6)	15 (94)	0.002**	3 (17)	8 (44)	7 (39)	0	2 (11)	9 (50)	0.059
Portion starch	0	17 (71)	7 (29)	0	1 (6)	15 (94)	0.001***	0	7 (39)	11 (61)	0	1 (6)	10 (56)	0.046*
Portion dairy	13 (54)	4 (17)	7 (29)	0	1 (6)	15 (94)	0.004**	11 (61)	3 (17)	4 (22)	0	4 (36)	7 (64)	.014*

Portion vegetables	2 (8)	10 (42)	12 (50)	0	0	16 (100)	0.011*	1 (6)	4 (22)	13 (72)	0	2 (18)	9 (50)	0.564
Self service meals	11 (46)	13 (54)	0	3 (19)	9 (57)	4 (25)	0.015*	5 (28)	8 (44)	5 (28)	1 (9)	3 (27)	7 (64)	0.096
Iron rich foods	9 (38)	9 (38)	6 (25)	0	1 (6)	15 (94)	0.002**	6 (33)	7 (39)	5 (28)	1 (9)	2 (18)	8 (73)	0.026*
Fruit as snack	0	3 (13)	21 (88)	0	0	16 (100)	0.317	1 (6)	3 (17)	14 (78)	0	2 (18)	9 (82)	0.655
Top shelf foods	0	13 (54)	11 (46)	0	4 (25)	12 (75)	0.102	0	14 (78)	4 (22)	2 (18)	5 (46)	4 (36)	0.557
Dairy other than main meal	2 (8)	3 (13)	19 (79)	0	0	16 (100)	0.180	0	0	18 (100)	0	0	10	1.000
Drinks with snacks	9 (38)	10 (42)	5 (21)	0	3 (19)	13 (81)	0.003**	4 (22)	11 (61)	3 (17)	1 (9)	3 (27)	7 (64)	0.034*
Drinks with meals	2 (8)	4 (17)	18 (75)	0	0	16 (100)	0.102	3 (17)	7 (39)	8 (44)	1 (9)	0	10 (91)	0.043*
Milk & water between meals	8 (33)	11 (46)	5 (21)	0	2 (13)	14 (58)	0.005**	5 (28)	10 (56)	3 (17)	1 (9)	2 (18)	8 (73)	0.014*

n, number of pre-schools; %, percentage, P, significance level
NMS, Not Minimum Standard (Score=0); MS, Minimum Standard (Score = 1); BP, Best Practice (Score = 3)
[a] Scores range from 0-18 in each section; 0-72 as overall score
*[b] Wilcoxon Signed Rank test, * P< 0.05; ** P<0.01; ***P<0.001*

Table 24 - Assessment method and intervention grouping scores achieved

	Observation method (*n* 42)							Self-Assessment method (*n* 27)						
SEF Scores	Minimal intervention (*n* 24) Median (range)			Intervention (*n* 18) Median (range)			*P* value [b]	Minimal intervention (*n* 16) Median (range)			Intervention (*n* 11) Median (range)			*P* value [b]
Environment	7.5 (2-16)			7.5 (5-12)			0.626	16 (6-18)			16 (6-18)			0.613
Food service	6.5 (0-14)			6 (2-10)			0.608	15 (9-18)			16 (10-18)			0.940
Meals	7.5 (2-15)			9 (3-18)			0.207	16 (12-18)			16 (4-18)			0.839
Snacks	12 (3-18)			10.5 (6-16)			0.565	16 (16-18)			16 (4-20)			0.480
Overall Score	34 (11-60)			33.5 (18-48)			0.849	63.5 (52-72)			64 (24-72)			0.843
	Minimal intervention (*n* 24) *n* (%)			Intervention (*n* 18) *n* (%)			P-value[b]	Minimal intervention (*n* 16) *n* (%)			Intervention (*n* 11) *n* (%)			P-value[b]
	NMS	MS	BP	NMS	MS	BP		NMS	MS	BP	NMS	MS	BP	
Policy	10 (42)	11 (46)	3 (13)	6 (33)	11 (61)	1 (6)	0.842	1 (6)	6 (38)	9 (56)	1 (9)	2 (18)	8 (73)	0.469
Education materials	1 (4)	12 (50)	11 (46)	0	9 (50)	9 (50)	0.695	0	3 (19)	13 (81)	0	4 (36)	7 (64)	0.314
Planned Physical activity	1 (4)	22 (91)	1 (4)	0	18 (100)	0	1.000	0	1 (6)	15 (94)	0	1 (9)	10 (91)	0.786
Outdoor time	2 (8)	13 (54)	9 (38)	1 (6)	12 (67)	5 (28)	0.650	0	6 (38)	10 (63)	0	2 (18)	9 (82)	0.289
Food as reward	2 (8)	15 (63)	7 (29)	1 (6)	15 (83)	2 (11)	0.311	0	5 (31)	11 (69)	3 (17)	2 (18)	6 (55)	0.249

Adequate number meals & snacks	18 (75)	4 (17)	2 (8)	11 (61)	2 (11)	5 (28)	0.236	0	4 (25)	12 (75)	2 (18)	0	9 (82)	0.892
Staff sitting at food times	4 (17)	18 (75)	2 (8)	1 (6)	17 (94)	0	0.784	0	3 (19)	13 (81)	0	4 (36)	7 (64)	0.314
Staff eating with children	10 (42)	9 (38)	5 (21)	7 (39)	11 (61)	0	0.547	5 (31)	3 (19)	8 (50)	3 (27)	5 (46)	3 (27)	0.528
Family style food service	7 (29)	15 (63)	2 (8)	1 (6)	17 (94)	0	0.244	0	6 (25)	10 (42)	2 (11)	1 (6)	8 (44)	0.858
Adequate time at meals & snacks	3 (13)	11 (46)	10 (42)	0	12 (67)	6 (33)	1.000	0	0	16 (100)	0	2 (11)	9 (50)	0.082
All children actively encouraged to feed selves	1 (4)	12 (50)	11 (46)	0	11 (61)	7 (39)	0.781	0	2 (13)	14 (88)	0	0	11 (100)	0.232
Appropriate feeding & drinking utensils	17 (71)	7 (29)	0	17 (94)	1 (6)	0	0.057	0	5 (31)	11 (69)	0	0	11 (100)	**0.044***
Portion protein	5 (21)	12 (50)	7 (29)	3 (17)	8 (44)	7 (39)	0.526	0	1 (6)	15 (94)	0	2 (11)	9 (50)	0.341
Portion starch	0	17 (71)	7 (29)	0	7 (39)	11 (61)	**0.041***	0	1 (6)	15 (94)	0	1 (6)	10 (56)	0.786
Portion dairy	13 (54)	4 (17)	7 (29)	11 (61)	3 (17)	4 (22)	0.617	0	1 (6)	15 (94)	0	4 (36)	7 (64)	0.052

Portion vegetables	2 (8)	10 (42)	12 (50)	1 (6)	4 (22)	13 (72)	0.168	0	0	16 (100)	0	2 (18)	9 (50)	0.082
Self-service meals	11 (46)	13 (54)	0	5 (28)	8 (44)	5 (28)	**0.045***	3 (19)	9 (57)	4 (25)	1 (9)	3 (27)	7 (64)	0.068
Iron rich foods	9 (38)	9 (38)	6 (25)	6 (33)	7 (39)	5 (28)	0.776	0	1 (6)	15 (94)	1 (9)	2 (18)	8 (73)	0.129
Fruit as snack	0	3 (13)	21 (88)	1 (6)	3 (17)	14 (78)	0.377	0	0	16 (100)	0	2 (18)	9 (82)	0.082
Top shelf foods	0	13 (54)	11 (46)	0	14 (78)	4 (22)	0.118	0	4 (25)	12 (75)	2 (18)	5 (46)	4 (36)	**0.031***
Dairy other than main meal	2 (8)	3 (13)	19 (79)	0	0	18 (100)	**0.042***	0	0	16 (100)	0	0	10 (100)	1.000
Drinks with snacks	9 (38)	10 (42)	5 (21)	4 (22)	11 (61)	3 (17)	0.569	0	3 (19)	13 (81)	1 (9)	3 (27)	7 (64)	0.272
Drinks with meals	2 (8)	4 (17)	18 (75)	3 (17)	7 (39)	8 (44)	0.055	0	0	16 (100)	1 (9)	0	10 (91)	0.228
Milk & water between meals	8 (33)	11 (46)	5 (21)	5 (28)	10 (56)	3 (17)	0.923	0	2 (13)	14 (58)	1 (9)	2 (18)	8 (73)	0.306

SEF, Scored Evaluation Form
n, number of pre-schools; %, percentage, P, significance level
NMS, Not Minimum Standard (Score=0); MS, Minimum Standard (Score = 1); BP, Best Practice (Score = 3)
[a] Scores range from 0-18 in each section; 0-72 as overall score
*[b] Mann Whitney U tests, * P< 0.05; ** P<0.01; ***P<0.001*

Self-assessment and observation classification

Comparing those pre-schools in the intervention and minimal intervention grouping, it would appear that the pre-schools in the minimal intervention group who self-assessed themselves awarded themselves a higher proportion of Gold and Platinum classifications than the pre-schools in the intervention group who self-assessed their service provision. Table 25 outlines the classifications achieved by pre-schools depending on the method of assessment used to attribute scores and the study group in which they resided.

Table 25 - Classifications achieved depending on intervention group and method of assessment

	Minimal intervention group (*n* 24)		Intervention group (*n* 18)	
SEF classifications	Observation (*n* 24) *n* (%)	Self-assessment (*n* 16) *n* (%)	Observation (*n* 18) *n* (%)	Self-assessment (*n* 11) *n* (%)
Participation	3 (13)	0	1 (6)	2 (17)
Bronze	13 (54)	0	11 (61)	5 (42)
Silver	7 (29)	3 (18)	6 (33)	4 (33)
Gold	1 (4)	9 (53)	0	0
Platinum	0	4 (24)	0	0

n, number of pre-schools; %, percentage; SEF, Scored Evaluation Form

Pre-school manager feedback on HIP project

During pre-school baseline and follow-up visits a semi-structured interview was carried out with each pre-school manager and detailed quantitative and qualitative information was gathered using the Characteristic Collection Form.

Pre-school manager views on nutrition and requests for information

At baseline and follow-up pre-school managers were questioned on a number of different topics querying whether they needed further information on various issues. Table 26 outlines pre-school manager views on healthy food provision and topics of interest to them and the change in these views during the project process. At follow-up there was a drop overall in the number of managers requesting more information on topic areas and in their concerns around food provision.

Table 26 - Pre-school manager views and requests at baseline and follow-up

Issue	Baseline *n* (%)	Post-intervention *n* (%)	Change *n* (%)
Provider concerned that children refuse healthy food	25 (60)	21 (50)	- 4 (10)
Provider finds provision of healthy food difficult	14 (33)	6 (14)	- 8 (19)
Provider requests information / help with dealing with parents	26 (62)	24 (57)	- 2 (5)
Provider requests more information / help with policy formation	29 (69)	23 (55)	- 6 (11)
Provider requests more information / help with menu planning	29 (69)	17 (41)	- 12 (28)
Provider requests more information / help with feeding children < 12 months	18 (43)	15 (36)	- 3 (7)
Provider requests more information / help with feeding children 1-5 years	24 (57)	14 (33)	- 10 (24)

n, number of pre-schools; %, percentage.

Pre-school manager comments on HIP project

Detailed qualitative information was gathered from managers with regard to their thoughts on the HIP project. Table 27 outlines the comment themes and selected quotes from managers on the themes identified.

Table 27 - Themes and quotes from interviews with the pre-school managers

Themes	Quotes
Awareness of food being given to children	'*made everyone more aware of foods being given'* *'makes you conscious of menus and what is in a meal'* *'...difference to cooking; aware of what is going into food'* '*thinking more about food they're eating'* '*never think of food as important as thinking of reading and writing'*
Awareness of own practice	'*makes you reflect on what you're doing'* *'made us think'* *'generally we're doing it - makes you more conscious - did learn -found helpful'* *'increased staff awareness, now talking to children etc.'* '*helping us look at things differently'*
Positive perception of HIP project	'*delighted to take part has opened our eyes''* *'thank you for this project'* *'enjoying doing it - everyday thing now'* *'useful to have updated information and continual support and updating'* *'All different now since the start; made big difference to this premises'.*
Practicalities of project	*'takes time to adjust'* *'part time babies - some don't know what to do with spoon; easier with full day care children'* *'thought it was going to be extra work, but keep it simple and practice is very important; thoughts are worse than reality'* *'some days doesn't go to plan - do our best'* *'Found it very good; learned a lot; good to educate children on different food types; positive parent feedback'* *'feel didn't give it all could have due to staff shortages - found useful would like to try working on it still'* *'takes time to get everything organised'* *'working well'*
Cost of food	*'money wise - adding desserts into menu is too much; feeding staff is huge factor haven't put up prices in 4 years'* *'food bill has gone up - bigger into fruit and vegetables now'* *'preparation cost, using 4 rings on hob, feeding staff etc, but happy if eating the food'* *'EECE scheme affecting service and fees charged; cutbacks because of EECE; if getting more money would provide better'* *'staff eating with children – costing'* *'fresh fruit & veg are costly - time making stock / tomato sauce and children not used to it at home anyway'*
Food wastage	*'it cost a lot of money - tried loads of different desserts & dinners, throwing in bin, but now know what works'* *'a lot of waste trying different recipes, trying different vegetables'* *'setting up costs, first month, store cupboard, increased cost; decreased waste now''* *'less waste than before'*

Themes	Quotes
Awareness of food being given to children	'*made everyone more aware of foods being given'* *'makes you conscious of menus and what is in a meal'* *'...difference to cooking; aware of what is going into food'* '*thinking more about food they're eating'* '*never think of food as important as thinking of reading and writing'*
Awareness of own practice	'*makes you reflect on what you're doing'* *'made us think'* *'generally we're doing it - makes you more conscious - did learn -found helpful'* *'increased staff awareness, now talking to children etc.'* '*helping us look at things differently'*
Positive perception of HIP project	'*delighted to take part has opened our eyes''* *'thank you for this project'* *'enjoying doing it - everyday thing now'* *'useful to have updated information and continual support and updating'* *'All different now since the start; made big difference to this premises'.*
	'decreased waste by a huge amount'
Positive experiences with food service	*'children enjoying mealtime more'* *'setting tables, getting children to role play - small steps and get it ready'* *'children love helping selves and setting tables'* *'great thing - serving bowls in centre - staff sit & eat - encourage them (children) to try a little bit of everything'* '*placemats that have name on them; knives, forks, spoons worked well'*
Fluid provision	*'have introduced water breaks'* *'stopped diluted juice in morning'* *'thinking about it, before had juice and water now have milk and water'* *'serving drinks - tried to let get own drinks, moving on to serving at table'*
Using the 3 Week Menu Plan – a resource for pre-schools	*'new dishes, afraid in beginning, tweaking menus, happy with that now, i.e. shepherd's pie'* *'have decreased use of packets'* *'time restriction on menus - preparation time of different foods'* *'3 week menu plan is great; focus on healthy eating; need to bring in with County Childcare Committees where there is no emphasis on healthy eating'*
Physical activity and the outdoors	*'now make point of doing physical activity everyday'* *'bringing children out regardless of weather - don't think it's practical'* *'manager has to buy in raincoats and wellies, parents not good at bringing these'*
Parent practices not backing up best practice that pre-schools are trying to achieve	*'mammies don't want children to be involved at home'* *'parents pay bills - doing 'bad habits' at home'* *'repeatedly seeing swallowing not developed - coming into baby room with liquidised foods only'* *'spoon feeding - parents not rowing in behind this'* *'struggle when coming from home environment; a lot of families living on fast food'*

Themes	Quotes
Awareness of food being given to children	'*made everyone more aware of foods being given'* *'makes you conscious of menus and what is in a meal'* *'...difference to cooking; aware of what is going into food'* '*thinking more about food they're eating'* '*never think of food as important as thinking of reading and writing'*
Awareness of own practice	'*makes you reflect on what you're doing'* *'made us think'* *'generally we're doing it - makes you more conscious - did learn -found helpful'* *'increased staff awareness, now talking to children etc.'* '*helping us look at things differently'*
Positive perception of HIP project	'*delighted to take part has opened our eyes''* *'thank you for this project'* *'enjoying doing it - everyday thing now'* *'useful to have updated information and continual support and updating'* *'All different now since the start; made big difference to this premises'.*
	'HIP supported us with parents and enhances policies - has had huge impact on us'
Thoughts on HIP project resources	*'bringing fussy eating into policy - handed out section of HIP book to parents'* *'Used HIP book to back up discussion with parent on fussy eater - worked well'* *'HIP books are easy to relate to'* *'HIP books very good, wouldn't be behind door in asking; genuinely happy with same'*
Need for staff involvement / buy in the HIP project process	*'wouldn't be able to do it without everyone's help, huge effort - staff meetings, all staff behind it - doesn't come naturally'* *'important to ensure everyone understands it, include on staff meeting agenda'* *'gave staff one month to look through (Education Resource Pack) and then agreed together on ideas to implement'* *'staff reluctance means they are thinking about it - it is in their head to argue their case; touching on subject'* *'staff are fussy - pull faces then children won't eat food'*

Pre-school manager comments on 'what went well' and 'not so well'

At the follow-up pre-school visit managers were further questioned regarding their thoughts on what 'went well' during the HIP project and 'what may not have gone so well'. Table 28 outlines the themes identified as to 'what went well' and associated quotes from managers and Table 29 outlines the themes and a series of quotes of what 'did not go so well' according to the managers.

Table 28 - Themes and quotes from interviews with the pre-school managers on what went well during the project

Themes	Quotes
Changes to shopping habits	*'Think when shopping what to put into it instead of processed'* *'Moved from frozen to fresh food in evenings'* *'Making staff more aware of what is being cooked and bought etc.'*
Reduction in reported waste	*'Waste hugely reduced'* *'Reduction in waste'*
Introduction of food tasting and other food related activities	*'Match letter of week to fruit / veg. and have tasting of it; letter of the week; kept momentum going all year'* *'Food tasting - a lot of the time won't get to try those foods'* *'Mini chef works well; pictures at child level'* *'Introducing things slowly'*
Introduction of and focus on health fluids	*'Everything's going well, i.e. drinks tray becomes habit; fluid station'* *'Introduced water breaks, water on demand; as would go without otherwise'* *'Water station hard at start with spillage - encouraging pouring out own – habit now'* *'Made us more aware of how often they do need drinks in each room'*
Positive self-service experiences	*'Self-service in older age group - decreased pressure on chef'* *'By November and December serving selves and pouring from jugs and spooning learn in Montessori'* *'Children like self-service Building children's confidence - all around development; gives time to learn through snack time'* *'Allowing them to have time for choice'*
Family style food service experience	*'Aware of different types of food - talk about them. Meals are positive - look forwards to them - not a drama'* *'Children love self-help and staff eating as a whole - very good'* *'Children like being' king of the castle' and banqueting; having teacher sitting down and being a 'person''* *'Surprised at cups - thought there'd be more spillage - was great'* *'Socially; staff sitting down and joining in; staff didn't feel they could sit down'* *'Taking time, discussing what's for dinner, making dinner a fun experience'* *'Suggestion of eating with the children - training session very good'*

Table 29 - Themes and quotes from interviews with the pre-school managers on what didn't go so well during the project

Themes	Quotes
Seamless physical activity	*'Seamless activity; changing rooms around- work in progress'*
Changing fluid and drinking habits	*'water station hard at start - never done before'* *'took lots of time for change from cranberry to milk and water (only serve these now)'* *'parents bringing in juice in beakers when trying (in service) to bring in milk and water'* *'water station - didn't work - have outside instead - initial compromise'* *'stopped juice - unless child won't take it - hard to change habit'*
Perception of staff attitudes, habits and routines	*'Staff issues such as their opinions; being ' set in ways' about food and nutrition'* *'staff perceptions of food leading to children liking food less or taking dislike to food'* *'staff 'don't like change' - barrier initially'* *'staff don't want to eat as on diets etc, and busy trying to help so have not time to eat'* *'adults (staff) thinking about it more of barrier than children'* *'problem with feeding adults - so many adults - feel children would act up'*
Perceived difficulties that arose for some providers when introducing self-service	*'self-service was going well and then lost staff - this was a challenge'* *' worked with morning and afternoon snack but didn't try self-service with main meal'* *'Really hard at the beginning; no such thing as taking turns - all want it; need to reassure more available'* *'worried about the hungrier child taking too much'* *'serving selves - throwing food everywhere - mixture of age groups – tried and it works at afternoon meal'* *'struggle with younger children, worry hot food will burn them'*
Overcoming children's food likes and dislikes	*'hard to move children from frozen evening meals to fresh food (done now) not any harder to buy fresh vs. frozen'* *'reward scheme; getting them to try is the hardest; if try get sticker; 'laughing then' if they try'* *'getting children on to 3 week menu plan food , moving from plain to different foods- do like it now, majority ok'* *'varying menus was difficult and didn't work'* *'some food quite limiting - tried things - i.e. salad plate & fish - wouldn't eat'*
Apprehension of some providers about children using certain utensils	*'Knives & forks - apprehensive about using them- tried for 2-3 weeks - stopped using them'* *'knives a no, no'* *'beakers with no lids- didn't work - using free flow lids'* *'giving plates to all children - using them as Frisbees'* *'got knives and forks - found it very difficult - couldn't get right size for children'* *'cups with no lids in youngest age group'*

Cost and wastage as an issue	*'separating food on plates didn't work; tried for one day but led to wastage'* *'staff eating children's meals'* *'Not mashing vegetables into dinner - doesn't work, and parents want us to do it.'* *'time element of making sauces from scratch'* *'Waste of food from parents'*

Pre-school manager: perceived main barriers at baseline and follow-up

Managers were asked their thoughts at baseline and at follow-up about what they felt were the main barriers to healthy eating in the pre-school setting. Table 30 outlines the themes and quotes associated with main barriers at baseline and Table 31 outlines the themes identified and their associated quotes in relation to main barriers noted at follow-up. Perception that lack of information and children's food habits were a barrier was not in evidence at follow-up.

Table 30 - Themes and quotes from interviews with the pre-school managers on main barriers at baseline

Themes	Quotes
Children's food habits	*'children don't like vegetables'* *'providing variation in carbohydrate at main meal proved difficult so now all main meals are potato-based'* *'difficulties getting children to eat'* *'food fads among children e.g. red sauce'*
Cost and time issues	*'time concerns when making food from scratch'* *'time involved in preparing 'proper' food'* *'healthy food provision is time consuming, need a dedicated person to deal with this'* *'financial problems: not able to buy food in bulk'* *'cost if food not eaten'*
Parents as a barrier	*'parental food provision under 18 months; consistency not appropriate for age'* *'parents not following through what is being done in crèche'* *'healthy eating not enforced at home which breaks child's routine established during the week'* *'healthy food provision difficult due to parental food provided in lunchboxes'* *'parents using bribery'* *'dealing with parents'*
A need for more information	*'need healthy afternoon snack ideas'* *'lack of education on making healthy meals interesting'*

	'ideas on shopping and reading labels' *'How to encourage children to eat all foods on the plate'*
Staff attitudes and dealings with parents	*'when introducing different types of foods and tasks people have different ideas'* *'staff and parents with differing opinions'* *'staff and parents not understanding why things are implemented and the need for best practice'* *'can't give chicken curry to children under 2 years'*

Table 31 - Themes and quotes from interviews with the pre-school managers on main barriers at follow-up

Themes	*Quotes*
Cost +/- time	*'time is expensive'* *'cost wise - chef cooking all day long; time & motion for chef making food'* *'healthy menu on low budget'*
Dealing with parents	*'Hard to deal with parents - parent notebook, but parents don't read it.'* *'parents don't seem to have the interest'* *'depends on group - parents working - convenience foods - children becoming accustomed to these taste'* *'if children are at home i.e. weekend or hols eating habits deteriorate'* *'hard to get time to talk to parents, you nearly need to make an appointment to see them'* *'only used to getting things can pick up with hands; things that are into oven or microwave and quick'* *'parents not giving children lumps -introduction healthy food harder'* *'hard to advise them on things; as do this and get attitude back- they know best'*
Staff perceptions and habits	*'staff have opinions & no-one agrees on things; everyone has differing opinions on how much child should get'* *'all staff have differing opinions on how food service should be done in the crèche & guidelines of crèche'* *'hit by staff shortages; no administration help so manager not on floor as much to oversee staff practice'* *'perception that children are eating 'too many times'*

Phase 6 Incentive Scheme determination

Round one Delphi Questionnaire

Twenty three of forty five pre-school providers (51 per cent) responded to round one of the Delphi Questionnaire Technique. In total 105 ideas for incentives were generated from Round One. Refer to Appendix 11 for more information.

Round Two Delphi Questionnaire

Seventeen of twenty-three providers (74 per cent) responded to Round Two of the Delphi Questionnaire process. Providers ranked the incentive ideas on a Likert Scale and providers reached at least 70% consensus with 16 incentive ideas. Table 32 outlines the incentive ideas from Round 2 on which more than 70% of providers had reached consensus.

Table 32 - Incentive ideas on which > 70% consensus was reached by services

	Consensus level	*n*	Median Score Response	Mean Score Response	Range
Grants for healthy drinks, i.e. milk	85	17	5	4.85	4-5
HIP project recognition, something such as a plaque	85	17	5	4.85	4-5
HIP project certificate for service	80	16	5	4.8	4-5
Extra funding / grants to promote healthy eating and physical activity	80	16	5	4.8	4-5
Vouchers for fruit and vegetable shops	80	16	5	4.8	4-5
Equipment that promotes healthy nutrition and physical activity e.g. smoothie maker; play equipment	80	16	5	4.8	4-5
Recipes	75	15	5	4.75	4-5
Healthy eating / physical activity resources for parents	83.3	10	5	4.75	3-5
Funding to help with the cost of food for a healthy menu	70	14	5	4.7	4-5
DVD's, videos, posters, songs on healthy food for children	70	14	5	4.7	4-5
HIP certificates for children	75	15	5	4.7	3-5
Menus	70	14	5	4.65	3-5
More healthy eating / physical activity literature for walls	70	14	5	4.65	3-5
National Healthy Eating Day for children to taster new foods	70	14	5	4.65	3-5
Colourful and child friendly menu charts for children	75	15	5	4.65	3-5
Quality mark to distinguish service from other services that aren't involved in the HIP project	70	14	5	4.65	3-5

n, number of pre-schools

Table 32 outlines the Delphi Round 2 items for which consensus was not reached by pre-schools questioned (ranked by mean).

Table 33 - Delphi Round 2 items that did not reach consensus (ranked by mean)

Incentive priority:	Mean	Consensus Level
Children's books and colouring books on healthy eating.	4.65	65%
Toys related to healthy eating: play food, puzzles and games.	4.6	65%
Education for parents in how to make healthy lunchboxes.	4.58	68.4%
HIP project certificate for service, staff and children.	4.55	65%
Set of simple guidelines re. Dietary best practice.	4.55	65%
HIP Project recognition in newsletters such as the County Childcare Committee or Triple P newsletter.	4.55	65%
HIP Project stickers for children.	4.5	60%
A once off workshop for staff (and chef) on menu planning.	4.5	60%
Help and advice from dietitian in the HIP Project.	4.5	60%
An information pack to help providers understand level of standard expected of them in the HIP Project.	4.5	60%
To have dedicated outside support person to ask advice / answer queries, e.g. HIP Support Worker.	4.5	55%
Funding towards helping parents learn about making healthy meals, i.e. nutrition and cookery course for parents.	4.5	55%
Link with local enterprise for incentive provision, i.e. locally produced yoghurts at subsidised price.	4.5	55%
Meal chart that would show exactly what is required for each meal in terms of food groups.	4.45	55%
Publicity from HSE HIP Project for pre-schools participating in project.	4.45	55%
Advertising and communication tools for parents to raise HIP Project profile with parents, e.g. HIP Project newsletter.	4.45	55%
Sample foods and rewards to bring home similar to Food Dude Scheme.	4.4	55%
Practical tips for staff on feeding issues such as fussy eating.	4.4	45%
HIP Project 'parent information stand' for hallway to promote the project and nutrition & physical activity.	4.35	55%
Templates & directions for healthy eating lesson planning.	4.35	45%
Specific steps on feedback form to encourage achievement of the next award level of the HIP Project.	4.35	45%
Hand-outs on HIP Project for parents in different languages, i.e. Polish, Russian and Chinese.	4.32	47.4%
HIP Project placemats for tables.	4.3	60%
Talk / demonstrations for children on healthy eating / physical activity.	4.3	50%
A once off demonstration of portions sizes, food groups.	4.3	45%
Short snappy regular health related information from the HIP Project, i.e. regular newsletter.	4.3	40%
HIP Project recognition for participating services in local media.	4.26	52.6%
Feedback on progress in the HIP Project.	4.25	50%
Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
Mentoring hours as a support provided by in-house HIP Project Team leader within the pre-school service.	4.2	40%
Health education resources i.e. 3D model of the digestive system.	4.16	57.9%

Incentive priority:	Mean	Consensus Level
Children's books and colouring books on healthy eating.	4.65	65%
Toys related to healthy eating: play food, puzzles and games.	4.6	65%
Education for parents in how to make healthy lunchboxes.	4.58	68.4%
HIP project certificate for service, staff and children.	4.55	65%
Set of simple guidelines re. Dietary best practice.	4.55	65%
HIP Project recognition in newsletters such as the County Childcare Committee or Triple P newsletter.	4.55	65%
HIP Project stickers for children.	4.5	60%
A once off workshop for staff (and chef) on menu planning.	4.5	60%
Help and advice from dietitian in the HIP Project.	4.5	60%
An information pack to help providers understand level of standard expected of them in the HIP Project.	4.5	60%
To have dedicated outside support person to ask advice / answer queries, e.g. HIP Support Worker.	4.5	55%
Funding towards helping parents learn about making healthy meals, i.e. nutrition and cookery course for parents.	4.5	55%
Link with local enterprise for incentive provision, i.e. locally produced yoghurts at subsidised price.	4.5	55%
Meal chart that would show exactly what is required for each meal in terms of food groups.	4.45	55%
Publicity from HSE HIP Project for pre-schools participating in project.	4.45	55%
Advertising and communication tools for parents to raise HIP Project profile with parents, e.g. HIP Project newsletter.	4.45	55%
Sample foods and rewards to bring home similar to Food Dude Scheme.	4.4	55%
Practical tips for staff on feeding issues such as fussy eating.	4.4	45%
HIP Project 'parent information stand' for hallway to promote the project and nutrition & physical activity.	4.35	55%
Templates & directions for healthy eating lesson planning.	4.35	45%
Specific steps on feedback form to encourage achievement of the next award level of the HIP Project.	4.35	45%
Hand-outs on HIP Project for parents in different languages, i.e. Polish, Russian and Chinese.	4.32	47.4%
HIP Project placemats for tables.	4.3	60%
Talk / demonstrations for children on healthy eating / physical activity.	4.3	50%
A once off demonstration of portions sizes, food groups.	4.3	45%
Short snappy regular health related information from the HIP Project, i.e. regular newsletter.	4.3	40%
HIP Project recognition for participating services in local media.	4.26	52.6%
Feedback on progress in the HIP Project.	4.25	50%
Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
Workshops for staff to help initiate the HIP Project.	4.15	45%
HIP Project talks / demonstrations / information sessions for parents provided by HIP Project Support Worker.	4.15	40%

Incentive priority:	Mean	Consensus Level
Children's books and colouring books on healthy eating.	4.65	65%
Toys related to healthy eating: play food, puzzles and games.	4.6	65%
Education for parents in how to make healthy lunchboxes.	4.58	68.4%
HIP project certificate for service, staff and children.	4.55	65%
Set of simple guidelines re. Dietary best practice.	4.55	65%
HIP Project recognition in newsletters such as the County Childcare Committee or Triple P newsletter.	4.55	65%
HIP Project stickers for children.	4.5	60%
A once off workshop for staff (and chef) on menu planning.	4.5	60%
Help and advice from dietitian in the HIP Project.	4.5	60%
An information pack to help providers understand level of standard expected of them in the HIP Project.	4.5	60%
To have dedicated outside support person to ask advice / answer queries, e.g. HIP Support Worker.	4.5	55%
Funding towards helping parents learn about making healthy meals, i.e. nutrition and cookery course for parents.	4.5	55%
Link with local enterprise for incentive provision, i.e. locally produced yoghurts at subsidised price.	4.5	55%
Meal chart that would show exactly what is required for each meal in terms of food groups.	4.45	55%
Publicity from HSE HIP Project for pre-schools participating in project.	4.45	55%
Advertising and communication tools for parents to raise HIP Project profile with parents, e.g. HIP Project newsletter.	4.45	55%
Sample foods and rewards to bring home similar to Food Dude Scheme.	4.4	55%
Practical tips for staff on feeding issues such as fussy eating.	4.4	45%
HIP Project 'parent information stand' for hallway to promote the project and nutrition & physical activity.	4.35	55%
Templates & directions for healthy eating lesson planning.	4.35	45%
Specific steps on feedback form to encourage achievement of the next award level of the HIP Project.	4.35	45%
Hand-outs on HIP Project for parents in different languages, i.e. Polish, Russian and Chinese.	4.32	47.4%
HIP Project placemats for tables.	4.3	60%
Talk / demonstrations for children on healthy eating / physical activity.	4.3	50%
A once off demonstration of portions sizes, food groups.	4.3	45%
Short snappy regular health related information from the HIP Project, i.e. regular newsletter.	4.3	40%
HIP Project recognition for participating services in local media.	4.26	52.6%
Feedback on progress in the HIP Project.	4.25	50%
Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
Healthy eating talks / demonstrations / information sessions for parents provided by HIP Project Support Worker / Dietitian.	4.11	55.6%
Ideas for budget meals.	4.1	40%

Incentive priority:	Mean	Consensus Level
Children's books and colouring books on healthy eating.	4.65	65%
Toys related to healthy eating: play food, puzzles and games.	4.6	65%
Education for parents in how to make healthy lunchboxes.	4.58	68.4%
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Set of simple guidelines re. Dietary best practice.	4.55	65%
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Help and advice from dietitian in the HIP Project.	4.5	60%
An information pack to help providers understand level of standard expected of them in the HIP Project.	4.5	60%
To have dedicated outside support person to ask advice / answer queries, e.g. HIP Support Worker.	4.5	55%
Funding towards helping parents learn about making healthy meals, i.e. nutrition and cookery course for parents.	4.5	55%
Link with local enterprise for incentive provision, i.e. locally produced yoghurts at subsidised price.	4.5	55%
Meal chart that would show exactly what is required for each meal in terms of food groups.	4.45	55%
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Sample foods and rewards to bring home similar to Food Dude Scheme.	4.4	55%
Practical tips for staff on feeding issues such as fussy eating.	4.4	45%
HIP Project 'parent information stand' for hallway to promote the project and nutrition & physical activity.	4.35	55%
Templates & directions for healthy eating lesson planning.	4.35	45%
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Feedback on progress in the HIP Project.	4.25	50%
Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
To have dedicated HIP Project Team Leader within the pre-school service to answer any queries and to lead the project in-house.	4.1	40%
Once off HIP Project training / information sessions for staff.	4.1	35%
More HIP Project books.	4.1	35%

Incentive priority:	Mean	Consensus Level
Children's books and colouring books on healthy eating.	4.65	65%
Toys related to healthy eating: play food, puzzles and games.	4.6	65%
Education for parents in how to make healthy lunchboxes.	4.58	68.4%
HIP project certificate for service, staff and children.	4.55	65%
Set of simple guidelines re. Dietary best practice.	4.55	65%
HIP Project recognition in newsletters such as the County Childcare Committee or Triple P newsletter.	4.55	65%
HIP Project stickers for children.	4.5	60%
A once off workshop for staff (and chef) on menu planning.	4.5	60%
Help and advice from dietitian in the HIP Project.	4.5	60%
An information pack to help providers understand level of standard expected of them in the HIP Project.	4.5	60%
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Feedback on progress in the HIP Project.	4.25	50%
Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
Networking of contact details of other services to share experience & advice in relation to the HIP Project.	4.05	35%
Mentoring hours as a support provided by HIP Project Support Worker.	4.05	30%
An on-going series of demonstrations of portion sizes, food groups.	4.0	62.5%

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Toys related to healthy eating: play food, puzzles and games.	4.6	65%
Education for parents in how to make healthy lunchboxes.	4.58	68.4%
HIP project certificate for service, staff and children.	4.55	65%
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Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
Award provided would be a 'culture' type piece, e.g. statue or design piece.	4.0	35%
HIP Project certificates for staff.	4.0	31.6%
A once off demonstration on preparing foods.	3.95	35%
HIP Project training sessions on continuous basis for staff.	3.9	30%

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Children's books and colouring books on healthy eating.	4.65	65%
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Sharing experiences / information between crèches on menus i.e. snacks & teas.	4.25	45%
HIP Project Awards for healthy eating policies.	4.25	45%
An on-going series of workshops for staff (and chef) on menu planning.	4.2	40%
An on-going series of demonstrations on preparing foods.	3.68	31.6%

Additional Phases

Voice of the Child Phase - Research Ethics Committee ethical constraints on project work

Ethical approval for the 'Voice of the Child' study was sought from the Research Ethics Committee of the HSE Dublin Mid-Leinster, Ireland and the Ethics Committee of the Dublin Institute of Technology. While ethical approval was granted by the Research Ethics Committee of the academic institution, the health services research ethics committee noted that ethical approval would only be granted if two conditions were met; firstly, that only a specific set of hedonic symbols from the literature could be used (62) and, secondly, that parental consent was obtained from both parents of each child that was to take part in the process. Co-ordination between dual ethics committees at a management level may have prevented this variance in approval from occurring; however, there was no co-ordination in place and, therefore, the research dietitian believed she could only proceed with the research by following all the conditions laid down by both committees. The stipulations imposed on the researcher, however, impinged on both the design and methodology of the present study.

Ethical conditions and effect on study sample

HIP project pre-schools which had been visited previously by the researcher (*n* 48) were excluded from the sampling process as such visits may have had an influence on practice and children's views in these settings. The remaining pre-schools (*n* 15) were divided according to the number of full day care children attending and their deprivation score (63). Each service identified in the sampling process was contacted by telephone. A verbal explanation of the 'Voice of the Child' process was detailed. Settings were advised that informed pre-school manager and two-parent consent would be necessary. Information and consent forms were sent to each pre-school manager at least one month prior to the arranged visit date. A follow up telephone call was made to each manager just prior to the scheduled visit to confirm visit details and ensure that parental consent had been obtained.

Nine of 15 pre-schools (n = 85 children, aged three to four years) agreed to take part in this element of the overall study. It became apparent upon attending each pre-school to carry out the 'Voice of the Child' work, that pre-schools had experienced difficulty in collecting consent from both parents of each prospective child. Table 34 outlines the numbers of children and consent for the present study.

Table 34 - Number of pre-schools and parental consent for the Voice of the Child study

	Number of pre-schools	Number of children
Services agreeing to participate	9	85
No consent obtained	2	n/a
Consent from one parent	5	n/a
Consent from two parents	2	7

n/a, not applicable

In hindsight one may hypothesise as to why 'two-parent consent' was required by the health service Research Ethics Committee; there may have been a number of factors that influenced this decision. The possible reasons for this will now be outlined.

Firstly, although it would not be possible to know the actual membership representation of the Research Ethics Committee at the time of the study ethical application, the Research Ethics Review Guideline (64) notes that the Research Ethics Committee should include: hospital physicians; hospital and community nursing staff; hospital and community senior allied health professionals; a general practitioner; a solicitor; a lay person and a public health physician. With this representation in mind, one may postulate that these membership would not reflect the socio-economic status of the local community and that this may have contributed to the Research Ethics Committee being out of step with the parental arrangements of children in the wider community. Requesting the inclusion of two-parent consent precluded, based on national Irish figures for one parent families, one third of the potential population from becoming involved in the study as 35.2 per cent of Irish families are noted to be lone parent families (47).

The second possible reason for requesting 'two-parent consent' may have been due to apprehension. In the UK, Angell et al (65), in reviewing 80 randomly sampled letters issued by National Health Service Research Ethics Committees, determined that some evidence existed that Research Ethics Committees were concerned about what may happen if only one parent were to sign a consent form. This concern is evident despite the fact that, as Angell et al note, there is no problem with this issue in the eyes of the UK law, as clinical trial regulations only require one parent to provide signed consent.

A possible third reason for requesting two parents to sign consent forms may have been due to confusion in the Research Ethics Committee on the issue of appropriate consent for minors in clinical and non-clinical trials in Ireland.

The two-parent consent requirement of the ROI Health Service based Research Ethics Committee in this study was outlined in their response letter as being '*a legislative requirement'.* However, nationally, lack of clarity amongst Research Ethics Committees was apparent; this may be due to the absence of

one body overseeing the governance of Research Ethics Committees in Ireland. In 2008, a national review of Research Ethics Committee practice (66) was undertaken with participants suggesting that *'there is a legislative vacuum and there is no clarity for non-clinical trials research. Some Research Ethics Committees operate to their own SOPs and some follow the guidelines available from the Irish Council for Bioethics'* and that '*the clinical trials act was brought in for a specific purpose but what it has done, or appears to have done, is (it) has forced people into a way of thinking, that maybe, could be replicated with research that's not of a clinical trials nature'.*

The European Communities (Clinical Trials on Medicinal products for Human Use) Regulations 2004, that govern clinical trials and the establishment and direction of ethics committees (67), outline that '*every person with parental responsibility for the minor'* should be consulted, and give their consent to a minor taking part in a trial. The Irish Council for Bioethics (68) guidelines state that '*parental or guardian's consent must be sought'* and Sheikh (69) maintains that all research, apart from a clinical trial, is not governed by legislation in Ireland, concluding that that '*where a minor is concerned, decisions in relation to its welfare are decided by the parent / legal guardian'.* It is possible that the issue of consent in this study, when considered by the Research Ethics Committee, was treated as consent for a clinical trial.

It is very welcome to note that in response to the Research Ethics Committee practice review (66), a comprehensive package of consultations was undertaken to develop a standard national Research Ethics Committee application form and guidance document for use in Ireland. This document was introduced in 2011 (70) and in it the chairperson, in her introduction, states that the standardised approach was introduced in response to the fact that '*the ethical review process had become an obstacle to research rather than a facilitator of it'*. It is interesting to note that the standard guidance now specifically outlines the requirement for minors with regard to consent: *'persons under the age of 16 cannot give consent to take part in most research studies, and (if consent is being sought) it should be sought from one parent or one legal guardian. It is recommended however that persons under the age of 16 be assented to participate in a manner appropriate to their age and level of understanding'* (70).

Fine and Sandstrom (71) suggest that *'in some ways, the idea of informed consent with preschoolers would seem like a laughable conceit'* but go on to say that *'children should be afforded some explanation'* and that '*this simple explanation might be sufficient to provide a measure of informed consent consistent with the informants' understanding'*. The issue of assent with minors is an important consideration, particularly when one is aiming to give children a voice. In this study, while those children partaking in the study were asked for verbal assent, there were other children (whose parents had not consented) who specifically asked why they could not partake in the study exercise and expressed disappointment when they were not able to do so.

Biggs (72) notes that in the UK there is a number of conflicting issues on consent between the law and ethical guidance and that the autonomy of minors is better protected by ethical guidance than by law. Biggs further suggests that *'Obtaining the assent of those who lack the legal capacity to give valid consent is an important acknowledgement of their individual autonomy and self-determination'* and notes that if a minor is not able to provide legal consent, parental consent should only be sought and be seen to be legal when a child's assent is in place. Considering this, it is a welcome sign that assent is now included in the national standard Research Ethics Committee application form.

Ethical conditions and effect on data collection

The second condition imposed on the study was the requirement to use only published hedonic symbols (62); as they were '*valid and reliable'*.

For the study a schedule of questions and pictures relating to food was developed; the food pictures used were a collection gathered from Microsoft Clip Art, specifically for this study. The researcher met with a small group of three to four children (for whom 'two-parent consent' had been obtained) in their settings. Children were not taken from their pre-school room, but were asked to move as a group to one side of the room and asked to give their verbal assent to take part in the exercise. When in the group with the researcher, the children were shown the pictures of different foods and food situations, questions about the pictures were asked, and children requested to point to hedonic symbols (62) to answer the questions.

When the first picture of food was shown to the children in the group situation and they were asked the first question about this picture, it became apparent to the research dietitian that the children were unable to relate their feeling about the food picture they were being shown to the hedonic symbols they had been given.

After a number of unsuccessful attempts, the researcher then asked the children to point to the hedonic symbols and asked them what they thought each symbol portrayed. It became apparent that the children's perceptions of the symbols were at odds to that which had been outlined in the literature (62). Table 35 outlines the children's responses in this study, and the description given by American children, of similar age, in the study carried out by Chen *et al.* (62).

Table 35 - Hedonic symbols; literature and children's explanation in the Voice of the Child Phase

Hedonic symbol description in literature [Chen *et al.*, 1996]	Children's interpretation in this study
'super bad'	'bold*'; 'sad'; 'mad'; 'cross'; 'happy'
'bad'	'sad'; bored'; 'don't know'; 'full'
'maybe good or maybe bad'	'grumpy'; 'happy'; 'tonking'; 'sad'
'good'	'happy'
'super good'	'Sad'; 'more happy'; 'why are there two happy faces?'

**'bold' in the Republic of Ireland is commonly used to mean 'naughty'*

The inclusion of the published symbols may have had a negative impact on the children's understanding of the study methodology, especially as the pilot pre-study demonstrated that the use of developmentally appropriate symbols led to a successful outcome, with children of this age correctly recognising the symbols. There is a need to recognise that tools that may be shown to be correct for use in a certain context may not be the most appropriate tools if used in a different scenario. While the researcher submitted Microsoft Clipart symbols with the Research Ethics Committee application, it became clear through two rounds of correspondence with the Research Ethics Committee on this issue that they required that only validated symbols were to be used.

Fine and Sandstrom (71) have noted there are challenges to creating research tools for use with pre-school aged or pre-literate children; perhaps it is for this reason that the Research Ethics Committee felt that a pre-published instrument may yield better results than something created at a local level.

The poor outcome of this study, however, does not reflect badly on the hedonic symbols from the literature that were used. The inability to collect data in this study, with a tool developed for research carried out in another country, more than a decade previously, is quite unsurprising, and rather than the researcher challenging the published literature, this result should further add to an information base which recommends the need to have situation specific tools with which to work with young children, to enable them to narrate their story (71). Moreover, it is important that specific research applications for work with minors be dealt with by Research Ethics Committees on an individual basis, especially if there are no recent studies of similar nature within the same cultural context.

Approaching Research Ethics Committees regarding ethical constraints imposed

In retrospect, it may have been possible to consider the ethical conditions prescribed and predict the type of problems that might be encountered when endeavouring to undertake the study under these ethical constraints. However, as Dixon-Woods *et al.* (73) suggests '*the proper role of applicants is one*

of docility; in responding to letters they must make displays of obedience and deference. In particular, unless they are to resort to the appeals mechanism, applicants are obliged to accept judgements which are inherently contestable and indeterminate as incontestable and final.' Dixon-Woods *et al.* also note that applicants' hands are effectively tied when it comes to receiving Research Ethics Committee letters with recommendations as to disagree would mean taking a huge risk of an unfavourable ethical opinion.

Perhaps, if there had been the opportunity to discuss the ethical issues raised by the Research Ethics Committee in a face to face interview, this may have helped to allay the concerns of the Research Ethics Committee and, therefore, may have resulted in a different endpoint with regard to this study. It would appear that there is the possibility to do this in the UK; Dixon-Woods *et al.*(73) note that researchers may now attend Research Ethics Committee meetings and that this can have an influence which may be seen in subsequent Research Ethics Committee decision letters.

Perhaps this facility is also possible in an Irish context; however, this possibility is not clearly evident. In this study, all correspondence with the Research Ethics Committee was by postal letter. It is interesting to note that even within the new national standard application guidance manual (70), there does not appear to be any information on how a Research Ethics Committee can be approached in a face to face manner to discuss its decisions.

Food Serving Size Atlas Development Phase

A food serving size atlas and accompanying household measure / weight reference guide for common foods for pre-school age children was developed. Each food type photographed is depicted in 'half - serving'; 'serving' and 'one and a half serving' sizes. Table 36 outlines the 'composite' food types and 'individual' food types included in the food serving size atlas.

Table 36 - Composite and individual foods included in pre-school food serving size photo atlas

Composite dishes:	Carbohydrate Foods:
Bolognaise sauce	Homemade potato wedges
Spaghetti bolognaise	Homemade oven chips
Beef casserole	Potato cakes
Beef casserole & mashed potato	Mashed potato
Homemade burger	Spaghetti (tinned)
Oven chips & burger	Spaghetti pasta - cooked
Shepherd's pie	Penne pasta - cooked

Chilli con carne	Rice
Chilli and rice	Scone
Chicken Risotto	Rice cereal
Chicken casserole	Wheat biscuit cereal
Chicken casserole & mash	Soft roll
Mild chicken curry	French toast
Milk chicken curry and rice	Slice white bread
Cheesy chicken & peas	Pitta bread
Cheesy chicken, peas and rice	Cracker
Cheesy chicken	Oat cakes
Fish pie	Rice pudding
Tuna bake	Popcorn
Vegetarian lasagne	**Protein Foods:**
Vegetable curry	Chicken breast - cooked
Vegetable curry and rice	Chicken slices – cooked
Vegetable pasta bake	Minced (ground) meat – cooked
Penne with tuna, tomato and sweet corn	Beef pieces - cooked
Macaroni cheese	Pork chop - cooked
Vegetarian croquettes	Lamb chop
Pasta Siciliana	Salmon poached
Chinese noodle and vegetable	White fish poached
Lentil and vegetable casserole	Fish fingers
Vegetarian rissoles	Tuna fish
Cheese & onion pie	Tinned salmon
Vegetable pasta salad	Peas
Spanish omelette	Quorn
Scrambled egg	Lentils
Alphabet pasta minestrone soup	Baked beans

Carrot & potato soup	Tofu
Italian peasant soup	**Dairy Foods:**
Homemade pizza	Cheddar (hard) cheese
Fruit crumble	Processed cheese slices
Banana muffin	Fromage frais
Apple bread	Custard
Fruit scone	Yoghurt
Fruit and vegetables:	Milk
Apple	Smoothie
Banana	**Fats:**
Mandarin	Butter
Grapes	
Plum	
Melon	
Kiwi	
Raisins	
Cherry tomato	
Cucumber	
Carrot sticks	
Celery sticks	
Raw pepper	
Broccoli	
Baked beans	
Orange juice	
Stewed fruit	
Fruit salad	

4 Discussion and Key Findings

The Healthy Incentive for Pre-schools project is the first intervention in the ROI full day care pre-school setting which has measured observed practice in a number of phases, commencing with a pilot phase. Pre-school nutrition and health was then assessed at baseline and at follow-up, after the introduction of an intervention to two randomly assigned groups. There are a number of key findings from the HIP project which will now be outlined.

In the pilot and baseline phases of the HIP project poor nutrition and health related practice was observed. These practices will be detailed in the following section and their importance placed in context of the literature.

Best practice and the pre-school environment

Food and health policy

The availability and visual presence of whole pre-school food and health related policy in the pre-schools was observed to be low at baseline and in the pilot phase. Development of a food policy allows manager, staff, parents, carers and children to understand the approach to food provision, teaching and learning about food; it allows consistent messages to be provided (74). A group should be developed to draft policy, and parents and staff should be included in this group to facilitate discussions on the policy developed. Policy drafts should be shared with parents and staff should be willing to work within the policy guidelines. Policy should be regularly reviewed (at least once per year) and if items in the policy are not being followed these should be addressed. All existing and new parents and staff should get a copy of the policy and policy should also be posted in a visible location (4, 74). The formation of groups containing parents to oversee policy development was low in the pilot and baseline phases of the HIP project.

Food related education materials

Few 'food related education materials' were seen in the majority of pre-schools in the project at baseline and n the pilot phase. However, it is recommended that learning about food should be linked into the curriculum of the pre-school, and that the learning can include the following: *personal, social and*

emotional development, i.e. food tasting opportunities, cooking activities opportunities to learn to work with others and heighten self-esteem; *physical development* i.e. the learning of fine and gross motor skills through using knives and forks at mealtimes, preparing foods, gardening; *literacy*, i.e. development of language and exploration of senses when discussing taste, texture, look and smell; *mathematics* for example counting cutlery when setting the table; *communication and language*, i.e. sitting with staff and teaching conversation at mealtimes; *understanding the world*, i.e. tasting food from different cultures and growing food and explaining where it comes from; *expressive arts and design*, i.e. engaging children in art activities with food and highlight colours and shapes (74).

In ROI, the Food and Nutrition Guidelines for Pre-schools (4) note that the *'pre-school can provide an opportunity to learn about food, where it comes from, how it grows, general good health and food cultures. Learning how to choose and enjoy many different nutritious foods in early childhood can provide the foundation for a lifetime of healthy food choices',* while in the united States the Contra Costa Child Care Council recommends that '*nutrition and physical activity are taught as specific leaning objectives and woven into activities throughout the day'*, examples of this include: reading books to children either before or after meals and snacks that are related to food, eating and physical activity; plan activities and games that increase knowledge and acceptance of foods and physical activity; get children involved in planning and preparing food; use television, computers and videos as education tools to promote food and physical activity; restrict television watching unless it is to do with the education plan; ensure adults join in with children in physical activity (75).

The provision of dining facilities that are comfortable and supportive of healthy eating is important; provision of colourful pictures of different foods at child level and the hanging of Food Pyramid posters in the dining environment is considered to be part of best practice in US Head Start pre-schools as the aim is to engage young children in the pleasant and social nature of meal and snack times (76).

Physical activity

In the HIP project all physical activity episodes carried out by the different age groups during the pre-school day was noted. Traditionally, it has been very difficult to measure physical activity in the pre-school aged child using conventional methods as children's physical activity tends to be short, intermittent and with frequent rest, because it lacks the long periods of pre-defined movement that is seen in adults (77). In the pilot and baseline phases of the HIP project low numbers of physical activity episodes was observed overall.

Physical activity in this setting includes all types of activity such as walking, active play and games that are active. Young children who participate in regular physical activity get immediate and long-term health benefits (74). Physical activity helps children to build muscle strength but also helps in the

development of vital physical skill of balance, co-ordination and climbing (78). Another advantage for young children is that *'Active children have a better appetite. A child that is inactive and has a poor appetite may not get all the nutrients he or she needs in a small amount of food'* (4).

Outdoor time

At baseline and in the pilot phase few children were observed to be taken outdoors for outdoor time and little outdoor clothing and footwear was observed which would enable children to be able to go outdoors on cooler days or days that might be drizzly or wet. Outdoor play provides many chances for the young child to learn about their environment. *'Playing outside in summer sunshine helps children to get vitamin D for healthy bones and teeth'* (4).

Outdoor time has been significantly correlated with physical activity in pre-school children (77). The American Dietetic Association (30) recommends that childcare providers should facilitate outdoor time '*at least once per day and preferably more often'* and the Health Promotion Agency of Northern Ireland recommends that childcare staff should *'ensure that children have access to outdoor play every day'* (78).

Food as a reward or a treat

In the HIP project during the pilot and at baseline, many services were observed to use food as a reward either through 'treat day Fridays' on menus; through staff using verbal prompts of food as rewards at mealtimes; or the provision of 'junk' type food on celebration days. Best practice however states that '*caregivers shall encourage, but not force, children to eat. Caregivers shall not use food as a reward or punishment*'. Offering food as a reward or withholding it as punishment may have an negative effect on a child's relationship with food (14).

While food is often part of celebration, guidelines recommend that because there may be many events and celebrations in large childcare settings, other ways of marking occasions should be used (78) i.e. party games or face painting rather than the more traditional 'sweets, crisps and fizzy drinks' (4). *'When food is used excessively for rewarding, pacifying or punishing the young child, the stage is set for emotional battles which often result in both immediate and more long-term feeding problems'* (18). It is suggested that types of rewards other than food rewards should be used during pre-school time for example praising, stars, stickers or wearing a crown (4). *'Rewarding good behaviour on the part of the child by verbal praise and non-food treats are preferable to constant rewards with candy or sweets'* (18). In the US many schools, districts and states have introduced policies to inhibit the use of food as a

reward in classrooms (79), with one survey of 2,069 schools indicating that approximately 40% of schools contacted did not allow food based rewards in the period 2009-2010.

Provision of adequate number of meals and snacks

The composition of meals and snacks was very variable in the HIP project with a poor level of understanding (at baseline and in the pilot phase) amongst pre-school managers as to the number of food groups a 'meal' and a 'snack' should contain; in most cases the number of meal and snack episodes observed did not correlate with that which is recommended (4).

While there may, in practice, be some confusion regarding what is considered a 'meal' and what is classified as a 'snack', in the United States it is stated that a 'meal' should be composed of 'all four components': Dairy; fruit / vegetables; grains or bread; and meat or meat alternative, while a 'snack' should be made by selecting two of four of the aforementioned components (80).

Young children have high energy requirements, but only have small stomachs, therefore necessitating them to eat small amounts on a regular basis. For this reason it is important that meals and snacks are timed well and there is no more than 3 hours between any meals and snacks (4, 74).

The National Training Institute for Child Care Health Consultants in the United States recommend that food should be offered to children every 2-3 hours suggesting the serving of '*breakfast at least 2 ½ hours before lunch and snacks at least 1 ½ hours before lunch or dinner'* (80). While in the United Kingdom, the School Food Trust (74) notes that children may need to be offered three meals (breakfast, lunch and tea) and two to three snacks in a day depending on the length of time they are spending in pre-school care. In Ireland, the guidelines are similar, stating that children in full day care, who are being cared for outside the home for more than five hours, should be offered *'at least two meals and two snacks – breakfast, snack, lunch and snack. One meal should be a hot meal. If children are there for a long day, an evening meal may also need to be provided'* (4).

The HIP project found that many pre-school managers and staff felt they could not 'challenge' a parent's food requests that were contrary to best practice. It is interesting to note however that it is recommended that if food is provided from a child's home the childcare provider should provide written guidelines for parents as to the nutrition requirements of children while in their care and should provide information on how to achieve these requirements. If food provided by parents is not sufficient the childcare provider should supplement the child's food to ensure all requirements are met, and if food provision from home consistently does not meet nutritional requirements a referral should be made to a health professional (14). In Ireland, the pre-school manager is stated to be '*responsible for <u>all</u> the food eaten with the pre-school setting'* (4).

Best practice and food service

Staff sitting with children

Few staff in pre-schools sat with children, while children ate their meals and snacks, at baseline or in the pilot phase. It is recommended, however, that children should not be left alone to eat at mealtimes and that instead food times should be viewed as a valuable opportunity for encouraging children to experience a sociable occasion; one where the discussion of the food eaten should be seen by staff as integral to each child's education (74). In the United States the American Academy of Pediatrics and American Public Health Association (14) state that staff must ensure that children sit to eat their food and that they '*do not eat while walking, running, playing, lying down or riding in vehicles*'. Childcare staff should be '*seated within arm's reach*' of children in the early years who are learning to feed themselves, while children who are over 12 months of age and are capable of feeding themselves should be supervised by an adult who sits at the same table. Close supervision prevents children engaging in activities that may lead to choking for example 'squirreling' of numerous pieces of food into the mouth at once. The standards further note that only one infant should be fed at any one time by a childcare provider and that to feed more infants than this makes it difficult for the staff member to read child feeding cues. If older children need feeding assistance one adult should not be providing assistance for more than three children, as to do so '*resembles an impersonal production line'* (14).

Staff eating with children

At baseline and in the pilot phase of the HIP project few staff ate the same food as the children, with the children, at meal or snack times. In an observational study in the United States, while it was observed that 69% of caregivers sat with children at mealtimes, only 53% ate the same food as the children were consuming with some staff consuming no food at all (81).

It is known, however, that when staff sit and eat with children they act as positive role models for children. Staff can stimulate conversation and get a better understanding of children's views on foods provided, so enabling better communication with parents regarding children's eating habits and food likes and dislikes (74). Social interaction should be encouraged, and conversation should be fostered on food, in terms of its colour; temperature; the quantity and number of types of food available; and events of the day should also be discussed (14).

'Family style food service'

Family style food service was not practiced in the majority of pre-schools at baseline or the pilot phase, with no pre-school carrying out all aspects of family style food service. Many guidelines refer to the educational and health benefits of family style service, with adults sitting, eating, and making conversation with children during mealtimes, allowing children to self-serve, allowing sufficient time for meals and providing correct utensils such as plates for all meals and snacks. Family style food service (FSFS) can be defined as '*meals in which child-size tables are set with plates and utensils. Food is passed in small containers for children to serve their own plates. Children may pour their own beverages from small pitchers'* The process provides many advantages for a child's development by promoting motor skills, language, self-esteem, social skills, table manners and independence. This type of food provision may also help with fussy eating, encouraging a picky eater to try and accept foods that it sees its peers serving and eating themselves. The four main components are table setting, food preparation, self–service and clean-up (82). During meal times in childcare young children are learning many things, including how to control muscles, particularly in their hands; it is therefore important that lots of room and space it given to children. This space will allow children to '*pass, serves, pour and eat'.* Furniture should be arranged so that children can '*sit, rise, and walk around the table without interfering with others at the table'.* High chairs should be moved into the table *'close enough that the little ones can see what's going on and be part of the mealtime experience'* (83).

FSFS should be encouraged for all children except for infants and very young children who require an adult to feed them. It encompasses the promotion of eating as an enjoyable experience. It encourages staff to give extra help and time to those children who may be slower and prevents food time behaviours such as '*fighting, feeding each other, stuffing food into the mouth'*. FSFS also encourages children to serve themselves; once a child is developmentally able to finger feed it can begin to serve itself food from a plate. Observation allows childcare providers to determine how well FSFS is progressing; therefore sitting and seating with children is fundamental. Provision of small jugs, a small number of servings on a central plate, and ensuring adult assistance is available; all make FSFS feasible whilst preventing contamination and excess waste. (14).

Facilitating older children to become involved in the preparation for meals such as: setting tables and cleaning of tables after meals, enables children to develop self-help skills and dexterity through new motor skill development. Staff should supervise closely to prevent contamination and ensure adequate cleaning takes place. A study which observed play episodes in 24 children noted that children's food preparation '*often mimicked the stereotype of busy parents*'; speaking on the telephone while cooking, eating and standing while cooking. Less than half of the children observed sat down to eat; only three used family style food service and only four offered a choice of what to eat. When children in the role play scenario were told that the person, to whom to they offered food, did not want it; ten children were

indifferent or ignored the comment; eight provided an alternative food and three children insisted that the food given should be eaten, with one child even trying to force feed the adult (84). Another study conducted on the effect of age on the amount of food eaten found that 5 year old children ate larger amounts of food when given large portions, whereas the amount of food eaten by children aged 3.5 years was not affected by larger portion size (85). The authors recommended that parents and childcare providers should be encouraged to allow children autonomy in deciding how much they wish to consume and should dissuade the use of practices that encourage children to focus on portion size; avoiding the use of language with children such as '*cleaning up your plate*'.

Adequate time

At baseline and in the pilot, while the minority of services provided adequate length of time for both meals and snacks, approximately half of services did not provide adequate meal or snack time.

Mealtime duration can be said to be strongly determined by the caregiver; reflecting what they think should be appropriate mealtime duration. It is important to remember that all children eat at different rates, and so when planning meal and snack timings cognisance should given to those children who may take longer to eat, thus ensuring that no children miss out on food or activity as a result. Meal and snack times should not be shortened to facilitate other activities, any distraction may lead to poor consumption by children at the meal or snack time (School Food Trust, 2012).

Encouragement to self-feed

At baseline and in the pilot phase, the majority of pre-schools did not encourage self-feeding in every age group in their care. In the United States, the American Academy of Pediatrics and American Public Health Association (14) states that 'c*aregivers shall encourage toddlers to hold and drink from a cup, to use a spoon, and to use their fingers for self-feeding';* while Benjamin (80) in 'Guidelines for out-of-home child care programs' recommends to*: 'Allow young children to feed themselves even if they make a mess. They need to explore the foods they are eating. This does not mean letting them play with their food. When they begin to play they no longer be interested in eating. Toddlers need lots of patience to learn to finger feed, use a spoon and drink from a glass or cup. Try to balance learning new skills with enjoyment of eating'.*

The encouragement of self-feeding delineates the roles and responsibilities of adults and children in the feeding relationship, with the adult being responsible for provision of adequate nutritious food and the child being then responsible for deciding how much to actually eat (80, 86, 87). This practice is termed the 'division of responsibility in feeding' (86), and key to this it the role of the parent or caregiver,

who must trust the child to decide how much and whether to eat. Children may not eat all the food offered at any time, perhaps eating only some of the meals or snacks provided, however the quantity of food supplied must be adequate to meet the child's needs at each time point should the children wish to eat (14).

Feeding strategies used by parents and caregivers have been classified as: repeated taste exposure; modelling; restricting access to food; pressuring strategies i.e. providing rewards in a coercive context; and strategies of encouragement i.e. provision of rewards to reflect achievement (88). An observation study of food time in UK primary schools noted that *'without exception, feeding was a lower priority than maintaining behaviour, clearing up and managing the throughput of children during what was a task-intensive and unpredictable period'* (88), it was also observed that few opportunities to encourage eating were seized upon by staff, even when carrying out tasks such as cutting up food, and often children were told that '*an entrée must be eaten before a dessert'.* Pressure to eat has been found to be negatively associated with child BMI , average calorie and energy density intake (89), with children eating significantly more food when they were not pressured to eat (90). The practice of rewarding is associated with an increase in children's intake of unhealthy food, while parental modelling is linked with a decrease in unhealthy food consumption and an increase in healthy food eaten (91).

Age appropriate eating & drinking utensils

The vast majority of pre-schools did not provide appropriate feeding utensils at baseline or in the pilot phase of the HIP project. There are a number of different aspects necessary to ensure adequate utensil provision in the pre-school setting.

It is recommended that children are introduced to an unlidded cup from 6 months of age (92) and that by 12 months of age an infant should drink from a cup rather than a feeding bottle (4). There are a number of reasons why this is recommended, including the prevention of dental caries risk, that may be associated with long term bottle use, and the need to move from the sucking reflex associated with bottle feeding, to the swallow reflex that is necessary for speech and language development (92). Learning to sip compared to sucking drinks it also better for children's teeth (74). A study of 1026 randomly chosen children participating in the ALSPAC study demonstrated that 64% received fluids in a bottle at the age of 18 months. The authors noted that bottle feeding with cows' milk can lead to excessive intake which may be associated with: overweight, if its intake is in addition to an already adequate diet; displacement of other dietary foods; or may lead to poor iron status. The authors found that those who consumed fluids from a bottle only, had a significantly lower iron level that those who used a cup only, (P=0.0.35) (93).

It is recommended that food should be served to young children from a dish and '*not directly from a factory sealed container*' (14). Children who do not require highchairs should be '*comfortably seated at tables that are between waist and mid-chest level and allow the child' feet to rest on a firm surface while seated'; 'eating utensils should be suitable in function, size and shape for use by children';* 'food should not be put directly on the table surface, as even when washed and disinfected table surfaces will never be as clean as a washed plate and when children eat from a plate they learn to place uneaten food on the plate rather than the table surface between bites so reducing the contamination of the table surface. Food should not be placed directly on to the surface of a highchair either (14).

Best practice, meals and snacks

'Making positive changes in the types of food available to children in schools has the potential to have a substantial impact on their dietary intakes and the prevalence of childhood obesity' (94). Relatively little data are available on food service in the pre-school setting. A number of studies have questioned providers about the food they provide to children, while some studies have directly observed food served or eaten by pre-school children

A concern has been expressed regarding the risk of rebound obesity in children with inadequate intake at an early age (8). Studies have demonstrated that children who exhibit early 'adiposity rebound' (a second rise in BMI that occurs across the centiles between ages 3 and 7) have an increased likelihood of being overweight and obese during adolescence (95) and adulthood (96). Much research has been carried out regarding the impact of poor nutrition in early life on long term health and development (21).

Health professionals have been encouraged to work with parents, guardians and child-care workers to both prevent and treat obesity in young children (30). Nutrient intakes have been shown to track from pre-school into the early school years, with the strongest association over time being for carbohydrate and fat, in particular total and monounsaturated fat; children with the most extreme intakes of nutrients, either very high or very low appear to be the most likely to sustain this pattern of intake over time (10).

Portion / serving sizes

Inadequate portion sizes of the main Food Groups were observed to be offered in the majority of services, at baseline and in the pilot phase, including: protein, carbohydrate, dairy and vegetables.

Children should be served *'small-sized portions'* and they should be allowed to have '*one or more additional servings as needed to meet the needs of the individual child' (14)*. Children tend not to eat the same quantity of food from day to day or from meal to meal (78) as their varying appetite and their

food preferences may also play a role. When caregivers do not comment on changes in the volume eaten by children, and when there is no requirement to eat a certain portion of food; eating problems should not ensue. Energy intake has been found to be positively related to the number of eating occasions, number of foods consumed, and to portion size (97), with portions size on its own accounting for a 17-19 % variance in energy intake. Food item size reduction has been shown to lead to a decrease in calorie intake when two portion sizes of equivalent foods are offered; even though a greater number of smaller sized cookies were eaten by children, those eating the larger cookies consumed a significantly larger gram weight of cookie and gained 68kcal over the 'small cookie' group (98).

Data from the Irish National Children's Survey (99) were used to explore the relationship between portion sizes of certain foods and the intake and quality of fat in Irish children. Larger portions of bread, boiled potatoes, breakfast cereals, fruit and vegetables and sugary sweets were linked with a fall in total and saturated fat as a percentage of the total energy on the days these foods were consumed; while increased portions of eggs, milk, cheese and chocolate revealed an increase in fat energy percentage consumed (100)

Dairy and calcium and vitamin D

At baseline and in the pilot phase few services provided the recommended portion of dairy food either with the main meal of the day or at any other time during the day.

Strong bone development begins in infancy and continues into early adulthood, in the US osteoporosis prevention is being prioritised over management by some key groups; focusing on prevention amongst the young population (101). Strategies to educate the population on increasing calcium intake should be tailored to the population group based on age; limiting soft drinks and making dairy foods including milk readily available may be useful in increasing calcium consumption (102).

In the recent Irish National Pre-school Nutrition Survey (25) researchers found that milk was considered a staple for this age group, with most being consumed as a beverage or with breakfast cereal. Whole cow's milk was consumed most often, with a trend of decreasing milk consumption with age (88% at 1 year to 78% at age 4); infant and 'growing-up milk' consumption was significant in children aged 1-2 years (31% % 18% respectively). Cheese was consumed by 64% of 1 year olds decreasing to 59% of 4 year olds. Yoghurt consumption increased from 54% of 1 year olds to 66% of 4 year olds. However children in full day care pre-schools may not be following this national average if poor dairy provision is widespread. A cross sectional study examining the prevalence of vitamin d deficiency amongst 365 12-24 month old American children found 12.1% were deficient in vitamin D while 40% were below the accepted optimal threshold of 30ng/ml (103).

Iron provision

Poor provision of iron containing food was also noted. Iron is essential for normal neurodevelopment (104). The prevalence of iron deficiency anaemia and its effect on cognitive development has been widely described (7, 105). At the age of eighteen months it has been shown that children with higher levels of milk and dairy product intake have lower ferritin (reflecting total iron stores) levels (106) with the authors recommending that meat, fish, fruit, vegetables should be encouraged in this age group due to their effect on haemoglobin levels. A marked positive effect on iron absorption has been seen, when meat is added to the weaning diet (107).

Food service

At baseline and in the pilot phase, the majority of pre-schools in the HIP project pre-plated food and self-service for children was very low. The development of a positive mealtime experience for children is an important part of healthy food habit formation, and the caregiver should be a role model who sits at the table and eats with the children (14, 16). Setting simple rules for children at the table is necessary and important to 'create a peaceful mealtime environment' (80). The mealtime should be unhurried (16). Social interaction and conversation, especially conversation regarding nutrition and food, enhances the mealtime experience and helps children to accept food and develop appropriate eating behaviours (108). A retrospective study noted that many common food dislikes can be traced back to a time when children experienced pressure to eat specific foods (13). It has been noted that pressuring children to eat is not effective in promoting food intake and it leads to children having negative affective reactions to the foods they are pressured to eat (90). Galloway *et al.,* (90) noted from their work that children who were pressured to eat by their parents in the home environment had significantly lower BMI scores than those who had not been pressured to eat. This study confirmed work carried out by Galloway *et al.,* (109) which demonstrated that seven year old girls who were thin, but not underweight, were more likely to be pressured to eat by their mothers, who also considered them to be 'picky eaters'. In a study carried out by Nahikian-Nelms (81), it was observed that only 2 of 24 child-care providers carried out family-style meal service. As a component of the study, a behaviour checklist was developed for use as an observation tool during meal times. The criteria on the checklist were selected as the published literature suggested that they were important in the interaction between childcare workers and children during meal times.

Meals provided in Head Start schools are a combination of family style and prepared plates with main course pre-plated and vegetables, fruit, bread and milk passed around to enable children to serve themselves (76).

Fruit provision and top shelf foods

Low levels of fruit provision were observed while foods from the Top Shelf of the Food Pyramid were given regularly at baseline and in the pilot, with the majority of Top Shelf Foods being provided by parents in lunchbox snacks. Sweitzer *et al.,* (110) recommended that health professionals should facilitate pre-school providers and parents to provide adequate food choices to meet the nutrition needs of children, finding in their study that although parents may be aware of the importance of providing a nutritious lunch, they may not actually pack a healthy lunch on a regular basis. In addition the authors recommended that when parents provide children's snacks, providers must '*address the practices that affect the long-term health and well-being of the children they serve'.*

Fluids with meals, snacks and between meals & snacks

Regular provision of drinks such as juices, juice drinks and squashes were observed and access to water or milk outside meal and snack times was inadequate at baseline and in the pilot of the HIP project.

Water is defined as '*an essential nutrient'* (111). Fluid requirements relative to body weight are high during childhood, and children are more at risk of dehydration than adults (112). The European Food Safety Authority (EFSA) (113) has developed DRVs for water, in these they recommend that infants aged 12-24 months should receive 1.1-1.2 l/day; children aged 2-3 years:1.3 l/day and children aged 4-8 years: 1.6 l/day . It would seem that drinking habits are generated in childhood making it necessary to ensure children learn to drink suitable fluids to maintain sufficient hydration levels (114).

'*Clean, sanitary drinking water shall be readily available throughout the day'* (14). Children should be encouraged to serve themselves water throughout the pre-school day. Children need to drink regularly to prevent dehydration, decrease tiredness and irritability and improve concentration levels. Poor fluid intake can lead to difficulties in toileting and so increased risk of infections (74). Dehydration has been described as a reduction in body mass, due to fluid loss, that is greater or equal to one per cent (111). Dehydration, even in its mildest form can negatively effect brain function, energy levels and alertness (87).

Although milk and water are encouraged as the most tooth friendly drinks for infants and children (4), and calcium found in milk is recommended for the prevention of osteoporosis (115), many children are consuming large quantities of drinks other than milk or water (116, 117), with the children at baseline in the HIP project being no different in this regard. Sugar substitutes include many artificial sweeteners and are used to sweeten food and beverages without increasing the calorie content. Consumption of beverages containing artificial sweeteners is not recommended (4, 87) as they have poor nutritional value and tend to displace milk, which is a nutrient rich food (87).

In 2001, the American Academy of Pediatrics (AAP) noted that 100% fruit juice had no nutritional benefit over whole fruit for children or infants older than six months, and recommended that 100% fruit juice should be limited to 4 to 6 oz/day for children aged 1 to 6 years (118). It also been noted that any intake of 100% fruit juice is associated with a larger amount of dental caries in one to five years (116). In contrast to this, a large scale cross sectional study in the school environment in Italy reported a statistically significant inverse relationship between milk consumption and Body Mass Index (BMI) (P= 0.003); with high milk consumers of milk having the lowest BMI (119). While in Ireland a study carried out into weaning practices of infants aged 6 months determined that 57% of the sample was given juice rather than water as a supplementary fluid and 33 of 401 mothers reported provision of sugar containing supplementary fluids (120).

The introduction of the HIP project intervention and its effect at follow-up

Flynn *et al.* (8) and Lanigan *et al.* (121) note that there are few nutrition interventions in the pre-school setting, and recommended that funding should be directed to develop such programmes, while Ward *et al.* (122) suggest that because the pre-school environment has the capability to have a positive affect on many children's health it is a *'unique and important setting for interventions to prevent childhood overweight'*.

Summerbell (123) expresses the need for caution when perusing intervention studies noting that *'one specific program will not meet the needs of all'* and that methods that work with older children and adults may not in fact work with younger children. However, Hayman *et al.* (124) suggest that 'c*ontemporary pre-school heart health programs are based on the premise that for children to be able to take care of themselves, they need to know what to do to keep themselves healthy (knowledge), need to believe that healthy living is really important to them (good attitudes), and need the opportunity to practice good health behaviour, not just talk about it (actions and behaviour)'*.

The introduction of the intervention comprising of an Education Resource Pack and a Scored Evaluation Form led to significant improvement in practice in both groups in the study: the minimal intervention group, which included manager only education, and the intervention group in which staff were trained in addition to the manager. The Education Resource Pack was developed to meet needs identified during baseline data collection. Training of staff had no significant impact on overall practice, with one to one feedback to the manager being as important in both the minimal intervention and intervention groups. The introduction of the Scored Evaluation Form tool enabled the measurement and quantification of practice in the full day care setting. A significant increase in the majority of Scored Evaluation From criteria scores and in all section and overall scored was captured from baseline to follow-up.

Inter-rater validation proved to be difficult due to poor self-assessment rates by pre-school providers (27 of 42; 64%) and no assessment by the inspection team. However, the two groups of Scored Evaluation Form users, dietitian observer assessment, and pre-school manager self-assessment, were compared to determine whether a difference in score administration would exist between the two groups. Pre-school manager self –assessment led to significantly higher scores being given on the Scored Evaluation Form than scores given by the dietitian observer. Comparing those pre-schools in the intervention and minimal intervention grouping, it would seem that the pre-schools in the minimal intervention group who self assessed themselves awarded themselves a higher proportion of Gold and Platinum classifications than those pre-schools in the intervention group.

While it had been hoped to ascertain the Scored Evaluation Form scoring that would be assigned to pre-schools by the pre-school inspectorate, this was not possible, as the inspection teams were not in a position to use the Scored Evaluation Form during their inspections. The inspection team have forms of their own to complete (6) in relation to the Pre-school Regulations; addition of yet another form for completion provided an increase in work load.

Pre-school manager perception and feedback

When questioned on issues that influenced practice the pre-school mangers noted that costs associated with food provision; parental influences; staff issues, and the economic downturn all had an impact on their service provision.

The perceived cost of trying new foods and a fear that children wouldn't eat newly introduced food which would in turn lead to increased wastage was reported as a real issue for providers. Some providers also commented on their not wishing to pay for the extra cost of staff eating food with children.

Providers noted that staff can have a very positive or very negative impact on healthy habit formation, eating, food experience and outdoor time, and that the staff in a pre-school need to be completely on board with the HIP initiative for it to work.

Parents are a source of concern for pre-school providers with many voicing a frustration that parents are not backing up work done in crèche at home; leading to managers and staff wondering why they should follow best practice guidelines. Some providers appeared to be afraid that because parents pay the bills and can decide where they will send their child that they cannot challenge parents on habits and attitudes as this may result in parents removing their child and sending it to a service who will question practice or encourage parents to follow best practice. A number of staff also felt that their long term experience counts for more than research and best practice and this makes changing practice

difficult. The need to encourage and support providers to follow best practice and to be in control of the food provided in their pre-school is necessary and is recommended (4, 14).

The introduction of the concepts of self-service and family style food service to Irish pre-schools was new to many of those who participated in the HIP project. Although these concepts are recognised as best practice across the world (14, 30), the cultural context must be acknowledged in this regard as for many in the Irish food landscape in general, these concepts of practice are new.

Some pre-school providers expressed fear in relation to giving children independence with food, i.e. cutting; self-service; fear of scalding with food; use of knives and forks; cups without lids. There was also an apprehension expressed that children would eat too much food if they were allowed to participate in self service, which is contrary to research available (98). While self-service may be introduced from an early age (86), a number of services 'felt' they could not introduced self-service to the younger age groups. However other providers expressed surprise at how well family style food service worked when introduced and how self-service reduced wastage and pressure on the chef. These providers acknowledged that the introduction of these practices took time but that the children enjoyed participating and that this increased children's confidence and independence.

The level of communication and personal contact provided to pre-school managers was very important in this project. Telephone follow-up and discussion was important; providers noted that they were apprehensive when they received their Scored Evaluation Form score through the post as they were insecure regarding score they had achieved until they were able to discuss it with the HIP project team.

Introduction of the Early Childhood Care and Education scheme proved to be an issue for some pre-schools. It was felt that the Early Childhood Care and Education scheme doesn't cover food provision, thus children must bring in food and pre-schools are not able to determine these food types. Many providers felt that parents send in too much food for their children's morning snack.

The economic downturn was discussed by many managers. The characteristics of the pre-schools in the main HIP project did not differ significantly from baseline to follow-up despite the economic downturn, however managers felt there had been an increase in part time full day care children which led to greater difficulty in encouraging healthy habits, as parents do not follow through these habits when children are at home during the other part of the week. Manager also alluded to a 'drop in child numbers' linking this with loss of staff which resulted in an inability to full embrace the concepts of HIP as they need a full staff quota to facilitate best practice.

The Delphi Questionnaire technique was used to collect ideas from providers on their most favoured incentive for the project. The top five most favoured incentives were: Grants for healthy drinks, i.e. milk; HIP project recognition, something such as a plaque; HIP project certificate for service; Extra

funding / grants to promote healthy eating and physical activity; Vouchers for fruit and vegetable shops.

Future roll out

The practical roll out and application is a 'key' issue that needs to be acknowledged for future project planning. The most cost effective evidence based way to roll out and support pre-schools must be investigated further as this project has determined that self-assessment and pre-school inspection team assessment are not viable options for the future. The finding that manger training alone is sufficient to promote significant improvement in practice is extremely useful as this will positively impact on resource implications.

A small investigation was carried out during the HIP project on the possibility of linking with a third level academic institution, such as Dublin Institute of Technology, in order to validate the Education Resource Pack to encourage professional identity. It was proposed this would involve Level 7 status and 100 working hours and that this would cost a pre-school provider approximately €900. It was felt that, as cost is a large concern for pre-school providers at present, that in the current climate, this type of training would be cost prohibitive. However, when one looks to other countries and the emphasis placed on university / third level training for pre-schools, this is certainly an avenue that should be pursued; development of a national training module that would not be cost prohibitive, should be considered for the future.

Should the research outcomes be communicated to the public?

To support pre-schools in their endeavours to carry out best practice it is very important that the research outcomes of this research are communicated to the public. There is a need for parents to understand what best practice for children is in relation to nutrition, physical activity, food service and outdoor time, and for this reason it would be very useful if an information campaign could be developed that would highlight these issues to parents and the community in general.

As there is a culture and tradition in the ROI of adult control of children's food choice and relatively few adults would encourage independence with food service, the need for a clear and concise campaign is warranted. There may be scope for confusion amongst the general public regarding appropriate serving sizes and how this would marry with 'family style food service'. Focus testing of campaign material would be essential to ensure that the messages included would be transparent and understood by the target audience.

5 Conclusions

This project has investigated the introduction of an incentive scheme to the full day care pre-school setting in ROI. As part of this process a Scored Evaluation Form tool has been developed and validated for use in this setting. The development and use of this tool enabled the collection of baseline data on pre-school practices in relation to nutrition, food provision, food service, physical activity and outdoor participation.

Poor practices at baseline were evident and the needs identified by this preliminary data collection phase facilitated the development of a tailored Education Resource Pack to aid in the training of the pre-schools on best practice. Random assignment of pre-schools to one of two groups: either receiving manager only training or manager and whole staff training, enabled the effect of staff training to be ascertained.

Post-intervention data collection demonstrated a significant improvement in overall food and health related practice, however additional staff training did not appear to confer any benefits to overall Scored Evaluation Form scores. Neither self-assessment, nor administration of the Scored Evaluation Form by the pre-school inspection team, was found to be a viable option for future pre-school assessment.

Pre-schools outlined the incentives that would be most favourable to them as service providers, and these included grants for food and acknowledgement of work carried out. A number of issues such as cost, the economic downturn, staff training, children's habits and parent attitude and support were reported by managers to have an impact on practice in the childcare setting.

The value placed on pre-school provision by society and policy makers must be questioned as a result of this project. Poor nutrition and health practice was identified in the full day care setting at baseline; however the introduction of a scheme that trained, supported and encouraged pre-schools to modify practice led to a significant improvement in overall practice. Irish children in full day care are at risk of malnutrition and poor dietary habit formation. Many factors are having an influence on pre-schools and pre-school workers which can and should be modified. Reflection on these project outcomes and recommendations are now necessary.

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