I, Sarah Davis, hereby submit this original work as part of the requirements for the degree of Master of Science in Nutrition.

It is entitled:
Evaluation of Teacher Implementation of Nutrition Education and Physical Activity into the Curriculum in the Hamilton County Head Start Program

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Evaluation of Teacher Implementation of Nutrition Education & Physical Activity into the Curriculum in the Hamilton County Head Start Program

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ABSTRACT

Objectives. To determine the extent to which the I am Moving/I am Learning/Harvest of the Month program was incorporated into the curriculum by Head Start teachers after an in-service on the program.

Design. Observational Study

Participants/Setting. Head Start teachers (N=24) in 12 classrooms located in 4 regions of Hamilton County, Ohio. For each region, three classrooms were selected based on their predicted level (low, medium, high) of program implementation into the curriculum.

Outcome Measures. Number of fruit and vegetable activities and physical activities.

Methods. Implementation was assessed using teacher-generated lesson plans for the fall period after the initial training (N= 12 days) and winter after a booster session (N= 12 days) and direct observation, with videotaping, in the classroom (N= 3 hours/classroom). Videos were coded using an observational tool. Surveys were used to collect demographic data from the teachers.

Results. There was no significant difference between the classrooms (low, medium, or high) for the number of physical activities and fruits/vegetable exposures in the lesson plans or in the classroom. There was a significant decrease (p<0.05) in the number of fruit and vegetable activities from the fall lesson plans (M=11.42) to the winter (M=3.92). Structured physical activities were strongly, positively correlated with children’s use of the program kits for physical activity during unstructured time (r= +0.66, p< .05). The structured fruit and vegetable activities were positively correlated with the unstructured fruit and vegetable activities (r=+0.77, p< .05).
Conclusion. The booster training session appeared to have no affect on program activities listed in the lesson plans. In addition, there was no significant difference in the level of fruit and vegetable or physical activities between the groups of varying predicted implementation. In the classroom observation, the structured physical activities positively impacted the children's physical activity during unstructured time. Further teacher training is needed to ensure the quality as well as quantity of physical activities and more attention is needed in the area of fruit and vegetable exposures for this age group. The Harvest of the Month feature was an underutilized component of the program and needs additional restructuring to encourage use by the teachers in the future.
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INTRODUCTION

Childhood obesity is a national public health concern. Population data from the United States, National Health and Nutritional Examination Survey (NHANES) 2007-2008 showed that~ 17% of children between the ages of 2 and 19 years of age are obese, as defined by a Body Mass Index (BMI)-for-age above the 95th percentile according to the Centers for Disease Control and Prevention (CDC) sex-specific growth charts. \(^1\) In addition, the prevalence of preschool-aged children (ages 2-5 years) who are obese increased from 5% to 10% between the years 1976-1980 and 2007-2008. The CDC reports that one in seven preschool-aged children from impoverished homes is obese. \(^2\,^3\) There is an increased urgency in obesity prevention in preschool children given that prevention is often more successful than the treatment of obesity.

While the majority of obesity prevention interventions have addressed older children, mainly in elementary school, many intervention strategies are now being targeted towards the preschool age population. \(^4\,^5\,^6\) Although more of these programs have been established, the obesity epidemic for this younger population persists. The problem with these programs may not necessarily be the intervention designs, but more likely effective implementation. One way to examine the exposure to an intervention is to conduct a thorough evaluation of teacher implementation using various methods like lesson plan reviews and direct classroom observation.

The Head Start Program, under the United States Department of Health and Human Services, serves preschool children of low-income families to promote
school readiness by focusing on social and cognitive development. Children in the Head Start program are more likely to be overweight or obese when compared to the total population of preschool-aged children, yet few studies have evaluated the effectiveness of intervention strategies for obesity prevention in these children. The Hamilton County Head Start Program recently adopted the “I Am Moving, I Am Learning” (IM/IL) program geared towards enhancing a healthy generation, utilizing a team approach including the children, their parents, and early childhood educators. Using IM/IL resource kits, the Head Start teachers were asked to work activities into their lesson plans that would increase the total amount of physical activity the children got each day. In conjunction with the IM/IL program, the Greater Cincinnati Nutrition Council developed the Harvest of the Month program. The objective of the latter program was to increase the number of exposures the children in the Head Start Program had to a variety of fruits and vegetables.

To increase the likelihood that a health promotion program is having a positive effect on the children, the implementation of these programs should be evaluated through the use of process evaluations. Process evaluations can help monitor a program by determining if resources were used appropriately and if the program is being executed as intended. The current study will evaluate the incorporation of program activities into the curriculum by Head Start teachers through the use of lesson plan reviews and direct observation of activities in the classroom. Teacher evaluations are a useful way to carry out a process evaluation in that they measure the teacher’s effectiveness in implementing a program in the classroom.
REVIEW OF LITERATURE

Childhood Obesity

Obesity in children increases the risk for diseases such as type 2 diabetes and hypertension. Childhood obesity is also known to be an independent risk factor for obesity in adulthood. Most children have a decrease in BMI during the early preschool years, followed by a rebound at around 4-7 years. For children where this rebound or increase in BMI happens at an earlier age, the trend is for these children to be heavier and to have higher BMIs throughout childhood and into adulthood. A greater emphasis is being placed on intervening before this rebound in adiposity occurs. Schools are an ideal place for prevention education and intervention studies because the contact with the children is continuous and the environment is structured.

It is the position of the American Dietetic Association (ADA) that children should receive dietary guidance from ages 2-11 years that includes not only sufficient physical activity, but a variety of nutritional foods that meet the dietary recommendations set by the U.S. Department of Agriculture (USDA), avoid over consumption of foods that are high in calories but low in nutrients, and should be provided environments which assist in the development of healthy eating behaviors. The National Association for Sport and Physical Education (NASPE) recommends that preschool children get at least a total of 60 minutes of unstructured physical activity throughout the day as well as the same amount of cumulative structured physical activity each day.
Out-of-home childcare centers are becoming more common, with the number of children attending childcare centers doubling over the last 30 years. As more parents are both working outside of the home, 57% of children between the ages of 3 and 6 years of age are spending time each week in child care centers. Gaining a better understanding of the nutritional experiences to which these children are exposed is important in designing strategies for teaching children to adopt healthy nutrition attitudes and eating habits, as well as activity patterns. These children are a captive audience, making this an opportune time to educate them and their families about healthy lifestyle choices.

**Head Start Program**

The Head Start Program is a federally funded preschool program that was created in 1965 for children from low-income households. This program is designed to meet all of a child’s needs including educational as well as health. This involves meeting nutritional needs while exposing the children to activities that will enhance cognitive and physical development. In 1981, the program was expanded and the Head Start Act was issued. In 2007, President Bush reauthorized the Head Start Program and the Head Start Act was revised. The purpose of the Head Start Act is to promote school readiness in addition to helping the children grow both cognitively and socially. Each classroom is required to have at least one teacher who is able to plan and implement learning experiences that will enhance the intellectual and physical development of the children. This includes things like improving the child’s readiness for school by working on literacy, their use and proper understanding of language, appreciation of books, understanding of increasingly difficult and varied
vocabulary, understanding of early math and science, problem-solving capabilities, and approaches to learning. The teacher must also establish and maintain a safe, healthy learning environment, supporting both social and emotional development in the children, and encourage family involvement in an effort to support further development of the relationship between the children and their families. The Head Start Act also states that by no later than September 30, 2013, at least 50% of all Head Start teachers should have a baccalaureate or advanced degree in early childhood education or a baccalaureate or advanced degree and coursework equivalent to a major relating to early childhood education, in addition to experience teaching preschool-age children. Head Start teaching assistants should have at least an associate degree in child development be enrolled in a program leading to an associate or baccalaureate degree; or enrolled in an associate degree program to be completed within two years. Each Head Start agency submits yearly progress reports related to reaching these goals for teachers. There are also requirements for teacher in-service, which specifies that all Head Start teachers must attend at least 15 hours of professional development each year. This professional development should be high quality, sustained, intensive, and classroom-focused in order to have a positive and lasting impact on classroom instruction and the teacher's performance in the classroom, and regularly evaluated by the program for effectiveness.21

While the Head Start program has many health promotion policies in place, such as the maintenance of Child Health Records for each child enrolled, staffing of registered dietitians to review and evaluate menus, and regulations that require
opportunities for outdoor and indoor space for active play, there is need for more programs targeted specifically towards obesity prevention.\textsuperscript{22} When nutrition socialization experiences in the Head Start program were previously evaluated, the evaluation included an assessment of the physical environment, program routines, as well as the teacher’s behaviors during meals. It was found that colorful posters containing pictures of food or the food pyramid placed on the walls at the eye level of a child help to create a pleasant and social environment during meals and snacks. Teachers also sat with the children at meals times and ate the same foods to model healthy eating choices. However, this evaluation highlighted the fact that there is still further work to be done. For example, meaningful nutritional conversation during meal times was rare. Most of the emphasis was simply on naming foods and the opportunity was missed to work with the children on classifying the foods into food groups or to plan future cooking activities.\textsuperscript{20} These findings underscore the need for further training for Head Start teachers on health promotion, specifically obesity prevention and healthy eating behaviors, is needed.

\textbf{I am Moving/I am Learning & Harvest of the Month}

The Head Start Program is governed by a set of federal regulations referred to as Program Performance Standards. As part of an obesity prevention initiative by the Head Start Program, these Program Performance Standards provide a regulatory structure for addressing obesity prevention. One of the ways in which they do this is by requiring program directors to develop local policies and practices that meet the standards involving obesity prevention in order to be awarded federal funding.\textsuperscript{23} The IM/IL program was designed by Choosy Kids, LLC to promote healthy
choices in early childhood. It was adapted for Head Start as a part of their obesity prevention initiative. The IM/IL program has three goals: (a) to increase the amount of time children spend each day engaged in moderate to vigorous physical activity (MVPA), (b) to improve the quality of structured movement experiences provided by the teachers, and (c) to promote healthy food choices for the children.24 The physical activity goals are closely aligned with the movement guidelines for preschoolers set by the National Association for Sport and Physical Education (NASPE), recommending that preschool children get at least a total of 60 minutes of unstructured and structured physical activity throughout the day.17

**Teacher Evaluation Methods**

An important aspect of evaluating a program in the school system is the evaluation of teacher effectiveness. Teachers are often evaluated by methods like classroom observations (including video observation), reviewing lesson plans, self-assessment, student achievement data, and student work sample reviews. Lesson plans are a useful way to gain insight into the approaches used by teachers to deliver educational content and how they manage their classroom environment.12 Still, the Regional Educational Laboratories (REL) Midwest study found that when they reviewed the policies in place for teacher evaluations in 140 districts, fewer than 4% of them required a review of the lesson plans as part of the teacher evaluation.25 In teaching, student learning is correlated with the level of planning; making lesson plans a critical part of the educational system.26

Direct observation of the classroom is another common method both in evaluating teachers as well as monitoring the implementation of a program or
intervention. In the REL Midwest study on teacher evaluations, 29% of the 140 school districts suggested or required the use of classroom observations for teacher evaluations. While this number is still surprisingly low, it is important to note that it is much higher than the percent of school districts that use lesson plan reviews. This suggests that many teacher evaluations are placing more emphasis on practice and are not realizing the importance in the connection between planning and practice.

Observations can be classified into low-inference or high-inference measures. A low-inference measure relies more on simply counting the behaviors of interest and leaves very little room for the observer’s own interpretation. In high-inference observing, the observer is often rating the teacher’s behaviors on a type of rating or Likert scale. The overall goal of the study can help direct the observer whether to use low- or high-inferences or a combination of the two. In addition to being able to capture information about the teacher’s actual instructional practice, direct observations allow the evaluator to observe different teachers, often from different schools, and make comparisons between them. However, there are limitations to keep in mind concerning direct observation. There is always a chance that the children may react to the observer. There is also a high experimenter burden in direct observation. Observers may introduce their own bias into the study. Still, direct observation is a common method for evaluation as it has been found to be a practical and appropriate tool. In fact, to ensure proper delivery of an intervention, observation, either in vivo or through the use of video or audiotape, is considered the gold standard.
**Intervention Fidelity**

As it is impossible for any single intervention program to single handedly eradicate all of the obesogenic factors in children’s environments, it is important to develop programs that each make a contribution to the concept as a whole. These programs will not succeed, however, without a feasible way to include them into the already full curriculum with the least amount burden on the teachers. Even when the intervention program is felt to be a burden, this can create a barrier to the implementation of the program. Ongoing process evaluations during a program can give information on these possible barriers that may inhibit fidelity to the program. Intervention fidelity refers to whether the intervention is being carried out as it was originally intended. It is important when it comes to determining if the intervention is maintaining internal validity and will help determine whether the outcomes of the program are due to the actual intervention or to other outside factors. One important component of maintaining the intervention fidelity is proper training of the staff, or in the case of children's school environment, the teachers. Even when adequately trained, the teachers should be continuously monitored and evaluated during the process and after the completion of the program or intervention.

Even with the best training, it is natural for the intervention providers to experience “drift” throughout the program as components are inadvertently added or dropped from the intervention. This deterioration of the program can be minimized by scheduling one or more “booster” sessions over the course of the intervention to offer additional training and feedback to the teachers. In an
evaluation of two classrooms in Kansas adopting the "Move and Learn" Program, designed to incorporate physical activity into the curriculum, the teachers reported in the process evaluations that the implementation of the program was successful while the direct classroom observation showed that the teachers were not adequately meeting the requirements set for the number and duration of move and learn activities. This was most likely influenced by social desirability, in which the teachers responded in a way they felt would be viewed favorably. To attempt to remedy this, the investigators met with the teachers again to go over the implementation strategy and the concepts first discussed during their initial training. The investigators credit the success of the program over the final half of the study to this "booster “session with the teachers. In many intervention studies, booster training sessions have been found to be critical to effectiveness. Therefore, an additional session with an opportunity for re-training as well as a chance for evaluation and feedback is recommended.4

**Interventions in middle and elementary schools**

The HEALTHY intervention study, funded by the National Institute of Diabetes and Digestive and Kidney Diseases, addressed four areas of school nutrition and physical education: nutrition, physical education (PE), behaviors relate to healthy lifestyle choices both in and out of school, and communication using marketing strategies to enhance the strategies and methods of the program. This intervention was conducted at 21 schools with middle school-aged children. The idea was to use these process evaluations to look for ways to improve the existing intervention delivery. These process evaluations consisted of structured
observations of class time, PE time, and the school environment, as well as structured interviews, focus groups, and teacher feedback questionnaires. Using mixed methods for the evaluation of the HEALTHY program allowed for the gathering of both quantitative data using structured observations and qualitative data using teacher feedback questionnaires. The authors found that it is important to maintain separation between the evaluation staff and the intervention staff to reduce bias. This can be difficult to accomplish since there are often times the evaluation staff and implementation staff must communicate in order to effectively carry out the evaluation plan. Direct observations were used to evaluate a sample of the PE classes, the school food environment, classes administering the behavior education program, and number, nature, and condition of the communication materials related to the intervention that were displayed throughout the school. The direct observations of these components verified that the intervention was being delivered as intended.\textsuperscript{31}

In a program similar to IM/IL-Harvest of the Month, a wellness project called 5-2-1-0 Goes to School, provided resource kits to 7 primary schools and 2 middle schools in Maine. These kits contained strategies for encouraging physical activity in school and included handouts that were designed to be sent home to parents. The kits and strategies were evaluated at the end of the school year by surveying teachers, administrators, and parents on their perceived usefulness of the kits and their opinion on the ease of implementation. In the 8 schools evaluated, over half of the teachers reported not using the kits. For the teachers who were implementing the program, about 10% of them did not wish to continue using the kits and this was
primarily due to time constraints in the school day. It should be noted that the response rates in this study were very low; 11% of parents and 38% of teachers completed the survey. School administrators were the group with the highest response rate, with 81% responding. While the majority of those surveyed found that the project and resource kits were useful and worthwhile, most teachers and administrators found that the barriers to implementation could not be overcome.33 Studies have found that the major barrier or challenge in these school-centered approaches is that the teachers feel as though their main focus needs to be on academic achievement. They are not effectively trained on how to incorporate physical activity and nutritional messages into the academic curriculum 34.

**Before and After-School Programs**

With the difficulty in fitting health and nutrition interventions into the school curriculum, one option is looking into the feasibility of implementing these interventions into other areas, such as preschools and before and after-school programs. The Coordinated Approach To Child Health (CATCH) program is a school based health promotion program promoting healthy food choices, physical activity, and tobacco prevention. The program is targeted towards 3rd to 5th graders. In one adaptation of the CATCH program, the program was piloted in 16 Texas after-school programs. The staff for the after-school program, not solely comprised of teachers, was trained in two 4-hour sessions, one session in which to focus on the physical activity portion and the other to focus on the snacks and education component. In addition, there was also a booster training session for each site halfway through the intervention in order to refresh the staff on appropriate structured physical
activities and classroom lessons. To monitor the implementation of the program, there were weekly visits designed for both quality control as well as providing additional assistance. The results of the direct observations showed that the confidence level as well as the skill level in carrying out the physical activity lessons of the staff varied, reinforcing the need for effective and continued training. The observations also showed that the children were more active during the staff-directed structured activities than during the children’s free choice play time. The authors concluded that the key factor in having a successful implementation of the program was adequate staff training. In accordance with these finding for the after-school program, other studies evaluating the CATCH program in elementary schools reported that there is a strong relationship between staff training, program fidelity, and school-level outcomes.35

Preschool Intervention Programs

Most preschools, including many Head Start programs are half-day programs, lasting 3 to 4 hours in length. This makes it more difficult for teachers to work in additional lessons on top of those necessary to prepare the children for kindergarten. One way to possibly circumvent the burden of working physical activity into the daily curriculum is for preschool teachers to incorporate movement into the lesson plans in the areas of mathematics, science, and language arts as they did in the “Move and Learn” Program in Kansas. One example of an activity in which this was accomplished was having the children work on their counting skills by counting the number of balloons they can kick within a one-minute time limit. The implementation of the program was monitored by process evaluations in which the
teachers were asked to record the “move and learn” activities for the day, how many children participated, and the children’s responses in terms of their enthusiasm, persistence, etc., recorded on a Likert scale. The teachers were also asked to give feedback on the implementation. The children in the classrooms implementing the “Move and Learn” curriculum had significantly higher amounts of moderate to vigorous physical activity than the children in the control or typical classrooms according to accelerometry and the Observational System for Recording Activity in Preschoolers. It is important to note that the implementation of this program did not disrupt the learning environment in these classrooms according to reports from teachers and staff. In fact, after the move and learn activities, the teachers reported high levels of physical and verbal self-regulation in the children.4

Many studies have looked into the outcomes at the student or child level and found that more intervention work is needed. Perhaps the best way to further investigate how obesity prevention interventions can be improved is by taking a closer look at the training of teachers in school-based interventions and evaluating the progress of the implementation in the classroom.

**Purpose and Null Hypothesis**

The purpose of this study was to determine the extent to which teachers of the Hamilton County Head Start Program incorporated the IM/IL-Harvest of the Month program into the curriculum. The methods used to measure the implementation of the program were lesson plan reviews and direct classroom observation. In the lesson plan reviews, the total number of fruit and vegetable exposures and physical activities were compared between the three groups of
predicted levels of implementation and over two time periods, fall and winter. The
null hypotheses for the lesson plan review are as follows:

1. There will be no change in the total number of fruit and vegetable
exposures listed in the lesson plans between the fall (Oct/Nov), after the
initial in-service training, and winter (Feb/March), after the booster session,
time periods.

2. There will be no change in the total number of physical activities listed in
the lesson plans between the fall (Oct/Nov) and winter (Feb/March) time
periods.

For the direct classroom observations, the total amount of time spent engaged in
and the total number of fruit and vegetable activities and physical activities was
measured using an observational tool and compared between the three groups of
predicated levels of implementation. The null hypotheses for the direct classroom
observation are as follows:

1. There will be no difference in the total amount of time spent engaged in
and the total number of unstructured fruit and vegetable activities between
the 3 groups of predicted levels of implementation.

2. There will be no difference in total amount of time spent engaged in and
the total number of structured fruit and vegetable activities between the 3
groups of predicted levels of implementation.

3. There will be no difference in total amount of time spent engaged in and
the total number of unstructured physical activities between the 3 groups of
predicted levels of implementation.
4. There will be no difference in total amount of time spent engaged in and the total number of structured physical activities between the 3 groups of predicted levels of implementation.

**METHODS**

**Settings**

The Hamilton County Head Start Program operates as a part of the Early Learning Program under the Hamilton County Educational Service Center. It consists of 27 sites, all located in the greater Cincinnati-Dayton area in Hamilton County, Ohio, excluding those in the Cincinnati Public School system. These 27 sites are divided between 4 districts. Each classroom consists of a head teacher as well as an assistant teacher. The classes met for approximately three hours, usually Monday through Thursday. At each site there is typically a morning class and an afternoon class.

**Sample**

A stratified sampling method was used to provide a cross-section of classrooms within Hamilton County Head Start program. In an effort to obtain classrooms representing varying levels of predicted use of the kits and training, the Health and Nutrition Coordinator for the Hamilton County Educational Service Center was able use prior experiences with the teachers to predict different levels of implementation of the program in each of the four regions. Three high, medium, low schools for each district were selected to yield a total of 12 Head Start classrooms to be evaluated. To alleviate burden on the teaching staff and to limit any bias, a
graduate student that was not previously involved with the training of the teachers conducted the evaluation.

**Training**

As part of in-service training, the teachers were required to attend an all day training session before the start of school year in August 2010. Both head and assistant teachers from all 12 schools that were observed as part of this evaluation attended the training. The training was conducted by the Hamilton County Educational Service Center and consisted of presentations focused on engaging the children in an increased amount of moderate to vigorous physical activity (MVPA) every day using the resources provided to them (Appendix 1). Examples of activities that are considered moderate intensity include dancing, while running would be considered vigorous physical activity. The emphasis was on ways to integrate MVPA into the normal curriculum. Each classroom received a resource kit from IM/IL, which included nutrition education activities as well as games and CDs, designed to encourage MVPA (Appendix 2). In addition to these each site was also provided with hula-hoops for the children on the day of training.

While the majority of the training was aimed at MVPA and the IM/IL program, a member of the Greater Cincinnati Nutrition Council spoke for an hour on nutrition building blocks, with an emphasis on fruits and vegetables. The teachers received handouts for the Harvest of the Month component developed to be incorporated along with the IM/IL resources. The goal of the Harvest of the Month program was to increase the number of exposures the children had each day to fruits and vegetables. The handouts given to the teachers designated each month
with a featured fruit or vegetable and gave an example of a book as well as a food activity (Appendix 3). Each month, the Nutrition Council sent the teachers more activity ideas for that month, a list of supplies, and ways to promote discussion with the children during and after the activity (Appendix 4). They were asked to incorporate at least one activity per month with the hope that they would include more. The Nutrition Council used a variety of resources in the development of the Harvest of the Month component, including a tool kit they had developed in 2005 for the Ohio Department of Education targeting elementary schools in a program called “Fruits and Vegetables Galore!” The California Harvest of the Month program was also referenced and adapted for the state of Ohio and early childhood. Other curriculums and resources referenced included “Color Me Healthy”, a curriculum for preschool focusing on fruits and vegetables.

A booster training session was held in January of 2011 to discuss the program implementation and serve as a reminder to the teachers to make sure they are actively incorporating activities from the IM/IL resources kits as well as Harvest of the Month into the curriculum. This project evaluation was also presented. Handouts for the teachers at this session included a classroom profile page to help them think about how often they use IM/IL and how they work to incorporate it into their day (Appendix 5). All of the teachers, with the exception of one assistant teacher received this booster training session.

Data Collection Method

The evaluation consisted of classroom observations and evaluation of the lesson plans. Both of these techniques allowed for the collection of quantitative data.
The observational tool consisted of low-inference measures, in which the behaviors of interest were counted or timed. A teacher survey, consisting of quantitative and qualitative questions, was used to gather demographic data about the teachers. While quantitative questions are more advantageous in terms of analysis and interpretation ease, the qualitative questions provide a better look at the “why” and the “how”. It allows for the collection of unanticipated information, possible solutions to problems with the intervention, and the diverse points of view that originate from different groups.\textsuperscript{31}

**Lesson Plan Review**

Teachers develop their own bi-weekly lesson plans in each of the Head Start classrooms. Three weeks worth of lesson plans were collected and reviewed for two time points, fall and winter. Given that the program typically ran four days a week, this resulted in 12 days total in the fall period and 12 days in the winter. The same three-week period in October and November and then February and March were used for all 12 classrooms. When reviewing the lesson plans, the number of listed physical activities and exposures to fruits and vegetables were totaled for each of the three-week periods. The two time points (fall and winter) were compared to determine any impact made by a booster training session that occurred in January.

**Classroom Observations**

All 12 of the schools in the sample were visited for one complete morning session. To maintain consistency, the same observer went to all classrooms and collected video at all of the sites except one, where taping the children was not allowed. This particular classroom was part of a coordinated program with
Cincinnati Children’s Hospital and the Hamilton County Courts, referred to as HCTIP. All of these children were under court order to be enrolled in this particular Head Start program due to personal circumstances, including abuse, neglect, and in many cases placement in the foster care system. Showing the children’s faces may put them at risk and would be a violation of court orders.

In addition to videotape, field notes were taken at each location. These notes were used to keep an accurate timeline for each classroom. It was also an opportunity to record any comments concerning the program made by the teachers to the observer, parents, children, or the other staff. Notes were taken at mealtimes regarding the foods served and the observed mealtime behaviors by both the teachers and the children.

**Instrument**

The development of the observation tool was an adaptation of the Environment and Policy Assessment and Observation instrument, developed to evaluate the nutrition and physical activity environment, policies, and practices at child care centers in the Nutrition and Physical Activity Self-Assessment for Child Care program at the University of North Carolina at Chapel Hill. In the original survey there were 102 items. For this study, the questions were modified to align with the research questions of this evaluation. The physical activities and fruit and vegetable activities were classified as either unstructured or structured activities. Unstructured activities are those physical activities and fruit and vegetable activities the children choose to do themselves during large group free choice play time. These are usually not participated in by the class as a whole, and
the teacher does not necessarily lead or take part in. Structured activities are activities that are lead by the teacher, during classroom time, and the entire class should be engaging in together. The adapted observation tool consisted of low-inference measures, relying more on simply counting the behaviors of interest.

To test the reliability of the developed observation tool, a sample video was watched and scored by two individuals. In the collection of data, the 12 videos were all reviewed and evaluated using the observation tool by the same individual to avoid differences between reviewers. The observation tool was used upon reviewing the videotape and not in vivo to allow the observer to be fully engaged in what was going on in the classroom and take notes on any details that may be missed in the video (Appendix 6).

Coding the Data

To interpret the data collected from the observational tool for each classroom, the results were recoded for statistical analysis. For structure/unstructured fruit and vegetable or physical activities, the data collected consisted of nominal variables (i.e. “Did this type of activity occur?”) and scale variables (i.e. how many occasions and the total amount of time spent engaged in this activity). The nominal variables were then assigned a numerical code depending on the answer to allow for analysis. Other nominal level variables included whether the teachers were engaged in the activities, if they ate fruits or vegetables with the children at mealtime, and if they went outdoors.
Teacher Surveys

A teacher survey was developed to collect data that might explain differences in teacher behaviors. Both the head teacher and the assistant teacher filled out the survey after the children from the morning session had left for the day. The survey included basic demographic information such as age, race, education level, etc. There was also lifestyle related questions concerning their height and weight (used to calculate BMI) as well as questions concerning their level of physical activity and the number of fruits and vegetables they typically consume in a day (Appendix 7).

Statistical Analysis

Data was entered into Statistical Package for the Social Sciences (version 18.0, 2010, SPSS, Inc., Chicago, IL). The data was then assessed for errors and normality. Paired t-tests were used to look at the change in the number of fruit and vegetable exposures or physical activity between the fall lesson plans and the winter lesson plans for each site. The difference in the mean number of fruit and vegetable exposures or physical activity in the lesson plans between the three groups of predicted implementation was also looked at across different time points using a repeated measures ANOVA.

The difference in the mean number of fruit/vegetable exposures or physical activities between the different groups of predicted implementation was determined using the one-way ANOVA. Bivariate correlations were run to determine whether there was any relationship between the dependent variables, such as number of structured physical activities and the teacher characteristics.

RESULTS
Table 1.
Observation Descriptive Data

| Was videotaping allowed on the day of observation? | Yes-92%  
| No-8% |
| Mean ±SD number of children present on day of observation | 12.25(1.29) |

Table 2.
Teacher Demographic Data

<table>
<thead>
<tr>
<th></th>
<th>Head Teachers n=12</th>
<th>Assistant Teachers n=12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ±SD age (yrs.)</td>
<td>54.17(5.78)</td>
<td>48.33(11.89)</td>
</tr>
<tr>
<td>BMI (in kg/m^2)*</td>
<td>≤29.9: 50%</td>
<td>≤29.9: 60%</td>
</tr>
<tr>
<td></td>
<td>≥30.0: 50%</td>
<td>≥30.0: 40</td>
</tr>
<tr>
<td>Race</td>
<td>Black=25%</td>
<td>Black=33%</td>
</tr>
<tr>
<td></td>
<td>White=75%</td>
<td>White=67%</td>
</tr>
<tr>
<td></td>
<td>Other=0</td>
<td>Other=0</td>
</tr>
<tr>
<td>Number of Years</td>
<td>≤ 15: 17%</td>
<td>≤ 15: 75%</td>
</tr>
<tr>
<td>Experience in Profession</td>
<td>&gt; 15: 83%</td>
<td>&gt; 15: 25%</td>
</tr>
<tr>
<td></td>
<td>Mean ±SD: 18.57(5.21)</td>
<td>Mean ±SD: 14.5(5.96)</td>
</tr>
</tbody>
</table>
| Serving of fruits and vegetables per day | ≤4: 58%  
|                         | ≥5: 42%             | ≥5: 42%                 |
| Level of physical activity (on a scale) | 1-2 Less Active: 8%  
|                         | 3 Moderately Active: 92%  
|                         | 4-5 Highly Active: 0  | 1-2 Less Active: 8%  
|                         | 3 Moderately Active: 83%  
|                         | 4-5 Highly Active: 8%    |

Lesson Plans

Table 3.
Mean number of physical activities in lesson plan in fall and winter

<table>
<thead>
<tr>
<th></th>
<th>Fall Mean ± SD</th>
<th>Winter Mean ± SD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>10.25±4.19</td>
<td>14.24±2.36</td>
<td>.31</td>
</tr>
<tr>
<td>Medium</td>
<td>9.75±6.80</td>
<td>10.50±6.56</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>13.50±8.10</td>
<td>14.25±5.74</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1.
There was a nonsignificant increase in the mean number of physical activities listed in the lesson plans between the fall period (M=11.17, SD=6.19) and the winter period (M=13.00, SD=5.06). However, there was a trend for a strong positive correlation between the number of physical activities in the fall lesson plans as compared to the winter lesson plans (r= +0.53, n=12, p>.05 and < .10). The predicted level of implementation was not significantly related to the number of physical activities in the lesson plans (Table 3 & Figure 1).
Table 4.
Mean Number of Fruit and Vegetable Activities in the Lesson Plans

<table>
<thead>
<tr>
<th></th>
<th>Fall Mean ± SD</th>
<th>Winter Mean ± SD</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>7.25±6.60</td>
<td>6.50±10.41</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Medium</td>
<td>18.00±13.14</td>
<td>2.50±1.73</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>9.00±5.29</td>
<td>2.75±4.19</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2.
Number of Physical Activities in Lesson Plans over Time by Group

There was a significant decrease in the number of fruit and vegetable exposures between the fall lesson plans and the winter lesson plans, (t (11) =2.19, p<0.05) and therefore, the null hypothesis was rejected. The predicted level of implementation was significantly related to the number of fruits and vegetable
exposures in the lesson plans ($\eta^2_p=.38$) (Table 4 and Figure 2). To look at these changes broken down by the percent of teachers who may have listed fruit and vegetable activities in varying frequencies between the fall and winter, see table 5.

**Table 5.**
Percent of Teachers with activities related to Physical Activity and Fruits and Vegetables in their Lesson Plans

<table>
<thead>
<tr>
<th>Lesson Plan Time Period</th>
<th>Number of Times Listed in Lesson Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\leq 6)</td>
</tr>
<tr>
<td>Fall</td>
<td>Physical Activities</td>
</tr>
<tr>
<td></td>
<td>Fruit &amp; Vegetable Activities</td>
</tr>
<tr>
<td>Winter</td>
<td>Physical Activities</td>
</tr>
<tr>
<td></td>
<td>Fruit &amp; Vegetable Activities</td>
</tr>
</tbody>
</table>
### Classroom Physical Activity Observation

#### Table 6.
Descriptive Data of Physical Activities as Observed in Classrooms

<table>
<thead>
<tr>
<th>Unstructured Physical Activities*</th>
<th>% Yes</th>
<th>Mean +SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured physical activities?</td>
<td>92%</td>
<td>Occasions- 1.17(.72) Total time(min)- 16.75(11.47)</td>
</tr>
<tr>
<td>Were the kits used?</td>
<td>75%</td>
<td>Occasions- 1.08(1.00)</td>
</tr>
<tr>
<td>Unstructured physical activity outdoors?</td>
<td>33%</td>
<td></td>
</tr>
</tbody>
</table>

#### Structured Physical Activities **

| Were there structured physical activities? | 100%   | Occasions- 2.58(1.44) Total time (min)- 5.75(3.31) |
| Did the teachers make positive comments about PA to or in front of the children? | 25%   |               |

#### Environment

| Was there PA equipment/resources accessible to the children? | 92%   |
| Were there PA displays in the room from the IM/IL kits?     | 17%   |
| Were there other PA displays separate outside of the IM/IL program? | 17 % |

* Unstructured activities are the activities the children choose to do themselves during large group free choice playtime.

**Structured activities are activities that are lead by the teacher, during classroom time, and the entire class should be engaging in together

During the classroom observation, the physical activities were classified as either unstructured or structured physical activities. The observation demographic information can be found in Table 1. There was no significant difference between
the three groups for unstructured or structured physical activities. Therefore, the null hypotheses were accepted. See Table 6 for details on the percentage of classrooms that had children engaging in unstructured and structured physical activities and the mean amount of total time spent in these activities.

Both the number of structured physical activities and the amount of time spent in structured physical activities were positively correlated with the number of positive comments the teachers made about fruits and vegetables ($r= +0.40, n=24, p=0.05$ and $r=+0.49, n=24, p< .05$). The number of times the teachers made positive comments about physical activities was also positively correlated with both the number of and the total amount of time spent in structured physical activities ($r= +0.45, n=24, p< .05$ and $r=+0.41, n=24, p< .05$). Also, the number of structured physical activities and the total amount of time spent in them were strongly positively correlated with the number of times the children utilized the kits for physical activity during unstructured time ($r= +0.66, n=12, p< .05$ and $r=+0.67, n=12, p< .05$). The number of structured physical activities was very strongly positively correlated with the total amount of time spent in structured physical activities ($r= +0.97, n=12, p< .05$).

**Classroom Fruit & Vegetable Observations**

See Table 7 for information on unstructured and structured fruit and vegetable activities observed in the classrooms. There was no statistically significant difference in unstructured or structured fruit and vegetable activities between the groups for predicted levels of implementation. Therefore, the null hypotheses for fruit and vegetable activities were accepted. The number of unstructured fruit and
vegetable activities and the number of times the kits were utilized for unstructured fruit and vegetable activities was strongly positively correlated ($r=+0.80$, $n=12$, $p<.05$).

**Table 7.**

Descriptive Data of Fruit & Vegetable Activities Observed in the Classrooms

<table>
<thead>
<tr>
<th>Unstructured Fruit and Vegetable Activities*</th>
<th>%Yes</th>
<th>Mean (+SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured Fruit/Vegetable activities?</td>
<td>50%</td>
<td>Occasions- 1.08(1.51)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total time (min)- 8.17(12.13)</td>
</tr>
<tr>
<td>Were the kits used?</td>
<td>25%</td>
<td>Occasions- 0.33(.65)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structured Fruit and Vegetable Activities**</th>
<th>%Yes</th>
<th>Mean (+SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were there structured F/V activities?</td>
<td>50%</td>
<td>Occasions- 0.67(.89)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total time (min)- 4.08(7.08)</td>
</tr>
<tr>
<td>Was the Harvest of the Month featured fruit or vegetable mentioned?</td>
<td>33%</td>
<td>Occasions- 0.33(.49)</td>
</tr>
<tr>
<td>Did the teachers make positive comments about fruits/vegetables to or in front of the children?</td>
<td>92%</td>
<td>Occasions- 1.42(.79)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were there fruit/vegetable related activities/resources accessible to the children?</td>
</tr>
<tr>
<td>Did the teachers create their own displays related to fruits/vegetables or Harvest of the Month?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mealtime</th>
<th>Breakfast</th>
<th>Lunch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did the head teacher eat fruits/vegetables with the children?</td>
<td>25%</td>
<td>92%</td>
</tr>
<tr>
<td>Did the assistant teacher eat fruits/vegetables with the children?</td>
<td>17%</td>
<td>83%</td>
</tr>
</tbody>
</table>
The number of structured fruit and vegetable activities was positively correlated with the number of unstructured fruit and vegetable activities \((r=+0.77, n=21, p<.05)\). Interestingly, the number of structured fruit and vegetable activities and the number of times the kits were utilized for fruit and vegetable activities during unstructured time were also strongly positively correlated \((r=+0.68, n=12, p<.05)\). The featured fruit or vegetable was only mentioned in 33% of the classrooms. In addition there were displays related to fruits and vegetables or Harvest of the month in only 33% of the classrooms.

Information on teacher demographics is summarized in Table 2. Pearson correlations examined any relationships between teacher demographic variables and the activities observed in the classroom. There was a positive correlation found between the total amount of time the children were observed spending in unstructured physical activity and teacher age \((r=+0.40, n=24, p= .05)\). There was a positive correlation between the number of structured physical activities observed and the BMI of the teachers \((r=+0.48, n=20, p < .05)\) as well as for the total amount of time spent in structured physical activities and the teacher’s BMI \((r=+0.46, n=20, p< .05)\). The number of servings of fruits and vegetables the teacher’s reported consuming each day was negatively correlated with the total amount of time the children spent engaged in unstructured fruit and vegetable activities \((r=-0.42, n=24, p< .05)\).

**Discussion**

In the lesson plans, the mean number of physical activities during the fall for a 3-week period was 11 and 13 for the winter. Given that this was a period of 12
school days, this would average out to approximately one physical activity listed in the lesson plan per day. It is important to keep in mind the NASPE recommendation stating that preschool children should get at least 30-60 minutes of MVPA each day.\textsuperscript{17} Having only one activity planned per day may make it challenging to meet this recommendation. Having a higher number of segmented activities incorporated throughout the preschool day may help ensure that classrooms are meeting this recommendation.\textsuperscript{6} There was a strong trend for a positive correlation between the number of activities in the fall and the number of activities in the winter. The teachers who had these activities listed in their lesson plans in the fall are more likely to have also listed them in the lesson plans for the winter period. The lack of significance (p=.08) is mostly likely due to the small sample size (n=12).

The mean number of fruit and vegetable activities in the lesson plans had a significant decrease from fall to winter. If the booster session had been effective in eliminating drift and reinforcing the intervention components, this would not be the expected result. However, in reviewing the lesson plans, it was important to take into account the themes from month to month and season to season. In the fall, there was more focus on harvest time. Fruits and vegetables such as apples and pumpkins were featured in activities and books more often during this time. In the winter, the focus was more on snow and winter-related themes. Therefore, the number of fruits and vegetable exposures in the fall lesson plans may be unusually high compared to the average for the school year.

Of the 12 classrooms visited, only 2 of them had more than once occasion of unstructured physical activity. For those where the weather was above 32 F, this
included time outdoors (33% of the classrooms). Research has shown that lack of outdoor space and play equipment are important factors in physical activity.\textsuperscript{40} However, upon observation it was clear that the children were not consistently engaged in MVPA during their time outdoors. In the Move and Learn study, they found that children only accumulated another 3 or 4 minutes of MVPA during their outdoor time. The authors suggested that the amount of time designated for outdoor play during half-day programs, which is usually about 10-20 minutes, is not enough time for meaningful MVPA opportunities to develop.\textsuperscript{4} During this unstructured time when the children were not outdoors or in a gym, they were confined to the classroom where there was not much room for many of the games provided in the kit. The items from the kits most frequently used by the children were the hula-hoops. Both outside and indoors, the only physical activity component of the resources kits that was typically freely accessible to the children was the hula-hoops.

In looking at the structured physical activities lead by the teachers, the frequency was higher than that of unstructured physical activities. However, the length of time of these activities was substantially shorter in structured (M= 5.75 minutes) than in unstructured (M= 16.75 minutes). This is most likely because the structured activities are designed to be more segmented and to be inserted into the curriculum in short bursts, often during transition times during the day. While much emphasis is placed on unstructured free playtime for children and its importance to cognitive, social, and motor development, there are studies showing that higher levels of structured activities in younger children produce higher levels of physical activity.\textsuperscript{39}
There was a positive correlation found between structured physical activities and the number of positive comments the teachers made about physical activity and fruits and vegetables in front of the children. One reason for this may be a social desirability aspect, in which the teachers reacted to having an observer present in the room. They may have been more likely to make positive comments to the children and more likely to engage in more of the activities on which they are being evaluated. In this sense, the unstructured physical activity gives a slightly more unbiased idea of how active the children truly are on a day-to-day basis in that particular classroom setting. In many of the activities observed, the children themselves were excellent indicators of how often a particular game or activity was done based on their reaction. For example, if the children were able to perform the activity with confidence and minimal instruction, it was clear they had done this type of physical activity often. Other times an activity would start and the children looked quite puzzled and unsure of themselves. The strong positive correlation between structured physical activities and the number of times the children used items from the kits during their unstructured time supports the idea that the structured activities increase the children’s desire and curiosity in using the resource kit for physical activity during their free choice time.

In reviewing the observed fruit and vegetable activities, the frequencies were lower. The strong positive correlation between unstructured and structured activities means that, as a particular site engaged more in structured fruit and vegetable activities, the children were more likely to participate in this type of activity on their own during their unstructured time. As the number of unstructured
fruit and vegetable activities increased, so did the number of time the kits were used. This was a statistically strong relationship and demonstrated the effectiveness of the kits in encouraging the children to take part more often in unstructured activities involving fruit and vegetables. Interestingly, there was also a relationship between the number of structured fruit and vegetable activities and the number of times the children utilized the fruits and vegetable resources during unstructured time. One explanation is that the structured fruit and vegetable activities increased the child’s knowledge and skill level, in the use of the resources in the kits. The more exposures to these types of activities, the more curious the children may become about expanding on these new skills during unstructured time.

One important aspect of fruit and vegetable exposure is mealtimes. This is important in Head Start children, who consume two meals a day in the half-day program. Children learn to prefer foods that are familiar, meaning they have been exposed to them many times. Also, modeling by peers, teachers, and family members have been shown to play a major role in the development of young children’s taste preferences.41 The school culture is central to school health promotion and this culture is influenced by the relationship between the teachers and students and the degree to which teachers serve as healthy role models for their students.40 As previously described, Head Start teachers are encouraged to sit with the children at mealtime and model healthy eating choices.20 While the percentage of head teachers and assistant teachers in this study who ate their fruits or vegetables at the breakfast meal were less than half, the percentages were higher for lunch. One of the reasons for this was that many of the teachers did not eat breakfast.
at all. It is also important to note that the fruit serving at breakfast was typically juice and the teachers instead often chose to drink milk.

Teachers surveys were given to look at any influence teacher demographics may have had on the variables measured in this evaluation (Table 2). The relationships found in this evaluation were contradictory what may usually be predicted. For example, as the teacher’s age increased, the amount of time the children spent in unstructured physical activity increased. It is important to remember that unstructured activity is activity that is not lead or initiated by the teacher. While this does not necessarily mean that the teacher never engaged in this activity with the children, often times that was in fact the case. Also, as the teachers BMI increased from the non-obese to obese category, the number of structured physical activities, as well as the amount of time spent in them, increased. This relationship could have been affected by social desirability, the low sample size, or the fact that the majority of the teachers in the non-obese category (BMI < 30 kg/m²) were still overweight (BMI > 25 kg/m²). Of the 20 teachers who reported their height and weight information in the survey, only 30% of them had BMI’s that fell in the healthy BMI range of 18.5-24.9 kg/m².

Of the 12 schools observed, 100% of them had at least one structured physical activity. Although the teachers lead these activities for the class by providing the time, space, and resources, it should be noted that not all of the teachers were actively engaged in the activity with the children. Of the head teachers, 83% actively participated and only 33% of the assistant teachers. However, often the assistant teachers did not participate because they were setting up for the
next activity or cleaning up from the previous. Since structured physical activities were frequently used during transition times, it was difficult for both teachers to be actively engaged. The teachers were also asked to report how many total servings of fruit and vegetables they personally consume each day. The USDA recommends about 5-9 servings of fruits and vegetables each day. The teachers in this study reported an average of about 4 servings of fruit and vegetables each day. Many of them remarked that the majority of their meals are consumed at school and that the fruits and vegetables they consume while eating with the children is often their entire intake of fruits and vegetables for the day. The negative correlation found between the number of servings of fruits and vegetables the teachers report having each day and the amount of time the children spent engaged in unstructured fruits and vegetable activities, may be due to inaccurate self-reporting by the teachers. Social desirability may have caused the teachers to report a number higher than what they actually consume.

One of the objectives of this evaluation was to get an idea of whether the teachers utilized the handouts provided to them with curriculum ideas on integrating the Harvest of the Month fruit or vegetable. During the observation, the featured fruit or vegetable was rarely mentioned or displayed. Many of the teachers were under the impression that the observer was only present to evaluate the use of the IM/IL kits and therefore little attention was given to the Harvest of the Month component on the day of observation. This could have been a result of inadequate attention given to this component during the training. Only about an hour of the training session was dedicated to the nutrition component lead by the Nutrition
Council. In looking at the training day agenda, the emphasis was on the physical activity component (Appendix 1).

The largest limitation of this study was the sample size. Due to the time demands in observing an entire morning class for each site, visiting the entire population of Hamilton County Head Start sites was not feasible. This smaller sample size may have limited the ability to detect statistical significance in some of the tests. Also, the sampling technique was based on the opinion of the NCESC in their prediction of the level of implementation of the program in an attempt to provide an adequate cross section of classrooms through each of the 4 regions.

The definition of what was considered MVPA was sometimes controversial. Several activities discussed with the teachers during their initial training during the MVPA component of the training did not encompass what would usually be thought of as MVPA. For example, one activity involved an instructional song from one of the IM/IL CDs while the children sit on the floor and created letters out of string. It then became a judgment call on whether to count this activity as MVPA on the observational tool. To ensure that the observer’s personal bias did not affect the decision making process, these conflicts were reviewed by a second observer and the two observers then came to an agreement on a final decision. In classroom observations, it is typically the children who react to the observer. However, in the case of teacher evaluations, the teachers may also be reacting to the observer. They may pay special attention to the activities the observer is there to witness more so than on an average day. While unplanned observations would have provided a more accurate insight into a typical day, the sensitive nature of the groups, given that the
children were so young and that this was a government-funded program, required the teachers to be notified ahead of time in the event there were children who may need special consideration before being videotaped.

The information gained in this evaluation can be used to adjust and adapt the IM/IL program and training for future Hamilton County Head Start classrooms. For example, further training may help the teachers to learn new and creative ways to integrate the kit into the curriculum. Also, the relatively low use of the Harvest of the Month needs to be considered in terms of whether improvements can be made that would increase the likelihood that the teachers may use it more. One idea would be to gain more detailed feedback from the teachers on the potential barriers they experienced in incorporating this idea into their daily routine. In many other Head Start programs throughout the country implementing the IM/IL curriculum, the staff was offered activities for them personally that pertained to their own diet and physical activity behaviors. The Hamilton County Head Start Program may want to consider adding this component as incentive for the teachers and a way to make them more invested in the IM/IL program.

On the teacher surveys there was a qualitative question about their opinion of the IM/IL–Harvest of the Month program. While the majority of the teachers were supportive of the overall idea of incorporating more physical activity into the classroom, few of them mentioned anything about the nutritional component of the kits or Harvest of the Month. If the objective for future years is still to increase the number of exposures the children get to fruits and vegetables each day, perhaps the training should be re-evaluated to stress the importance of this aspect.
Conclusion

This study served to evaluate the teachers’ implementation of the IM/IL-Harvest of the Month curriculum. While the kits provided to them were utilized for both structured and unstructured activities, the quality of these activities leaves much room for improvement. There was no significant difference between the groups of predicted levels of implementation set by the Health and Nutrition Coordinator at Hamilton County Educational Service Center. The lack of fruit and vegetable exposures from the kits as well as the Harvest of the Month component highlight the need for this aspect of the program to be revised, particularly in the area of teacher training. Many teachers remarked on the difficulty in providing adequate attention to things like nutrition and physical activity in such a limited amount of time each day. Perhaps changes are needed at the organizational and policy levels to ensure that while school-readiness is still a main focus of the Head Start program, health and nutritional programs do not fall by the wayside.
Appendix 1

Agenda from Initial Teacher Training in August 2010

Hamilton County ESC Early Learning Program Staff In-Service

August 23, 2010 Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:40am</td>
<td>Opening Session</td>
<td>Karen Heyob</td>
</tr>
<tr>
<td></td>
<td>• Opportunity Knocks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Best Practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Planning for Program Change</td>
<td></td>
</tr>
<tr>
<td>8:40-11:00</td>
<td>MVPA Everyday</td>
<td>Nancy Struewing</td>
</tr>
<tr>
<td>9:40-10:00</td>
<td>Break Session</td>
<td></td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>Moving with the Brain in Mind</td>
<td>Barb Winter</td>
</tr>
<tr>
<td>12:00-12:30pm</td>
<td>Lunch and Table-Talk Card Activity</td>
<td></td>
</tr>
<tr>
<td>12:30-1:20</td>
<td>Scavenger Hunt</td>
<td></td>
</tr>
<tr>
<td>1:20-2:05</td>
<td>Nutrition Building Blocks</td>
<td>Lauren Niemes</td>
</tr>
<tr>
<td>2:05-2:30</td>
<td>Food Experience &amp; Break Session</td>
<td></td>
</tr>
<tr>
<td>2:30-3:30</td>
<td>Body Language</td>
<td>Nancy Struewing</td>
</tr>
<tr>
<td>3:30-4:00</td>
<td>Family/Home-School Connections</td>
<td>Karen Heyob &amp;</td>
</tr>
<tr>
<td></td>
<td>Assessment Connections to GOLD</td>
<td>Frances Edwards</td>
</tr>
</tbody>
</table>

41
* Teachers also received Hula-Hoops along with the above kit.
Appendix 3

**Harvest of the Month - Early Childhood**

Here are some ideas to integrate fruits and vegetables into your classroom throughout the year.

<table>
<thead>
<tr>
<th>Month</th>
<th>Harvest Fruits and Vegetables</th>
<th>Books</th>
<th>Food Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>September</td>
<td>Melons</td>
<td><em>Lunch</em> by Denise Fleming, <em>I Eat Fruit</em> by Hannah Tufts</td>
<td>Melon tasting - watermelon &amp; cantaloupe Seed sorting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tomatoes</td>
<td><em>I will Never NOT EVER Eat a Tomato</em> by Lauren Child, <em>Feast For 10</em> by Cathryn Falwell</td>
<td>Cherry tomato tasting, Tomato harvest Pizzas</td>
</tr>
<tr>
<td>October</td>
<td>Apples</td>
<td><em>Apple Farmer Annie</em> by Monica Wellington, <em>I am an Apple</em> by Jean Marzollo, <em>What Am I?</em> by NN Charles</td>
<td>Cinnamon Apple slices, Crockpot Applesauce</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pumpkins</td>
<td><em>Pumpkin Circle Feast For 10</em> by Cathryn Falwell</td>
<td>Upside Down Pumpkin Pies</td>
</tr>
<tr>
<td>November</td>
<td>Pears</td>
<td><em>The Beastly Feast</em> by Bruce Goldstone</td>
<td>Fresh and Canned pear tasting, Pear Share</td>
</tr>
<tr>
<td></td>
<td>Greens</td>
<td><em>Feast For 10</em> by Cathryn Falwell</td>
<td>Vegetable Soup</td>
</tr>
<tr>
<td>December</td>
<td>Tangerines</td>
<td></td>
<td>Peel and share tangerines</td>
</tr>
<tr>
<td></td>
<td>Sweet Potatoes</td>
<td><em>Give Me My Yam!</em> by Jan Blake and Peter Melnyczuk</td>
<td>Sweet potato tasting - baked, mashed, canned Grow a Sweet</td>
</tr>
<tr>
<td>Month</td>
<td>Produce</td>
<td>Book Title</td>
<td>Author</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>January</td>
<td>Oranges</td>
<td><em>An Orange in January</em> by Dianna Aston</td>
<td>A Star in My Orange:</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Looking for Nature’s Shapes</em> by Dana Rau</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Broccoli</td>
<td><em>All Our Fruits and Vegetables</em> by Roberta Duff</td>
<td>I Eat vegetables by Hannah Tofts</td>
</tr>
<tr>
<td>February</td>
<td>Bananas</td>
<td><em>Sweet as a Strawberry</em> by Sally Smallwood</td>
<td>What Am I? Looking through shapes at apples and grapes by NN Charles</td>
</tr>
<tr>
<td></td>
<td>Carrots</td>
<td><em>All Our Fruits and Vegetables</em> by Roberta Duff</td>
<td>Tasting Club</td>
</tr>
<tr>
<td>March</td>
<td>Pineapple</td>
<td><em>Sweet as a Strawberry</em> by Sally Smallwood</td>
<td>Fruit Salad</td>
</tr>
<tr>
<td></td>
<td>Cabbage</td>
<td><em>The Giant Cabbage - An Alaskan Folktale</em> by Charles Stihler</td>
<td>Tasting Club</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Growing Vegetable Soup</em> by Lois Ehlert</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>Mangoes</td>
<td><em>Come and Eat with Us!</em> by Child’s Play</td>
<td>Mango Smoothies</td>
</tr>
<tr>
<td></td>
<td>Spinach</td>
<td><em>Eating the Alphabet</em> by Lois Ehlert</td>
<td>Fruit Salad</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Butterfly Salads</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rainbow Rollups</td>
</tr>
<tr>
<td>May</td>
<td>Berries</td>
<td><em>Sweet as a Strawberry</em> by Sally Smallwood</td>
<td>Fruit and Yogurt</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Strawberries are Red</em> by Petr Horacek</td>
<td>parfaits</td>
</tr>
<tr>
<td></td>
<td>Sugar Snap or Snow Peas</td>
<td><em>Lunch</em> by Denise Fleming</td>
<td>Growing Colors by Bruce McMillan</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Growing Colors</em> by Bruce McMillan</td>
<td>Eat Your Peas Louise by Pegeen Snow</td>
</tr>
<tr>
<td></td>
<td>Sugar Snap or Snow Peas</td>
<td></td>
<td>Sugar Snap Peas and dip</td>
</tr>
</tbody>
</table>
Books available through Neat Solutions for Healthy Children
www.neatsolutions.com

Nutrition Council  www.nutritioncouncil.org  5/10
Appendix 4

Vegetable Component for the Month of October

<table>
<thead>
<tr>
<th>(Interest) Area</th>
<th>Activity</th>
<th>Materials</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group time (large)</td>
<td>Read Aloud</td>
<td>Pumpkin Circle: The Story of a Garden by George Levenson</td>
<td>Read the story.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suggestions for Discussion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discuss how pumpkins grow and the &quot;pumpkin circle&quot;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discuss where, when and how pumpkins are used.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Talk about foods made with pumpkin.</td>
</tr>
<tr>
<td>Group time (large)</td>
<td>Read Aloud</td>
<td>Sweat for 10 by Cathryn Falwell</td>
<td>Have children count with you as you read the story.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plastic foods from IM/LL</td>
<td>Have children name the foods in the story.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foods-Photo card library from IM/LL</td>
<td>Assemble as many foods as possible using the food models &amp; Photo cards.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pictures (packages) of foods listed in the story</td>
<td>Have children take turns choosing a food, naming it and thinking of another fruit or vegetable that is the same color or that starts with the same letter.</td>
</tr>
<tr>
<td>Group time (small)</td>
<td>Spell Your Name!</td>
<td>Orange Construction Paper</td>
<td>Write each child's first name in large letters on a piece of orange construction paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dry Pumpkin Seeds</td>
<td>Have children glue pumpkin seeds along the line of the letters to outline their names.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glue</td>
<td>Ask children to trace a fruit or vegetable that starts with the same letter as their name.</td>
</tr>
<tr>
<td>Literacy</td>
<td>Shared oral</td>
<td>Pumpkins by Mary Lyn Ray</td>
<td>Display books in book or library center.</td>
</tr>
<tr>
<td>Sensory/Science</td>
<td>reading</td>
<td>Too Many Pumpkins by Linda White</td>
<td>Read books selected by children as time permits during small group activities or center time.</td>
</tr>
<tr>
<td></td>
<td>opportunities</td>
<td>Pumpkins (different sizes &amp; shapes)</td>
<td>Have the children describe how pumpkins look &amp; feel on the outside.</td>
</tr>
<tr>
<td></td>
<td>Pumpkins Shapes</td>
<td>Knives</td>
<td>Discuss similarities and differences among the various pumpkins - large &amp; small, smooth &amp; bumpy etc.</td>
</tr>
<tr>
<td></td>
<td>and Sizes</td>
<td>Spoon</td>
<td>Cut the top off one pumpkin. Have students put their hands inside. Ask children to describe how the inside feels and smells.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paper towels</td>
<td>Let students help sort the pumpkin seeds. Clean and bake the seeds for the children to taste. (Recipe include for baking pumpkin seeds.)</td>
</tr>
<tr>
<td>Interest Area</td>
<td>Activity</td>
<td>Materials</td>
<td>Procedure</td>
</tr>
<tr>
<td>---------------</td>
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<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Math          | Measuring         | Pumpkin, Yarn, Scissors, Measuring tape                                   | • Let children take turns measuring the pumpkin by wrapping yarn around the pumpkin.  
  • Cut the yarn as directed by each student.  
  • Ask students to estimate the length of their piece of yarn.  
  Using a ruler or measuring tape let students measure the length of their yarn.  
  Compare actual length to the estimate. |
|               | Counting          | Cleaned pumpkin seeds, Paper Plates – 2 for each child, Stapler, Markers, Crayons or Colored Pencils | Make a pumpkin seed instrument:  
  • Ask each child to draw a pumpkin face on 1 paper plate. Be sure they draw on the side of the plate that sits on the table.  
  • Have students color the 2nd plate orange, (wrong side).  
  • Staple each set of plates together leaving an opening for children to add pumpkin seeds.  
  • Have each child choose a number between 5 & 10. Let them count out that number of seeds & put the seeds inside the paper plates. Staple to close completely. |
|               | Height            | Cut 25 medium-sized pumpkins out of orange construction paper. Number pumpkins from 1 to 25. Measuring tape | • Tape pumpkins to a wall one above another. Pumpkin #1 should be closest to the floor and pumpkin #25 should be at the top of the column.  
  • Have students stand next to the column of pumpkins and measure their "pumpkin" height. |
| Cooking (Food Experience) | Upside Down Pumpkin Pie Recipe Included | Spiced Pumpkin, Vanilla Pudding (prepared before class or purchased), Light Whipped Topping, Graham Cracker (in sealed snack baggie), Cinnamon/sugar mixture, Bowls, Spoons, Napkins | • Use included recipe with pictures to allow students to assemble their own Upside Down Pumpkin Pie.  
  • Before beginning, complete the following:  
    o Prepare or purchase vanilla pudding  
    o Thaw whipped topping  
    o Add spices to canned pumpkin according to recipe  
    o Place N of a graham cracker in a snack baggie & seal. |
| Music/Movement | Pumpkin Vines     | 1/4/1/CD #7 – Swing and Sway                                             | • Have children pretend to be a pumpkin vine and grow from the floor to standing up, swinging and swaying along the way as described in Pumpkin Circles.  
  • Use pumpkin instruments to create songs or follow along with CD music. |
| Family Partnership | Healthy Snack recipe | Take home recipe                                                          | • Send information home in children's backpacks as usual. |

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### Upside Down Pumpkin Pie

**Makes 20 small servings**

- 2 cans (15-ounce) pumpkin
- 2 packages (3.4-ounce each) instant vanilla pudding
- 3 cups skim milk or 1% milk
- 2 containers (12-ounce each) light whipped topping, thawed
- 3 teaspoons pumpkin pie spice
- 1 teaspoon cinnamon
- 5 graham crackers (rectangular sheets; 2¼ -inch X 5-inch)
- Cinnamon & sugar mix — optional

**Instructions:**

1. Make pudding following package instructions except use 1½ cups skim or 1% milk instead of the 2 cups of milk in the Instructions on each box. Cover prepared pudding; refrigerate until you are ready to use.
2. In a medium bowl, mix pumpkin, pumpkin pie spice & cinnamon. Stir to combine. Store in a covered container in the refrigerator until ready to use.

**To assemble individual Upside Down Pumpkin Pie:**

- Give each child a small cup or bowl. Have each child add the following to their cup or bowl:
  - 1 spoon of whipped topping
  - 2 spoons of "spiced pumpkin"
  - 3 spoons of vanilla pudding
  - Stir until combined.
  - Crush one graham cracker square. Spread evenly on top of the pumpkin mixture.
  - Sprinkle with cinnamon & sugar if desired. Eat & enjoy!

*Please see separate file with picture instructions to use with children.*
Appendix 5

**IMIL Classroom Profile**

**Engaged and Using IMIL**

Through a collaboration with the University of Cincinnati, a graduate student will randomly visit our Head Start classrooms to research how IMIL has impacted the class. She will gather information on how IMIL is implemented in the classroom, look at nutritional activities, and view the Parent/Home School Connection. Through her research she will gain knowledge of how effective the program is working for children and families. The visits will occur during the months of February and March. Please welcome Sarah as she explores the IMIL curriculum.

- How often do you use IMIL?
- How is it incorporated into your day?
- Have you integrated the IMIL activities/principles into different classroom components?
- Have you incorporated nutritional and physical wellness vocabulary into your daily routines?
- Have you used the materials in the green box?
  1. High
  2. Medium
  3. Low
- What materials were most useful and least useful?

**Home/School Connection**

- Graduate student would like to see Parent Response Pages.
- Graduate student would like to see Parent Meeting Attendance.

**Lesson Plans**

- Are IMIL activities listed on your lesson plan and are you using the materials?
- Do you have nutritional activities on your lesson plan?
- Do breakfast, lunch, and snack conversation include nutritional information?
- Are you using the Fruit and Vegetable lesson plans of the month from the Nutrition Council?

Did anything you learned about IMIL personally impact you? If so, how?

Signature: __________________________ Date: __________________________
# Observation Form for Physical Activity

<table>
<thead>
<tr>
<th>Variables</th>
<th>Y/N</th>
<th># of occasions</th>
<th>Total time in minutes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Activity during Large Group Time (unstructured)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the children use materials from the kits?</td>
<td></td>
<td></td>
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<tr>
<td>Did this include time outdoors?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(Total) Structured Physical Activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* (Individual activities and times listed below)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Did the Head Teacher engage in this activity: (Y/N)  
   2. Did the Assistant Teacher engage in this activity: (Y/N)  
   3. Were the children actively engaged: (Y/N)  

2. Did the Head Teacher engage in this activity: (Y/N)  
   2. Did the Assistant Teacher engage in this activity: (Y/N)  
   3. Were the children actively engaged: (Y/N)
<p>| | | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>3.</td>
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<tr>
<td></td>
<td>1. Did the Head Teacher engage in this activity: (Y/N)</td>
<td></td>
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<tr>
<td></td>
<td>2. Did the Assistant Teacher engage in this activity: (Y/N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Were the children actively engaged: (Y/N)</td>
<td></td>
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<tr>
<td>4.</td>
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<tr>
<td></td>
<td>1. Did the Head Teacher engage in this activity: (Y/N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Did the Assistant Teacher engage in this activity: (Y/N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Were the children actively engaged: (Y/N)</td>
<td></td>
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<tr>
<td>5.</td>
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<tr>
<td></td>
<td>1. Did the Head Teacher engage in this activity: (Y/N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Did the Assistant Teacher engage in this activity: (Y/N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Were the children actively engaged: (Y/N)</td>
<td></td>
</tr>
</tbody>
</table>

Did the teachers make positive comments about PA to the children or in front of the children?

Environment

Was there PA equipment accessible to the children?

Were there PA displays from the IM/IL kits?

Did the teachers create their own displays pertaining to PA?

Were the children seated or sedentary for
20 minutes or more at a time?

* Structured physical activities are defined as those in which the teacher gives instruction and is engaged in the activity with them.

Observation Form for Fruit/Vegetable Activities

<table>
<thead>
<tr>
<th>Variables</th>
<th>Y/N</th>
<th># of occasions</th>
<th>Total time in minutes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit/Vegetable Activities during Large Group Time (unstructured)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Did the children use materials from the kits?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured Fruit/Vegetable Activities *</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Individual activities and times listed below)</td>
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</tr>
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<td>2.</td>
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<tr>
<td>3.</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Did the Head Teacher engage in activities: (Y/N)
2. Did the Assistant Teacher engage in activities: (Y/N)
3. Were the children actively engaged: (Y/N)
| 4. | 1. Did the Head Teacher engage in this activity: (Y/N)  
|    | 2. Did the Assistant Teacher engage in this activity: (Y/N)  
|    | 3. Were the children actively engaged: (Y/N)  
| 5. | 1. Did the Head Teacher engage in this activity: (Y/N)  
|    | 2. Did the Assistant Teacher engage in this activity: (Y/N)  
|    | 3. Were the children actively engaged: (Y/N)  

| Was the featured Fruit/Vegetable addressed? |  
| Did the teachers make positive comments about Fruits/Vegetables to the children or in front of the children? |  

**Environment**

| During breakfast, did the teachers eat the F/V? | Head Teacher:  
|    | Asst. Teacher:  
| During lunch, did the teachers eat the F/V? | Head Teacher:  
|    | Asst. Teacher:  
| Were there F/V learning resources accessible to the children? |  
| Were there F/V displays from the IM/IL kits? |  
| Did the teachers create their own |  

52
| displays or use other displays pertaining to F/V or Harvest of the Month? |   |   |   |
Appendix 7

Harrison Head Start

3/22/11

1. Age:

2. Highest level of education:

3. What is your race?
   - White, .......................................................... 1
   - Black or African American, ............ 2
   - American Indian,................................. 3
   - Eskimo or Aleut,................................. 4
   - Asian or Pacific Islander, or .......... 5
   - Other? (SPECIFY)................................. 6

4. Height:

5. Weight:

6. How many servings of fruits and vegetables do you eat each day?

7. Level of physical activity on a scale of 1 to 5 (with 1 being not physical active, 3 being moderately active 3-5 days a week, & 5 being high intensity exercise 5-7 days of the week):

8. How long have you been in your current field or profession?

9. Were you at the I am Moving/I am Learning-Harvest of the Month training in August?

10. Please feel free to leave any comments or concerns about the IM/IL-Harvest of the Month curriculum.
References:


