A Doctoral Project

entitled

Implementation of a Mentor Led Physical Activity Program among Disadvantaged Youth

by

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Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Doctor of Nursing Practice Degree

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Physical activity is an integral part of the war on pediatric obesity. Pediatric obesity is a worldwide epidemic affecting children of all races, classes, and gender. According to the Ohio Youth Risk Behavior Survey of 2013 over one third of Ohio children in grades nine through twelve were considered overweight or obese and engage in more than three hours of screen time, television, computers or video games daily. The purposes of this project was to introduce physical activity in the classroom environment in the form of physical activity breaks, led by physical activity leaders (PALs) to achieve improved BMI category, increase grade point average (GPA), and increase physical activity (measured by PACE score) of high school students in health class. The Larrabee’s Model for Evidence Based Practice Change was used to guide the planning, implementation, and evaluation of this evidence based project. The intervention was delivered to an inner city high school in West Central Ohio. Two health teachers and the project coordinator were enrolled and trained in Let’s Move Active Schools curriculum and served as PALs. The PALs designed physical activities and introduced physical actives in the classroom in the form of physical activity breaks for ten minutes. Thirty eight freshman students in health class completed 8-week program. Results showed that there were significant differences
in GPA and PACE score however there was no significant difference in body weight status due to short time frame of project. Project results will be disseminated to school administration with anticipation of inclusion of physical activity breaks for every classroom for the remainder of the school year and beyond.
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Implementation of a Mentor Led Physical Activity Program among Disadvantaged Youth

Overview of Clinical Issue

Pediatric obesity is a global public health crisis (Wang & Lim, 2012) and is one of the biggest public health challenges identified by the World Health Organization for the 21st century. Overweight is defined as having a body mass index between the 85th and 95th percentile, while obesity is defined as having a body mass index over the 95th percentile for age and weight per Centers for Disease Control (CDC) standardized growth charts (CDC, 2015).

Obesity prevalence decreases as household income and education levels increase, making obesity a problem of poverty (Potter, 2006; CDC, 2010, Grow et al, 2010) where health disparities are directly related to environment, access to healthcare, and health outcomes (Carter-Pokras & Baquet, 2002). Obesity affects one in three children with greater disparity in gender, socioeconomic status (less than 130% of Federal Poverty Income Ratio, PIR) (figure 1) and race.
In the United States, obesity in adolescents has more than quadrupled in the last 30 years (Ogden, Carroll, Kit, and Flegal, 2012), mirroring global obesity and overweight statistics. Healthy People 2010 goals for pediatric obesity were not achieved, highlighting an even greater need for prevention and intervention to impact obesity for the next decade. While there is a critical importance in achieving healthy weight before Kindergarten (Hernandez, 2014), daily physical activity is still a large part of intervention and prevention of pediatric obesity no matter the age of the child.

According to 2012 National Health and Nutrition Examination Survey (NHANES) only 25% of children ages 12-15 reported 60 minutes or more of physical activity per day and more than 50% of their waking hours engaged in sedentary behavior described as screen time (Borrud, 2012). Screen time includes television viewing, computer use, and video games.
Data from the 2009 Allen County Health Risk and Community Needs Assessment, cites cardiovascular disease in Allen County as a leading cause of death with 30% of the population reporting no exercise, although 77% reporting adequate opportunities to exercise, with 15% living below poverty level. These results have remained stagnant in the latest health rankings by state from the Robert Wood Johnson Foundation (2015). During routine third grade hearing and health screenings, inclusive of height and weight, in the 2009-2010 academic year, children in Allen County had BMI ranging from 34-44.6% with an average of 39.3%. The Ohio Department of Health (2008) identified 30% of Ohio youth as being obese making Ohio the 13th most obese state in the country with Black and Hispanic children significantly more overweight than their counterparts.

**Significance of Problem**

One third of children nationally and locally are considered obese. Obesity is associated with more than 40 different medical or psychological problems (Hoppin, 2004). Comorbidities can be divided into five categories: metabolic, anatomic, psychologic, degenerative, and neoplastic diseases (Hoppin, 2004; Barlow, 2007; Hudson, 2008). Although many of these chronic diseases are seen in adulthood, obesity in childhood has been proposed as the impetus.

In 2013 thirty percent of Ohio adults self-reported as being obese, while thirteen states, Ohio included, had adult self-reported obesity rates at or above thirty percent with estimated annual obesity attributable expenditures for Ohio in 2009 at $689.6 million (National Conference of State Legislatures, 2014). Total health-care costs attributable to obesity and overweight would double every decade to 860.7-956.9 billion US dollars by
2030, accounting for 16-18% of total US health-care costs (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008), making obesity a growing and constant concern among public health professionals.

In the high school environment, children no longer have access to recess, despite documented cognitive, social, physical and academic benefits (AAP, 2013). Ohio high schools are required to take one-half unit each of health and physical education for graduation requirements, with each school district allowing exemptions such as extracurricular activity substitutions for physical education class time (Ohio Graduation Checklist, 2014). Additionally, academic pressures both inside and outside the classroom with more high tech gadgets have led to less physical activity and more sedentary time. Implementing early intervention and prevention of pediatric obesity by increasing physical activity during the course of the school day, children will build a foundation of healthy active living and increased self-awareness of the need for daily physical activity.

Prevention makes more of an impact than treating a condition or complication, but only two to three percent of health care spending goes to preventative medicine according to the Allen County Health Risk and Community Needs Assessment (2009). Implementation of physical activity in the classroom is classified as primary prevention aimed at preventing the occurrence of chronic disease in healthy people. Schools have been cited as the prime opportunity for prevention and intervention in relation to dietary teaching and physical activity related to pediatric obesity (Hoppin, 2004; CDC, 2009; Barlow, 2007; Corbin, Kulinna, Dean et al., 2013; AAP, 2013; AlMarzooqi & Nagy, 2011; Kropski, Keckley, & Jensen, 2008). Implementation of a school based physical activity program led by physical activity leaders in the school classroom will increase
awareness of the need for daily physical activity, increase grade point average (Lees & Hopkins, 2013), and affect eventual health outcomes.

**Purposes**

The purposes of this project was to introduce physical activity in the classroom environment in the form of physical activity breaks, led by physical activity leaders (PALs) to achieve healthy body weight status, increase grade point average (GPA), and increase physical activity of high school students in health class. This is an evidence based project with the identified (P) population, (I) intervention, (C) comparison, (O) outcome, and (T) time (PICOT) to illustrate the purpose of this project. High school students (population) in an inner city high school, exposed to in class physical activity breaks lead by a PAL (intervention), compared to their previous regular activities in class (comparison) will demonstrate self-reported increased physical activity, improved BMI category, and increased GPA (outcome), over an eight week period (time). The goals of this project are to help high school students achieve improved BMI category and improve school academic performance by increasing regular physical activity.

**Guiding Frameworks**

The Larrabee’s Model for Evidence Based Practice Change and selected concepts from Bandura’s social cognitive theory were adopted to guide this project. The Larrabee change model provided a systematic method for assessment, planning, implementation, and evaluation of evidence based practice change in the clinical environment.

**Larrabee Change Model.** Originated in 1999 by Doctors Rosswurm and Larrabee, the model has undergone reconstruction, and in 2009 was renamed, Model for Evidence-Based Practice Change (Larrabee, 2009). This evidence based practice model
of change derives from theoretical and research literature, and outlines a systematic and organized approach to practice change in six steps (figure 2).

**Step 1. Assess the need for change in practice.** Major steps in this phase are identification of stakeholders; collection of internal data about current practice; comparing internal and external data to confirm the need for a practice change, identifying the practice problem; and linking the problem interventions and outcomes (Larrabee, 2009). Defining a PICOT question which identifies population, intervention, comparisons, outcome and time frame assist in refining the problem and lend support from the literature search. Identification of team members was essential to assist with school policy and routine.

**Step 2. Locate the best evidence.** Major steps in this phase are identifying types and sources of evidence; review research concepts, tools and methods of appraisal, planning the search and review; and conducting the search (Larrabee, 2009). Identification of the research question guided inclusion and exclusion of literature significant to the PICOT.

**Step 3. Critically analyze the evidence.** Major steps in this phase are critically appraising and weighing the strength of the evidence; synthesizing the best evidence; assessing the feasibility, benefits and risks of the new practice (Larrabee, 2009). Rapid critical appraisal was done for each article for inclusion or exclusion in relation to the project.

**Step 4. Design practice change.** Major steps in this phase are defining the proposed practice change; identify the needed resources; design the evaluation of the pilot, and design the implementation plan. Change strategies listed are change
champions, which proved to be the priority as the project moved forward, as well as opinion leaders, educational sessions, educational materials, reminder systems, and audit and feedback (Larrabee, 2009).

**Step 5. Implement and evaluate change in practice.** Major steps in this phase are implementing the pilot study; evaluating the processes, outcome and costs; developing conclusions and recommendations (Larrabee, 2009).

**Step 6. Integrate and maintain change in practice.** Major steps in this phase are communicating recommended change to stakeholders; integrating the new practice into standards of practice; monitoring the process and outcomes indicators; celebrating and disseminating the results of the project (Larrabee, 2009).

**Rationale.** This model, based on change theory, provides a guide in a systematic approach to the entire process of developing and integrating an evidence-based practice change. Practitioners need skills and resources to appraise, synthesize, and diffuse the best evidence into practice. The current model, Larrabee (2009) is adapted from the original model of Rosswurm and Larrabee (1999).
Step 1: Assess the need for change in practice
- Include stakeholders
- Collect internal data about current practice
- Compare external and internal data
- Identify the problem
- Link problem, interventions, and outcomes

Step 2: Locate the best evidence
- Identify types and sources of evidence
- Review research concepts
- Plan the search and review
- Conduct the search

Step 3: Critically analyze the evidence
- Critically appraise and weigh the evidence
- Synthesize the best evidence
- Assess feasibility, benefits, and risks of new practice

Step 4: Design practice change
- Define proposed change
- Identify needed resources
- Design the evaluation of the pilot
- Design the implementation plan

Step 5: Implement and evaluate change in practice
- Implement pilot study
- Evaluate processes, outcomes, and costs
- Develop conclusions and recommendations

Step 6: Integrate and maintain change in practice
- Communicate recommended change to stakeholders
- Integrate into standards of practice
- Monitor process and outcomes periodically
- Celebrate and disseminate results of project

Figure 2. Larrabee’s Model for Evidence-Based Practice Change (2009)
Social Cognitive Theory. Social cognitive theory (SCT), was first conceptualized in 1941 as social learning theory, and expanded on by Albert Bandura in the 1960s through his Bobo doll experiment (Bandura, Ross, & Ross, 1961). Social learning/cognitive theory claims that people learn through observing, imitating, and modeling (Bandura, Ross, & Ross, 1961). Three major influences of social cognitive theory are personal, behavioral, and environmental factors (figure 3).

**Figure 3.** Bandura Social Cognitive Theory (Bandura, Ross, & Ross, 1961)

**Personal.** In the personal realm, one forms beliefs about what they can do, anticipate consequence, set goals, and plan a course of action based on expectations, persuasion, and accomplishments.

**Behavioral.** A second influencing factor is behavior which is based on three components of self being, observation, judgment, and reaction. Self-observation is looking at ones behaviors and keeping track of their actions. Self-judgment is
comparison of observations with standards set forth by self or environmental factors. Self-reaction is reward or denial of reward whether or not the expectation is met.

**Environmental.** The environmental realm encompasses two sub sections; reinforcement and observational learning. Environmental reinforcement are behaviors present subsequent to a stimulus that can be negative or positive. Observational learning is simply learning from others and in children acquiring new responses.

Adult modeled mentoring is an effective approach in social cognitive theory in promoting health behaviors among both adults and adolescents, and is an effective intervention for hard to reach and marginalized populations (Petosa & Smith, 2014). Social cognitive theory supports these findings suggesting that adult leaders and peer mentors have the ability to strongly influence each other because people are more likely to imitate the behavior of those they see as similar to themselves (Petosa & Smith, 2014). In the school environment, adult modeling is an optimal technique for introduction and implementation of physical activity where everyone in the class is participating and included

**Review of the Literature**

**Search Strategies**

Literature search strategies for this project utilized databases from CINAHL, PubMed, Google Scholar, Cochrane Reviews, and Medline. Keywords used to facilitate search applicability were “Pediatric Obesity”, “Pediatric Obesity AND Interventions”, “Pediatric Obesity AND Interventions AND Schools”, “School Based Interventions AND Obesity”, “Physical Activity for Adolescents”, “Impact of school based physical activity on grade point average, and lastly “Social Cognitive Theory” (SCT). Search limits were
applied as (1) age of child between 13 and 18; (2) male and female genders, (3) English language; (4) published in last ten years; and (5) full text articles. Results of search are listed in table 1.

Excluded articles were over ten years old and those not accessible by electronic means or full text access. Other exclusion criteria were interventions focused on decreasing screen time, nutrition intervention or education without physical activity, qualitative studies, and non-English Language. The University of Toledo library system was used to conduct the search.

Another facet of inclusion or exclusion was internal and external validity of the article. Internal validity was established with the independent variable, type of programming intervention, influencing the dependent variable, physical activity and BMI. External validity was established by generalizability of studies reviewed compared to project site setting and population. Thirteen studies were included to support the PICOT.

**Table 1. Literature Search Strategy**

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**Level and Strength of Evidence**

Rapid critical appraisal methods utilized for this project adhered to published, structured, and standardized criteria on evaluative instruments from Larrabee (2009). Critical appraisal tools guide information collection and allow for rapid side by side comparison of level of evidence, strength of evidence, and quality of evidence in addition to relevance of literature specific to the clinical question. The appraisals of studies for this project were searched by PICOT statement and specified to school based interventions for obesity in addition to cognitive behavioral therapy and academic performance with physical activity. Interventions were consistent across the studies inclusive of physical activity in many forms from walking to dancing, lifestyle changes, and dietary modification.

Larrabee (2009) outlines a hierarchy of evidence; 1a, 1b, 1c, 2a, 2b, 3a, 3b, 4, and 5 to rank literature that varies in quality and credibility. Systematic reviews with homogeneity rank at the top, 1a, of the hierarchy, a properly randomized randomized control trial (RCT) with narrow confidence ranks a 1b, while a well-designed controlled trial without randomization ranks a 1c. Level 2a warrants a systematic review of cohort studies with homogeneity, while 2b is one cohort study. Level 3 is a systematic review of case control studies with homogeneity, while level 3b is one case control study. Level 4 is descriptive correlational studies, descriptive comparative studies or case series. Level 5 is opinions of well-respected clinical experts, descriptive studies, case reports, or reports from expert committee (table 2). Quality of evidence in the Larrabee model was adapted from rating scales used in AHCPR research reviews (Rosswurm & Larrabee, 1999) based on validity, reliability, and applicability to practice.
**Table 2.** Larrabee’s 2009 Hierarchy of Evidence

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<td>One properly randomized RCT with narrow confidence interval</td>
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<td>Well designed controlled trials without randomization</td>
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<td>2a</td>
<td>Systematic review of cohort studies with homogeneity</td>
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<td>2b</td>
<td>One cohort study</td>
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<tr>
<td>3a</td>
<td>Systematic review of case controlled studies with homogeneity</td>
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<tr>
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<td>One case control study</td>
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<td>Descriptive correlational studies, descriptive comparative studies, case series</td>
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<tr>
<td>5</td>
<td>Opinions of respected clinical experts, descriptive studies, case reports, or reports from expert committees</td>
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**Critical Appraisal of Literature**

Table three illustrates appraisal of literature guided by the PICOT. Interventions and outcomes varied among the thirteen studies with the least reliable predictor being BMI. School based interventions did not include scheduled physical education class but additional in class physical activity breaks in the classroom.

In the integrative research review of ten studies, by Cole, Waldrop, D’Auria, and Garner (2006) looked at theoretical and methodological characteristics of school based interventions using healthy lifestyle education, dietary habits, and/or physical activity in children ages 4-14. This review was included because it identified use of social cognitive theory in 80% of the studies, directly supporting social contexts of children influence children increasing acceptance, values and standards of their society. Healthy lifestyle education was used in 90%, dietary habits in 40% and physical activity in 80% of reviews. Four of the studies used a combination of all three interventions, three used a combination of two interventions, and three only used one intervention. The intervention of physical activity was used in all but two of the studies reviewed and ranged from three
times a week dance class to a 15 minute daily walk before class. Outcomes were reviewed on BMI, weight, and found girls to have greater weight loss than boys.

In the umbrella review from Safron, Cislak, Gaspar, and Luzcszynska (2011), seventeen systematic reviews and five meta-analyses, examining 196 trials, were reviewed to analyze the effectiveness of school based interventions based on diet, physical activity, with only one review inclusive of behavior intervention. BMI was the overarching outcome indicator, however there were consistently mixed results. Findings supported interventions were more effective if they focused on reduction in sedentary behavior, added moderate to vigorous physical activity and parental involvement lasting at least three months. This article was retained because the aim was at the general population of school based interventions, versus a preselected population of children at risk for obesity, in addition to physical activity.

The systematic review from Kropski, Keckly, and Jensen (2008) was specific to experimental or quasi-experimental studies and focused on school based interventions of obesity. Of the 14 studies reviewed only one used nutrition alone, two focused on physical activity alone, and eleven combined components of both physical activity and nutrition. This study, demonstrated the need for decreased carbonated beverages, and although inconclusive of outcomes, was retained because of utilization of social learning theory and the support for use in girls which directly supports data of the community needs assessment of girls having higher rates of obesity and less physical activity than boys.

To investigate utilization of a theoretical framework in obesity intervention, the systematic review from AlMarzooqi and Nagy (2011) looked at 22 intervention studies
by type, duration, outcomes measured, and significance of the intervention. Of the 22 studies reviewed, 10 focused on individual behavior changes, four used social learning theory, 12 had nutrition policy changes, and only nine showed significant outcomes. Outcomes were increased physical activity, decreased sedentary time, and decreased BMI. This study was retained because it supported interventions, whether nutrition or physical activity, in a school environment where the article cites is the best setting for childhood obesity intervention.

In the Cochrane review from Waters, de Silva-Sanigorski, Burford et al. (2011) the aim was to update the previous review and to determine the effectiveness of physical activity programs lasting 12 weeks or more with outcomes grouped by adiposity measures, physical activity, or diet related behaviors, posing the question “What works for whom, why and for what cost?” According to search criteria, 55 studies were included, with an 82% rate of homogeneity among studies, better outcomes with children ages 6-12. The question posed was answered with a synthesis of articles concluding that school curriculum inclusive of healthy eating, activity, and body image, increased sessions for physical activity in the school, environments that support being active throughout the day, and support for teachers to implement health promotion strategies.

The literature review of 51 intervention studies from Shaya, Flores, Gbaryor and Wang (2008) used school based interventions and anthropometric measures for obesity interventions in children ages 6-19. Interventions ranged from four weeks to eight years, with 15 studies utilizing physical activity only, 16 studies used educational models with behavior modification, 20 studies used both, and 31 utilized quantitative measures such
as anthropometrics to measure efficacy of intervention. A total of 40 studies were statistically significant for quantitative measures.

In the systematic review from Kothandan (2014) family and school based intervention were compared in treatment of obesity. Of the 13 studies reviewed, five were school based and eight were family based with ages of children between six and seventeen and studies ranging from one month to three years. Findings revealed family based interventions were most effective for children under age 12 and school based interventions were more effective for children over age 12. This review was included because of the focus being school based and the ages of children up to age 17.

In the randomized control trial of population based interventions, from kindergarten to high school, Sharma (2006) identified 11 reviews with outcomes of decreased television time (36%), increased physical activity (73%), and a change in nutrition behaviors (55%). Although decreased TV time (increased physical activity), decreased carbonated beverages was found to be the most modifiable, nutrition and physical activity were also beneficial. Additionally, SCT formed the basis for 55% of studies reviewed. This study was retained secondary to use of SCT and school based interventions as well as specified interventional programs focused on a specific population.

In the integrative review from Zenzen and Kridli (2009) dietary interventions (88%) and physical activity (88%) interventions were utilized in school obesity programs. All studies implemented healthy lifestyle education, 56% utilized family involvement, and 56% evaluated effect on BMI, based on duration of intervention, use of a theoretical framework, strength of evidence supporting each study. This was included because six
studies reviewed by Sharma (2006) were also reviewed in this article by Zenzen and Kridli (2009) and the comparative nature of the crossover studies supported use of definitive programming in implementation of physical activity in a school environment. Again, the BMI remains controversial when measured as an outcome.

Aerobic physical activity (APA) has a positive association on academic, behavioral and psychosocial functioning (Lees & Hopkins, 2013). In the review of eight qualitative studies, a positive impact was measured in academic progress, reduced depression, and increased self-esteem without dose (time) dependent relationship. Interventions ranged from timed physical activity to measured heart rates or by accelerometry. Outcome measures varied from the Beck depression inventory to cognitive test battery to Wechsler Intelligence Scale for children. The biggest weakness of the studies included was small participant numbers and short follow up. Interestingly, there was also evidence to support the synergistic effect of APA on academic performance.

Basch (2011) supports the data of the local community needs assessment citing lack of physical activity being disproportionately higher in urban Hispanic and Black children with greater health disparities, additionally citing that the populations with the least physical activity also have least access to school based physical activity opportunities and resources. In class physical activity has a powerful positive influence on brain, physical health, and ability to learn with favorable affects on cognitive functioning secondary to increased oxygen saturation and increased brain neurotransmitters.
In the review of 23 randomized control studies from Budd and Volpe (2006), Bandura’s social cognitive theory was cited as most often used theoretical perspective summoning self-efficacy, planning and action. Cultural, social, and community factors also exert influence and affect behavior change. Of the 23 studies reviewed, 12 were school based. Four of the studies had obesity prevention as the priority, four listed obesity prevention as the primary outcome, three highlighted increasing physical activity, and the remaining focused on improving multiple risk factors for heart disease including obesity. The statistic that the probability of adult obesity increases from 60% in overweight children at age nine to 80% in overweight 17 year olds, highlights the need for interventions in adolescents.

Mura et al (2015) cite that schools are the ideal setting to implement physical activity programming. In the review of 31 articles the setting was homogenous in the school setting, while the interventions were varied by type, intensity, and duration. Six of the studies took place in the classroom, fifteen were classified as curricular, and seven were classified as either extracurricular or afterschool. Only five schools used a structured program while the other schools used age appropriate physical activity in the course of the curriculum and class time. Outcomes varied from academic performance to attention to BMI, and cognitive performance. Assessments also varied and ranged from paper testing to 800 meter run time, MRI results and laboratory profiles. Twenty one out of twenty eight interventions showed a positive effect of exercise in at least one academic outcome with more positive findings regarding cognition.
Table 3. Critical Appraisal of Literature

<table>
<thead>
<tr>
<th>Citation</th>
<th>Framework</th>
<th>Design/Method</th>
<th>Sample/Setting/Size</th>
<th>Variables</th>
<th>Measurement</th>
<th>Strengths/Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cole, Waldrop, D’Auria, Garner 2006</td>
<td>Social cognitive theory</td>
<td>Integrative Research Review</td>
<td>N= 10 studies</td>
<td>Healthy lifestyle education Nutrition PA</td>
<td>Outcome BMI/weight</td>
<td>90% school based interventions 40% manipulated nutrition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setting: school</td>
<td>Setting: school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safron, Cislak, Gaspar, Luzcszynska 2011</td>
<td>none</td>
<td>Systematic umbrella review</td>
<td>N=17 reviews of 196</td>
<td>Diet PA BH</td>
<td>Outcome BMI, obesity prevalence reduction, other weight related indices, PA</td>
<td>school based interventions more effective among children than adolescents PA vs nutrition not clear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inclusive of post-test, randomized control design,</td>
<td>trials Time frame</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>quasi experimental</td>
<td>2-36 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kropski, Keckly, Jensen, 2008</td>
<td>Grounded social learning</td>
<td>Systematic review to identify experimental or quasi-experimental school based interventions</td>
<td>N=14 School based</td>
<td>Nutrition only PA only Combination</td>
<td>Improvement in one area dietary/PA/or sedentary behaviors</td>
<td>Social learning more appropriate for girls Environmental interventions for PA better for boys</td>
</tr>
<tr>
<td>Citation</td>
<td>Framework</td>
<td>Design/ Method</td>
<td>Sample/ Setting/ Size</td>
<td>Variables</td>
<td>Measurement</td>
<td>Strengths/ Limitations</td>
</tr>
<tr>
<td>----------------------------------</td>
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<td>----------------------------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>AlMarzooqi, 2011</td>
<td>none</td>
<td>SR</td>
<td>N=22 studies 10 interventions</td>
<td>PA Nutrition BH</td>
<td>BMI</td>
<td>Schools best setting for obesity intervention</td>
</tr>
</tbody>
</table>
| Waters, de Silva-Sanigorski, Burford et al. 2011 | None      | SR (Cochrane Review) | N=37 out of 55 potential studies | Adiposity PA Diet         | Intervention implementation Cost, equity, outcomes | Meta-Analysis  
Strong evidence to BMI change  
School curriculum changes  
PA time at school  
Staff support for PA |
| Shaya, Flores, Gbaryor, Wang 2008 | none      | Literature Review for school based intervention duration, type, outcomes | N =51 out of 77 potential intervention type duration outcomes measures significance of intervention | PA programs Health/fitness education models Dietary regimens | PA programs | 86% Physical activity interventions  
75% educational only  
75% combination PA/education |
| Kothandan, 2014                  | none      | RCT using CASP | N=13 of 1231 potential 8 family based 5 school based N=2067 | PA Diet/Nutrition Health promotion Combo of all | Height/weight BMI | School more effective for 12-17 year olds  
Family more effective for under 12 years |
<table>
<thead>
<tr>
<th>Citation</th>
<th>Framework</th>
<th>Design/Method</th>
<th>Sample/Setting/Size</th>
<th>Variables</th>
<th>Measurement</th>
<th>Strengths/ Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharma, 2006</td>
<td>none</td>
<td>SR of school based interventions between 1999-2004</td>
<td>N=11</td>
<td>Nutrition PA, Out of school Carbonated drinks, Family involvement</td>
<td>BMI, Nutrition knowledge, TV view time</td>
<td>Population based interventions for obesity 63% in elementary 81% PA/diet 27% on TV time 73% SCT</td>
</tr>
</tbody>
</table>
| Budd & Volpe, 2006   | none      | SR of RCT                   | N=12 of 23 potential 3 increased PA 4 CV risk reduction | BMI, Cholesterol, Lipids, Skin folds, Resting HR, Nutrition knowledge, Fat/sugar intake | BMI, BP, Diet recall, TV/Screen self-report, Timed run, Knowledge/behaviors | Pre-post measure of change  
Interventions geared to age of student  
Behavior mod  
PA out of PE |
| Zenzen & Kridli, 2009 | Coopers describe degree of variability in method/theory | Integrative literature review | N= 8 of 16 potential | Dietary PA, Healthy lifestyle, Family involvement | BMI, Weight loss | 25% SCT  
25% Trans-theoretical model  
2 Pender’s Health promotion |
| Basch, 2011          | None      | Literature review           |                     | Physical activity, Cognitive scores | Academic/cognitive achievement | Weight control  
Improved mental/emotional/cognitive health |
<table>
<thead>
<tr>
<th>Citation</th>
<th>Framework</th>
<th>Design/ Method</th>
<th>Sample/ Setting/ Size</th>
<th>Variables</th>
<th>Measurement</th>
<th>Strengths/ Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lees &amp; Hopkins, 2013</td>
<td>none</td>
<td>Systematic review</td>
<td>N=8</td>
<td>APA Cognitive scores</td>
<td>Beck depression inventory</td>
<td>Tool validity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cognitive and achievement testing</td>
<td></td>
<td>Sample sizes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Length of study</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reduced depression</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Increased self-esteem</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Improved academic scores</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Greater functional/anatomic brain changes increased hippocampal, basal ganglia, frontal and parietal cortex</td>
</tr>
</tbody>
</table>
Synthesis of Evidence

Table four illustrates a side by side comparison of synthesis and level of evidence according to Larrabee (2009). The level of evaluated studies in addition to strength resulted in selection of thirteen quality studies utilizing standardized worksheets based on criteria from Rosswurm and Larrabee (1999). Utilizing the criteria of validity, reliability, and applicability according to Larrabee (2009), none of the studies were of low quality with a majority being acceptable quality. The focus of this project is introduction of physical activity in the classroom utilizing Larrabee’s model for evidence based practice change and Bandura’s social cognitive theory of behavior.

Programming geared to obesity prevention and intervention centers around two main concepts of increased physical activity and nutrition education. Physical activity, as the focus of this project, is the central intervention cited in each study. While the format of physical activity differs by programming from explicit, Planet Health (Budd & Volpe, 2006) to introductory level, all interventions were school based varying from weeks to years in duration. In the evidence based reviews from Kropski, Keckley, and Jensen (2008), Sharma (2006), Budd and Volpe (2006), Zenzen and Kridli (2009), AlMarzooqi and Nagy (2011), Safron, Cislak, Gaspar, et al. (2011), Kothandan (2014), Waters, de Silva-Sanigorski, Burford, et al. (2011), Cole, Waldrop, D’Auria et al. (2006), and Shaya, Flores, Cbarayor et al. (2008) all identified physical activity as an intervention alone or in addition to nutrition education in a school based environment. Additionally, AlMarzooqi and Nagy (2011), Waters, de Silva-Sanigorski, Burford, et al. (2011), and Sharma (2006) identified the need for a component of behavioral health intervention with the overarching theme of social cognitive theory. Ages and grades of children in the reviews
varied from elementary to high school with more success in outcomes, related to BMI, in structured activity identified in lower grades (Sharma, 2006) where physical education classes are compulsory and recess is still available in comparison to high school curriculums. In another venue, Kothandan (2014), compared effectiveness of family intervention (n=8) to school based intervention (n=5) in treatment of pediatric obesity finding that interventions were more successful in the family based group for younger children and school based intervention were more successful in older children.

Organized extracurricular activities and sports clubs, were excluded in all reviews.

Change in body mass index was largely measured as an outcome indicator in all reviews except with other anthropometrics measured in reviews from Safron, Cislak, Gaspar, et al. (2011), Shaya, Flores, Cbarayor et al. (2008), and Sharma (2006).

**Table 4. Quality/Level of Evidence**

<table>
<thead>
<tr>
<th>Citation</th>
<th>Outcomes</th>
<th>Interventions</th>
<th>Level of Evidence</th>
<th>Quality of evidence High/acceptable/low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cole, Waldrop, D’Auria, Garner, 2006</td>
<td>BMI/weight/</td>
<td>Education/dietary intervention/PA</td>
<td>2a</td>
<td>acceptable</td>
</tr>
<tr>
<td>Safron, Cislak, Gaspar, Luzczynska 2011</td>
<td>BMI, anthropometric measures</td>
<td>PA/nutrition</td>
<td>2a</td>
<td>acceptable</td>
</tr>
<tr>
<td>Kropski, Keckly, Jensen, 2008</td>
<td>BMI</td>
<td>Nutrition/PA</td>
<td>2a</td>
<td>acceptable</td>
</tr>
<tr>
<td>AlMarzooqi, 2011</td>
<td>BMI</td>
<td>PA/nutrition/BH</td>
<td>2a</td>
<td>acceptable</td>
</tr>
<tr>
<td>Waters, de Silva-Sanigorski, Burford et al., 2011</td>
<td>Combination intervention yielded better outcomes, more diversity</td>
<td>Nutrition education PA</td>
<td>1a</td>
<td>high</td>
</tr>
<tr>
<td>Shaya, Flores, Gbaryor, Wang,</td>
<td>BMI, anthropometrics,</td>
<td>PA/health and fitness education/</td>
<td>2a</td>
<td>acceptable</td>
</tr>
<tr>
<td>Citation</td>
<td>Outcomes</td>
<td>Interventions</td>
<td>Level of Evidence</td>
<td>Quality of evidence</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>2008</td>
<td>BP, lab results, qualitative variables</td>
<td>nutrition education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kothandan, 2014</td>
<td>Family more effective for kids, School more effective for teens, Weight/BMI</td>
<td>Family BH/PA/Nutrition vs School based intervention of PA/nutrition</td>
<td>2a</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Basch, 2011</td>
<td>Weight control, Improved mental/emotional/cognitive health</td>
<td>PA</td>
<td>2a</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Lees &amp; Hopkins, 2013</td>
<td>Reduced depression, Increased self-esteem, Improved academic</td>
<td>PA</td>
<td>2a</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Mura, Vellante et al, 2015</td>
<td>Improved math, reading, academic performance, Greater functional/anatomic brain changes, increased hippocampal, basal ganglia, frontal and parietal cortex</td>
<td>PA</td>
<td>2a</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Sharma, 2006</td>
<td>All interventions need BH BMI/anthropometrics</td>
<td>PA/Nutrition/SCT</td>
<td>2a</td>
<td>acceptable</td>
</tr>
<tr>
<td>Budd &amp; Volpe, 2006</td>
<td>Reduction in body weight or prevention of weight gain/increased PA</td>
<td>“Planet Health” classroom education /behavioral modification decrease TV time,</td>
<td>2a</td>
<td>acceptable</td>
</tr>
</tbody>
</table>
According to the literature, the physical activity leader (PAL) interventions were effective in decreasing BMI and increasing physical activity in the adolescent population and illustrate a positive association with academic achievement (Lees & Hopkins, 2013) and psychosocial functioning. Conversely, there is controversy when utilizing BMI measures as outcome indicators in children secondary to height and weight growth velocity during adolescence as cited in literature from Safron (2011), Budd (2006) and Zenzen (2009). Table 5 illustrates comparisons of effectiveness of physical activity interventions led by PAL across different studies. Physical activity, led by PAL was identified in each article with the addition of family intervention noted in the Kothandan (2014) article.

An emerging theory of academic achievement resulting from increased physical activity reinforces the need for increased physical activity breaks in the classroom environment. Mura et al (2015), Basch (2011), and Lees and Hopkins (2013) all identify the benefits to academic and cognitive achievement with the addition of physical activity during the course of the school day. Mura et al (2015) include magnetic resonance...
imaging and brain patterning, demonstrating a degree of plasticity, in the course of their systematic review defining increased brain volumes in areas specific to academic performance and ultimate success.

BMI measures in children remain controversial. Calculation of BMI for adults and children are the same however the interpretation is different. The CDC cites that for adults, BMI classifications do not depend on age or sex. For children and adolescents between 2 and 20 years old, BMI is interpreted relative to a child’s age and sex, because the amount of body fat changes with age and varies by sex. Percentiles specific to age and sex classify underweight, healthy weight, overweight, and obesity in children. The BMI-for-age determined for an individual indicates the relative position of the child’s BMI value among children of the same sex and age. BMI is a reasonable indicator of body fat for both adults and children (CDC, 2105). Because BMI does not measure body fat directly, it should not be used as a diagnostic tool. Safron et al (2011) cite that a lack of larger effect on BMI secondary to interventions being population based with behavior strongly impacting outcomes. Budd and Volpe (2006) agree that outcomes that measure a change in BMI are a more sensitive indicator in girls than boys. Additionally, none of the studies in the review from Zenzen and Kridli (2009) achieved an outcome significantly lowering BMI citing a multifactorial nature and impossibility to make a direct correlation between duration of study and effect on BMI.

**Table 5.** Comparative Effectiveness of Physical Activity Intervention Led by PAL

<table>
<thead>
<tr>
<th>Citation</th>
<th>Outcomes</th>
<th>Peer mentored/PAL</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cole et al., 2006</td>
<td>BMI/weight/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Safron et al., 2011</td>
<td>BMI/anthropometrics/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Kropski et al., 2008</td>
<td>BMI/anthropometrics/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Study</td>
<td>BMI/PA</td>
<td>PAL</td>
<td>Benefit</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------</td>
<td>-----------</td>
<td>------------</td>
</tr>
<tr>
<td>AlMarzooqi, 2011</td>
<td>BMI/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Waters et al., 2011</td>
<td>BMI/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Shaya et al., 2008</td>
<td>BMI/anthropometrics/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Kothandan, 2014</td>
<td>BMI/anthropometrics</td>
<td>Family/PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Sharma, 2006</td>
<td>BMI/anthropometrics</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Budd et al., 2006</td>
<td>BMI/anthropometrics/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Zenzen et al., 2009</td>
<td>BMI/anthropometrics/PA</td>
<td>PAL</td>
<td>Beneficial</td>
</tr>
</tbody>
</table>

PAL=Physical Activity Leader, BMI=Body Mass Index, PA=Physical Activity, ND=Not Defined

**Physical Activity Guideline Appraisal**

The 2008 Physical Activity Guidelines for Americans were the first comprehensive guidelines ever to be issued by the Federal government (HHS, 2008).

The guidelines were developed by a panel of 13 experts from fields of exercise science and public health, providing achievable steps for youth, adults and seniors as well as people with special health conditions to live longer, healthier lives (HHS, 2008). These guidelines outline health benefits of physical activity for all ages with additional safety measures and special populations addressed and will serve as the foundation for this project.

The American Academy of Pediatrics (2014), Centers for Disease Control (2014), SHAPE America (2013), and the US. Department of Health and Human Services (2008) all agree and have outlined the need for moderate to vigorous physical activity for children a minimum of 60 minutes daily. The 2008 guidelines outline three specific needs for children’s physical activity, aerobics, muscle strengthening, and bone strengthening activities for a recommended 60 minutes of physical activity each day. The AGREE II tool (Brouwers et al., 2010) will be utilized to evaluate the guidelines.

**Guideline Evaluation by Agree II Tool**
The purpose of the Agree II tool is to assess the quality and reporting of practice guidelines, provide a methodological strategy for development of guidelines, and to inform what and how information ought to be reported in guidelines (Brouwers et al., 2010). There are six quality domains encompassing 23 specific criteria on the AGREE II tool: scope and purpose; stakeholder involvement; rigor of development; clarity of presentation; applicability; and editorial independence. The 2008 Physical Activity Guidelines (PAGs) for Americans will be using the AGREE II instrument. Three evaluators; the principal investigator, a physical education teacher, and the school nurse evaluated and ranked each of the 23 items (table 6).

**Table 6.** Evaluation of Physical Activity Guidelines by AGREE II Tool

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>Rater 1</th>
<th>Rater 2</th>
<th>Rater 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope and Purpose</strong></td>
<td>1. The overall objective(s) of the guideline is (are) specifically described</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2. The health question(s) covered by the guideline is (are) specifically described</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><strong>Stakeholder Involvement</strong></td>
<td>4. The guideline development group includes individuals from all the relevant professional groups</td>
<td>6</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5. The views and preferences of the target population (patients, public, etc.) have been sought</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6. The target users of the guideline are clearly defined</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>7. Systematic methods were used to search for evidence</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Rigor of Development</strong></td>
<td>8. The criteria for selecting the evidence are clearly described</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>9. The strengths and limitations of the body of evidence are clearly described</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>10. The methods for formulating the recommendations are clearly described</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Domain</td>
<td>Item</td>
<td>Rater 1</td>
<td>Rater 2</td>
<td>Rater 3</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
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<td>---------</td>
</tr>
<tr>
<td>Clarity of Presentation</td>
<td>11. The health benefits, side effects, and risks have been considered in formulating the recommendations</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>12. There is an explicit link between the recommendations and the supporting evidence</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>13. The guideline has been externally reviewed by experts prior to its publication</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>14. A procedure for updating the guideline is provided</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Applicability</td>
<td>15. The recommendations are specific and unambiguous</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>16. The different options for management of the condition are clearly presented</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>17. Key recommendations are easily identifiable</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Editorial Independence</td>
<td>18. The guideline describes facilitators and barriers to its application</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>19. The guideline provides advice/tools on how the recommendation can be put into practice</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>20. The potential resource implications of applying the recommendations have been considered</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>21. The guideline presents monitoring/auditing criteria</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Overall Assessments</td>
<td>22. The views of the funding body have not influenced the content of the guideline</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>23. Competing interests of guideline development group members have been recorded and addressed</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Rate the overall quality of this guideline Rating Scale: from 1 the lowest possible quality to 7 the highest possible quality</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Overall Assessments</td>
<td>I would recommend this guideline for use. Rating Scale: from 1- Yes, 2- Yes with modifications, and 3-No</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

The first section of the AGREE II tool is the scope and purpose domain. This domain includes the following items: overall objectives specifically described, health
questions covered by the guideline are specifically described, and the population to whom the guideline is meant to apply is specifically described (Brouwers et al., 2010). In domain one, the 2008 Physical Activity Guidelines for Americans scaled score was 100% with specific rationale noted with health intents, expected outcomes, targets identified, interventions recommended, and special populations noted.

The second section of the AGREE II tool is the stakeholder involvement domain. This domain includes the following items: the guideline development group includes individuals from all relevant professional groups, the views and preferences of the target population have been sought, the target users of the guideline are clearly defined and systematic methods were used to search for evidence (Brouwers et al., 2010). In domain two, the 2008 Physical Activity Guidelines for Americans scaled score was 76% with descriptors relative to professional input, as well as the guideline was well written with a specified audience listed, although, views and preferences of target population were not described.

The third section of the AGREE II tool is the rigor of development domain. This domain includes the following items: criteria for selecting evidence is clearly described, strengths and limitations of body of evidence are clearly described, methods for formulating recommendations are clearly described, the health benefits, side effects, and risks have been considered in formulating recommendations, there is an explicit link between recommendations and supporting evidence, the guideline has been externally reviewed by experts prior to publication and a procedure for updating the guideline is provided (Brouwers et al., 2010). In domain three, the 2008 Physical Activity Guidelines for Americans scaled score was 58%. In criterion seven there was no mention
of systematic method to search for evidence. Search criteria were not described, strengths and limitations of body of evidence were not described, and vague links to recommendations from evidence was made, although evidence was not cited. The guideline review panel is unclear and there is no procedure noted for updating the guideline. Clarity of guideline, targeted populations, and documentation on how the guideline was developed was illustrated.

The fourth section of the AGREE II tool is clarity or presentation. This domain includes the following items: recommendations are specific and unambiguous, different options for management of the condition are clearly presented, and key recommendations are easily identifiable (Brouwers et al., 2010). In domain four, The 2008 Physical Activity Guidelines for Americans scaled score was 100% as there are clearly written and explained action plans for specific age groups and special populations. This guideline is a plan for increased physical activity and is noted as a prevention strategy for health.

The fifth section of the AGREE II tool is applicability. This domain includes the following items: the guidelines describes facilitators and barriers to application, guideline provides advice on how recommendations can be put into practice, potential resource implications of applying the recommendations have been considered, and the guideline presents monitoring criteria (Brouwers et al., 2010). In domain five, the 2008 Physical Activity Guidelines for Americans scaled score was 86% as there are specified content and utilization guides identified. There is a published road map for implementation, and additional sources for support, with additional links to outside sources of information, although there is no description of barriers or facilitators was noted.
The sixth and final section of the AGREE II tool is editorial independence. This domain includes the following items: the views of the funding body have not influenced the content of the guideline, and competing interests of guideline development group members have been recorded and addressed (Brouwers et al., 2010). In domain six, the 2008 Physical Activity Guidelines for Americans scaled score was 100% as this guideline comes directly from the government of the U.S. and a letter from the secretary of health and human services is included in the guideline without notation of competing interests. This 2008 Physical Activity Guidelines for Americans guideline is of high quality and is recommended for this project.

In summary, the overall quality of the 2008 Physical Activity Guidelines for Americans is a five. A rating of one on the scale indicates the lowest possible quality and a rating of seven indicates the highest quality. The quality rating is based on the evaluation of three individual appraisers of the current guideline utilizing the AGREE II tool. Based on the AGREE II tool evaluation findings, the 2008 Physical Activity Guidelines for Americans is recommended for this project.

**Essentials of DNP**

This project had addressed all eight DNP essentials which were summarized by the AACN (2006). The first essential is scientific underpinnings for practice. Nursing is derived from both social and natural sciences with contributions from principles governing human life in stages of sick or well (AACN, 2006). Integration of science and ethics provides the highest level of nursing care. In the course of this project, scientific evidences to support the need for physical activity to prevent the onset of chronic illness were identified through the use of literature searches supporting evidence based practice.
The biologic and social sciences are integrated in this project to identify methods of preventative health and implementation with children.

The second essential is organizational and systems leadership for quality improvement and systems thinking. The nursing process is a major theme in this essential. Assessment and identification of a health issue, and optimizing health care delivery (AACN, 2006) through facilitating change. In relation to the context of this project, pediatric obesity is a priority public health concern with two avenues of change making the most impact dietary improvement and physical activity. Change can be implemented in many forms from mandates (school lunch programs) to independent change agents such as this project. A physical activity deficit in students was identified. The community was assessed and a strategy for improvement was developed. The proposal was presented to school administration and approved for implementation.

Essential three is clinical scholarship and analytical methods for evidence based practice. Nursing care, observations, and interventions from evidence based literature build practice guidelines, and build collaborative relationships outside nursing (AACN, 2006). A part of this essential is built on the Institute of Medicine (IOM) quality guidelines to promote safe, effective, efficient, equitable, and patient centered care and application of science to nursing care (AACN, 2006). In this project, relevant literature was accessed and formed the foundation of the project proposal from guidelines establishing recommendations for physical activity for children. These guidelines were adopted and provided the outline for project implementation.

Essential four is information systems and technology for improvement and transformation of health care (AACN, 2006). Literature searches have never been easier.
with utilization of technology to harness the plethora of scientific resources. Additionally, electronic health records hold enormous amounts of patient data relevant to research and process improvement. Utilization and evaluation of data is paramount in care delivery specific to patient populations and diagnosis. In the course of this project, on-line database searches were accomplished with the assistance of the indispensable university librarian. Literature was searched, filtered and reviewed in accordance with Larrabee’s model of rapid appraisal for scientific appraisal. Relevant statistics were extracted and translated into useable language for school administrators.

Essential five is healthcare policy for advocacy in health care (AACN, 2006). Expert influence is integral to health care advocacy from the front lines and advanced practice nurses are perfectly poised to influence health care policy with their expertise. For this project, a highly vulnerable population was identified with a deficit in preventative health care and the current graduation requirements for Ohio resulting in a growing problem of pediatric obesity. The opportunity for change was identified, scientific evidence supported and validated a need for practice change, and a plan for implementation was formulated approved and adopted with support from school administration.

Essential six is inter-professional collaboration for improving patient and population health outcomes (AACN, 2006). The IOM has outlined a mandate to employ safe, timely, equitable, effective, efficient, and patient centered care. Nursing identifies deficits in health care, consults and builds practice models, and collaborates for best outcomes. Collaboration outside of nursing completes the cycle of change and encourages inclusivity from other experts to improve the patient experience. This project
utilized the resources of public health professionals, teachers, administrators, and mentors inside the nursing community.

Essential seven is clinical prevention and population health for improving the Nation’s health (AACN, 2006). Health promotion and risk reduction is accomplished by identification of all influences on a population. In this project the focus of intervention is on a vulnerable, minority population in Ohio which is ranked highly on the obesity scale. The identified correlation of minimal physical education credits and growing pediatric obesity cannot be overlooked. It is essential and appropriate to identify health issues and engage governmental resources to change the trajectory. This is the purpose of utilizing the Let’s Move curriculum from Shape America.

Essential eight is advanced nursing practice (AACN, 2006). The specialty population identified in this project is obese pediatric age patients specifically high school freshman. While this project is population specific the potential outcome of increased physical activity over a lifetime has been proven to improve health and prevent chronic disease. Another aspect of this essential is serving as a mentor to students and other nurses paves the way for inquiry, investigation, and involvement in patient care. This project has improved communication and colleague relations within the workplace and inter-professional relations with community members.

Methodology

Project setting /Population

The purposes of this project was to introduce physical activity in the classroom environment in the form of physical activity breaks, led by physical activity leaders (PALs) to achieve healthy body weight status, increase grade point average (GPA), and
increase physical activity of high school students in health class. The setting of this project was at the public high school in Allen County located in west central Ohio.

The project encompassed all students enrolled in health classes which were subjected to a PAL led in class physical activity for ten minutes at the start of each health class. All health class students were encouraged to participate as the health teachers made the physical activity a part of the daily curriculum.

The targeted senior high school has 1,054 students enrolled for the 2015-16 school year and is comprised of grades 9-12 with a predominance of Black race, diverse mix of ethnicity, and socioeconomic status (table 7). During a phone interview with school personnel it was stated that “socioeconomic statistics are not reported” as there is minimal economic diversity resulting in school grant monies to provide free breakfast and lunch despite family income.

Table 7. Targeted School Student Population Demographics 2015-16 School Year

<table>
<thead>
<tr>
<th>Grade</th>
<th>Gender</th>
<th>Race</th>
<th>Statistics not broken out by grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Black:</td>
<td>Male 246 (23.3%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td></td>
<td>Female 260 (24.6%)</td>
</tr>
<tr>
<td>Grade 9</td>
<td>135</td>
<td>Hispanic:</td>
<td>Male 12</td>
</tr>
<tr>
<td></td>
<td>143</td>
<td></td>
<td>(.01%)</td>
</tr>
<tr>
<td>Grade 10</td>
<td>157</td>
<td></td>
<td>Female 11</td>
</tr>
<tr>
<td></td>
<td>138</td>
<td></td>
<td>(.01%)</td>
</tr>
<tr>
<td>Grade 11</td>
<td>120</td>
<td>White:</td>
<td>Male 200</td>
</tr>
<tr>
<td></td>
<td>136</td>
<td></td>
<td>(18.9%)</td>
</tr>
<tr>
<td>Grade 12</td>
<td>124</td>
<td></td>
<td>Female 171</td>
</tr>
<tr>
<td></td>
<td>101</td>
<td></td>
<td>(16.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>536</td>
<td>Mixed Race:</td>
<td>Male 77</td>
</tr>
<tr>
<td></td>
<td>518</td>
<td></td>
<td>(.07%)</td>
</tr>
</tbody>
</table>

(50.8%) (49.1%)
Implementation

Utilizing Larrabee’s (2009) six step change model for this project appraised, synthesized, implemented, and diffused evidence based practice into the school environment, optimizing health outcomes. The six steps are: assess the need for change in practice, locate the best evidence, critically analyze the evidence, design a practice change, implement and evaluate change in practice, and integrate and maintain change in practice.

Assess the need for change. According to Allen County Health Risk and Community Needs Assessment (2009) the pediatric obesity rate in Allen County is 30% (external data), the school obesity rate is 33% (internal data) and only 25% (external data) of children are getting the recommended amount of 60 minutes per day of physical activity. The school has a written wellness policy addressing the need for nutrition and physical activity, but only one component was being addressed in the form of school lunches with little progress made toward increased physical activity as evidenced by no active living policy, identified on school web site, or recess in the high school environment. Limited compulsory physical activity in the high school was determined by course credit requirements (internal data).

The school health index (SHI) is a self-assessment tool (appendix A & B) which was used to assess the needs of target population. The SHI is a planning guide, geared to middle and high school grade levels, from the CDC that enables schools to identify strengths and weaknesses in policy, develop action plans, and involve students, parents,
administration, and community in improving school services. The tool is comprised of eight modules: school health and safety, health education, physical education and other physical activity programs, nutrition services, school health services, school counseling, health promotion for staff, and family and community involvement. The SHI addresses a host of health topics: physical activity, nutrition, tobacco use prevention, asthma, unintentional injury and violence prevention, and sexual health.

The school nurse and vice principal rated the targeted school on each of the 24 indicators (see Appendix A). Each indicator was rated from 3 to 0, “3” in place, and “2” partially in place, “1” underdevelopment, “0” no/not met. Results from the school health indicator assessment were entered into a School Health Index Scorecard (see Appendix B). The assessment results indicated that only 10 out of 24 indicators were met by the targeted school (see Table 8). Results were entered into the Let’s Move, Active Schools web site to compare with those from other enrolled Ohio schools.

Table 8. Assessment of School Health Indicators

<table>
<thead>
<tr>
<th>School Indicators</th>
<th>School Score</th>
<th>Let’s Move Enrolled Ohio Schools meeting criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>225 minutes of physical education per week</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Years of physical education</td>
<td>1</td>
<td>44%</td>
</tr>
<tr>
<td>Time requirement for length of physical education class</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Adequate teacher/student ratio</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Sequential physical education curriculum consistent with standards</td>
<td>2</td>
<td>83%</td>
</tr>
<tr>
<td>Information and materials for physical education teachers</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Physical education grading</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Prohibit exemptions or waivers for physical education</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Students active at least 50% of class time</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Individualized physical activity and fitness plans</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Health-related physical fitness</td>
<td>2</td>
<td>37%</td>
</tr>
<tr>
<td>Promote community physical activities</td>
<td>0</td>
<td>56%</td>
</tr>
<tr>
<td>Licensed physical education teachers</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Address special health care needs</td>
<td>2</td>
<td>63%</td>
</tr>
</tbody>
</table>
Physical education safety practices | 2
Professional development for teachers * | 3
Participation in intramural programs or physical activity clubs | 3
Availability of interscholastic sports | 3
Promotion or support of walking and bicycling to school | 2 13%
Availability of before- and after-school physical activity opportunities | 0 25%
Availability of physical activity breaks in classrooms * | 0 25%
Training requirements for sports coaches | 3
Physical activity facilities meet safety standards | 3
Athletics safety requirements | 3

3=In Place, 2= Partially in Place, 1= Underdevelopment, 0= No/Not met

One quarter of children in Allen County do not get the recommended amount of 60 minutes of daily physical activity while one third is considered obese. Identified gaps in physical activity at the high school level in addition to results of the community needs assessment have prompted the need for implementation of physical activity breaks in the classroom.

**Locating the best evidence.** Systematic reviews and clinical practice guidelines were searched and a plethora of information was elicited. Only those reviews which focused on pediatric obesity intervention or prevention in a school based environment, and were quantitative in nature were included. Search strategies for this project utilized databases from CINAHL, PubMed, Google Scholar, Cochrane Reviews, and Medline in the last 10 years. Preferential literature selection was given to systematic reviews and randomized control trials which yield the highest level of evidence. Critical appraisal tools from Larrabee (1999) were utilized to organize and prioritize literature with relativity to the PICOT. The search was streamlined by formation of a PICOT. High school students (P) in an inner city high school, exposed to in class physical activity
breaks lead by a PAL (I), compared to their previous regular activities in class (C) will demonstrate self-reported increased physical activity, healthy body weight, and increased GPA (O), over an eight week period (T). In summary, thirteen studies met established criteria were adopted in this evidence based project.

**Critically analyze the evidence.** A plethora of information is available on pediatric obesity, however, rapid critical appraisal forms from Larrabee (2009) were utilized to assess strength, validity, reliability and applicability to practice. The identified benefits of increased physical activity, decreased BMI, and improved academic performance have been supported in the literature and clinical practice guidelines. The strength of the evidence in literature supports a change of practice, specifically implementation of in school physical activity guided by PALs in the classroom. Pediatric obesity has a two pronged approach to intervention; nutrition and physical activity. The focus of this project is implementing physical activity in six classrooms led by PALs using specified curriculum for eight weeks.

The 2008 Physical Activity Guidelines (PAGs) for Americans and specifically for children outlines 60 minutes of moderate to vigorous daily physical activity, in the form of bone and muscle strengthening or aerobic activity (U.S. 2008). The AGREE II tool was utilized to assess the 2008 Physical Activity Guidelines for Americans from the U.S. Department of Health and Human Services. Appraisal using the AGREE II yielded high scores in all domains except in domain three, rigor of development, where there was no citation regarding database searches and inclusion criteria for the search.

**Design practice change.** According to the evidences, PAL intervention strategies could be effectively adopted by physical activity programs for the classroom settings.
Based on guidelines from HHS (2008), the Comprehensive School Physical Activity Program (CSPAP) with a multi-component approach is suggested guideline for school districts, administrators, or research to develop physical activity program for school students. In the proposed project, the CSPAP was used to guide the proposed practice change including PAL training for the health teacher and project coordinator, adoption and implementation of *Let’s Move Active Schools* in the program, and school wide adoption of proposed change.

*Let’s Move Active Schools* streamlines the selection of programs, resources, professional development and funding opportunities, and delivers a customized action plan. Key elements of in-class physical activity are based on bone and muscle strengthening and aerobic exercise. Shape America has outlined the goal of physical education to develop physically literate individuals who have the knowledge, skills, and confidence to enjoy a lifetime of healthful physical activity. To be a physically literate individual one has learned the skills needed to participate in a variety of physical activities, knows the implications and benefits of involvement in various types of physical activities, participates regularly in physical activity, is physically fit, and values physical activity and its contributions to a healthful lifestyle (Shape America, 2014). In the high school environment, students build on knowledge and values, and adopt lifetime activity and skills (Shape America, 2014).

Physical Activity Leader (PAL) learning system is a cutting-edge, all-inclusive professional development resource within the *Let's Move Active Schools* framework, adaptable to individual school environments. PAL training competencies are based on content knowledge, leadership, communications, and collaboration. The 7 hour trainings
are skill building leadership workshops targeted for Physical Activity Leaders (PALs), which are offered at no cost for all levels in an effort to develop and support individuals who will champion an effort in their local schools/school district to ensure 60 minutes a day of physical activity for all school-aged youth through *Let's Move Active Schools*. Scheduled, on-site, free instructional training completed in one day for up to fifty participants offers continued educational opportunities for participants to continue the momentum for continued success. PALs are integral to success of implementation of in class physical activity.

Stakeholders for this project are school superintendents, high school principals, school nurses, health teachers and the project coordinator. The proposed change was presented to the targeted school Wellness Committee which included the superintendent, the high school principal, the school nurse, and the physical activity coordinator. Consent and support (see Appendix G) was given by the school Wellness Committee to enroll the targeted school into *Let's Move Active Schools* program. The committee suggested implementation of the PAL in health classes starting in winter 2016.

The two health teachers volunteered to act as PAL and to coordinate the program in class. The project coordinator and two health teachers enrolled in PAL on line training provided by Shape America. Training was competed via webinar. The activity consisted of classroom recreation, recruitment of students in a safe and fun environment, and how to include physical activity in the school.

This project provided verities of physical activities to students during 10-minute break in health classes for 8 weeks. The outcome indicators were BMI, Physical Activity Changes Everything (PACE score), and GPA which were measured at before and after
Let’s Move program. Data was coded and analyzed using Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to calculate demographic variables and major variables. Paired T tests were used to compare the outcome measures, GPA and PACE score before and after the proposed practice change within the participant group. A marginal homogeneity test was used to assess the body weight status between pre and post intervention. To control for Type I errors, the level of significance will be set at 0.05, two-tailed.

A budget of $350 was spent for healthful snacks and gifts of appreciation for participation for the health teachers. E-mails were exchanged with two health teachers, identified as PALs and school nurse, establishing a collegial relationship before project implementation.

Implement Practice Change

The Let’s Move program started the beginning of the second semester, January 25, 2016 and ended after eight weeks. Two weeks prior to start of the project, IRB approved parental consent and student assent forms were copied and distributed to the students in each health class.

One week prior to start of project a set of 45 (nine weeks of project, 5 days per week) 3X5 index cards in a manila envelope with an accompanying poster board to mount daily cards, was delivered to the health classroom. The cards were labeled as aerobic, bone, muscle, or PALs (teachers’) choice exercises. The PALs choice cards were added to accommodate weather or class curriculum. The purpose of the cards was to provide concrete direction in each area of concentration according to the 2012 Physical Activity Guidelines for Americans and to provide random selection of in class physical
activity breaks. Students randomly selected a card from the envelope at the start of the
day and the exercise listed on the card was written on the board for subsequent classes to
follow. The card of the day was attached to the poster board for record keeping and as a
visual reminder to the PAL and students.

Each semester five health classes are scheduled to accommodate the Ohio
graduation requirements of one half credit of health education. First period health is from
8-8:55. Second period health is from 8:59-9:49. Third period health is from 9:53-10:43.
Fifth period health is from 12:21-1:11. Sixth period health is from 1:15-2:05.

**Project participants**

There are 122 students registered in 6 health classes within second semester of
2015-2016 school year; however there were only 38 students committed and completed
8-week Let’ Move program. A few reasons for low student participation are low rate of
return of parental consent forms, low literacy levels of parents on complex IRB forms,
and student participation being voluntary. Among project participants, 20 (52.6%) were
boys, while 18 (47.7%) were girls giving a relatively equal distribution of gender profile.
There was a predominance of African American 15 (39.5%) followed by Caucasian 13
(34.2%), Mixed 5 (21.1%) being Black and Caucasian, or 2 (5.3%) self-identified as
mixed and Hispanic. The average age for the study participant’s is 15.71 (see Table 9).

**Table 9.** Demographics of Project Participants

<table>
<thead>
<tr>
<th>Class period</th>
<th>N</th>
<th>Gender</th>
<th>Race</th>
<th>Age Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Boys %</td>
<td>Girls</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td></td>
<td>2.6%</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td></td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>
A pre-test analysis of the students was assessed using the data collection tool measuring for height, weight, BMI, race, gender, class time, GPA, and PACE score (appendix E) on day one of project by PALs. Data was collected by actual weights and self-reported height. The PACE is a tool which poses two questions: over the past seven days, how many days were you physically active for a total of at least 60 minutes per day, and over a typical week, on how many days are you physically active for a total of at least 60 minutes per day. Each question is rated on a scale of 0-7 days with a formula (the sum of question one and two divided by two) indicating meeting physical activity guidelines (score greater than or equal to five) or not (score less than five). GPA was provided by school teachers via the electronic student record.

The PALs also made student self-calculation of BMI part of the curriculum for in class teaching. BMI calculation was double checked by project coordinator utilizing CDC on-line formula and then converted the each student’s BMI to the BMI percentile according to their age and growth development. According to the CDC, BMI percentile less than 5th is considered as underweight, BMI percentile between 5th - 84th is considered as normal weight, BMI percentile between 85th - 95th is considered as overweight and 96th of BMI percentile or above is considered obese. Healthy snacks
were again provided in the form of apples, navel oranges, strawberries, and carrots.

Follow up e-mails were exchanged for program process evaluation and feedback.

Each health class began with 10 minutes of in class physical activity ranging from in class isometrics to a one half mile walk around school (appendix F). After eight weeks of school, students were reweighed and reassessed with the PACE tool and GPA.

**Process Evaluation**

The process of project planning phase required organization, prioritization and clarification. Identifying stakeholders and resources was paramount as they provided constructive input. Organizing people identified as stakeholders required clear and effective communication. Prioritizing planning phases was required for progression from one stage of implementation to another. Clarification of teacher roles, project goals, and consent procedures when working with minors resulted in more emails and phone calls with IRB.

During the project close monitoring of the implementation process was required. Weekly updates regarding concerns, questions, and alterations were communicated through electronic means with the health teachers and project facilitator. Two deliveries of healthy snacks were made to the students, both participating and non-participating, in the form of fresh strawberries, oranges, carrots, and apples for their enjoyment. After week four, a scheduled face to face meeting with the two health teachers revealed strengths and weaknesses of the project with qualitative feedback collected. Both teachers had positive comments regarding planning and communication as well as reporting on student participation and enthusiasm. The teachers spoke of clear delivery of plan and of the student enjoyment of doing something other than sitting the entire class. The students
even reminded the health teacher to draw the card and to pick the physical activity break for the day and post the activity on the white board.

**Results/Outcome Evaluation**

A post-test analysis of the students in the ninth week of the project was conducted. A paired-samples t-test was conducted to compare GPA and PACE scores between pre and post *Let’s Move* program. Results findings suggested that there were significant differences in the mean GPA between pre-intervention group (M= 2.99, SD=.73) and post intervention group (M=3.17, SD=.65); t=-2.22, p = 0.36. There was a significant difference in the mean PACE scores between pre-intervention group (M=3.38, SD=2.42) and post intervention group (M= 3.92, SD=2.36); t=-2.395.66, p = 0.022. These results suggested that students increased their daily physical activities after 8-week *Let’s Move* program. Project findings supported that more physical activity improved students’ school performances (See Table 10). However, there were no significant differences in the mean BMI between pre-intervention group (M= 25.89, SD= 7.43) and post intervention group (M= 25.87, SD= 7.97; t=-.63, p = 0.95).

**Table 10.** Comparison of Outcome Variables between Pre and Post Intervention

<table>
<thead>
<tr>
<th>Outcome Variables</th>
<th>N</th>
<th>Pre-intervention Mean (SD)</th>
<th>Post-intervention Mean (SD)</th>
<th>Paired t-test (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>38</td>
<td>2.86 (.73)</td>
<td>3.10 (.65)</td>
<td>-2.22 (.036)</td>
</tr>
<tr>
<td>PACE</td>
<td>38</td>
<td>3.38 (2.42)</td>
<td>3.92 (2.36)</td>
<td>-2.39 (.022)</td>
</tr>
<tr>
<td>BMI</td>
<td>38</td>
<td>25.89 (7.43)</td>
<td>25.87 (7.97)</td>
<td>0.063 (0.95)</td>
</tr>
</tbody>
</table>

A marginal homogeneity test was used to assess if student BMI status (underweight, normal weight, overweight, and obese) are different between pre and post *Let’s Move* program (see Table 11). Results findings indicated there were no changes in
students’ body weight status. Therefore, there were no significant differences in BMI category between pre and post program (p >0.05).

Table 11. Comparison of BMI Categories between Pre and Post Intervention

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>Pre Intervention BMI (%)</th>
<th>Post Intervention BMI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>1 (2.6%)</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>Normal weight</td>
<td>19 (50%)</td>
<td>19 (50%)</td>
</tr>
<tr>
<td>Overweight</td>
<td>7 (18.4%)</td>
<td>7 (18.4%)</td>
</tr>
<tr>
<td>Obese</td>
<td>11 (28.9)</td>
<td>11 (28.9)</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

After the project was complete, the students wanted to continue the physical activity breaks at the beginning of each health class, reporting that they had a lot of fun. On follow up e-mails, the health teachers were both complimentary of the project and further discussion revolved around potential adoption school wide. No weaknesses in project planning or implementation were reported.

Discussion

The purposes of this project were to introduce the Let’s Move program to the targeted school and recruit the health teachers and project coordinator to be trained as PALs, to bring physical activity breaks into the classroom to improve BMI category, increase physical activity, and improve school academic performance. Thirty eight students participated in the project and completed eight weeks of Let’s Move program lead by the PAL. Each student was assessed for BMI, GPA, and PACE scores pre and post intervention. Project findings suggested that there were statistical significant differences in GPA and PACE score before and after intervention. The findings from Lees and Hopkins (2013), Mura et al (2015), and Basch (2011) were consistent with outcomes of this project supporting physical activity positively influencing GPA in
middle and high school aged students. Additionally, literature findings from previous studies (Cole et al. 2006, Safron et al., 2011, Kropski et al., 2008, AlMarzooqi, 2011, Waters et al., 2011, Shaya et al., 2008 Budd et al., 2006, Zenzen et al., 2009) supported that the physical activity of middle and high school students increased when lead by a PAL. GPA was also improved after eight weeks of PAL led Let’s Move programming.

Due to short period of project implementation time, there were no significant differences in student’s BMI category after 8-week of the program. Considering this phase of life for a young person, a great deal of growth is occurring; therefore weight and height change rapidly at the same time during growth and development. The growth can be a result of bone and muscle building, hormonal influence or simply the season of the year being late winter and weather dampening the opportunities for access to outside activities. This result is consistent with literature from Safron (2011), Budd (2006), and Zenzen (2009).

One limitation of this project is small sample size. Because of financial and geographic disadvantages, absence from school is one of major concerns for school teachers. In the inner city, children within a predetermined distance must walk to school. Low student participation may impact generalizability. This school mandate places an uneven burden on students who have to travel in untoward weather, making school attendance an option, not a priority. Students who have to walk to school are also exposed to the hazards of crossing railroads, dangerous neighborhoods, and crossing streets that are not clearly marked or guarded. Some disadvantaged youth are breadwinners for the household working night shift and going to school on no sleep, making an entire school day too long to handle. Some parents are illiterate, making the
required consent form difficult to comprehend and reinforce the lack of education, making more of a burden. An education on culture and poverty is essential when interacting with students coming from diversity and adversity. Direct to home mailing of consent forms may increase recruitment of student participation as forms sent home from school often get lost in backpacks. There is also opportunity to increase student participation by amending consent forms to meet guidelines of healthcare literacy.

**Integrate/Maintain change of Practice**

Larrabee (2009) recommends a six step process in the change to evidence based practice model with the last step, integrating and maintaining change. Results of this project support the use of physical activity leaders to facilitate physical activity break in the classroom. GPAs improved as did PACE scores. The outcomes of this project and evidenced based literature partially support the proposed PICOT question in GPA and PACE scores.

Integration and sustainability will occur when school administration adopts school wide Let’s Move programming and policy development for every grade level in every school in the public school system. Outcomes of this project will be presented to school board and recommendations for future diffusion to all classes and potential PALs via system wide education and implementation of Let’s Move Active Schools. Two health teachers as PALs in this project will serve as role models who will attract more school employers to participate the program and also serve as trainers who will provide guidance and training to future PALs. A seven hour formalized training with a trainer from *Let’s Move Active Schools* will be scheduled for all school staff to learn skills and protocols to implement *Let’s Move Active Schools* in all classes. The program director will serve as
consultant to the targeted school. The school Wellness Committee and PALs will collect data each semester and monitor program outcomes.

Strengths of the program include accessibility and efficiency in plan. Weaknesses of the program could be adaptability to students whom are physically incapable or unable to complete aerobic, muscle or bone building exercises. After PAL training, flexibility and adaptability in programming for everyone could be accomplished.

**Conclusion**

Pediatric obesity is public health crisis setting the foundation for a host of adult onset chronic illness. Nutrition and physical activity have been identified as major components of lifestyle changes needed to change the trajectory. Nutrition guidelines have been established and adopted in the form of school lunch choices, while physical activity has taken the back seat secondary to academic mandates. Schools are a prime target for integration of physical activity particularly when students spend the majority of their waking hours in a classroom from Kindergarten to high school. Schools are the obvious choice for implementation of a well-rounded curriculum of education and physical activity, setting the stage for a lifetime of wellness. Evidenced based literature and guidelines from reputable sources such as the AAP the CDC, and the U.S. Department of Health and Human Services agree; Physical activity is paramount in maintaining and improving health and in prevention of disease.

The Larrabee’s model for change to evidenced based practice successfully provided a step-wise approach for planning, implementing, and evaluating this evidence based project. Small changes in the form of teacher and staff education, becoming PALs, can result in major impact in the war on pediatric obesity and a lifetime of wellness.
References


Appendix A

School Health Index Self-Assessment

PA.1 225 minutes of physical education per week

Do all students in each grade receive physical education for at least 225 minutes per week throughout the school year?
NOTE: Physical education classes should be spread over at least three days per week, with daily physical education preferable.
3 = Yes.
2 = 135-224 minutes per week for all students in each grade throughout the school year.
1 = 90-134 minutes per week for all students in each grade throughout the school year.
0 = Fewer than 90 minutes per week or not all students receive physical education throughout the school year.

PA.2 Years of physical education

How many total years of physical education are students at this school required to take?
3 = The equivalent of all academic years of physical education.
2 = The equivalent of more than one academic year but less than all academic years of physical education.
1 = The equivalent of one academic year of physical education.
0 = The equivalent of less than one academic year of physical education or students are not required to take physical education at this school.

PA.3 Time requirement for length of physical education class

Does your school have a time requirement for the length of physical education classes?
3 = Yes. Physical education classes are scheduled for the equivalent of 225 minutes or more per week.
2 = Yes. Physical education classes are scheduled for the equivalent of 91 – 224 minutes per week.
1 = Yes. Physical education classes are scheduled for the equivalent of 90 minutes per week.
0 = No. Our school does not have a time requirement for minutes per week for physical education or we require less than 90 minutes per week.

PA.4 Adequate teacher/student ratio

Do physical education classes have a student/teacher ratio comparable to that of other classes?
NOTE: Aides and volunteers should not be counted as teachers in the student/teacher ratio.
3 = Yes.
2 = The ratio is somewhat larger (up to one and a half times larger) than the ratio for most other classes.
1 = The ratio is considerably larger (more than one and a half times larger), but there are plans to reduce it.
0 = The ratio is considerably larger (more than one and a half times larger), and there are no plans to reduce it.

PA.5 Sequential physical education curriculum consistent with standards

Do all teachers of physical education use an age-appropriate, sequential physical education curriculum that is consistent with national or state standards for physical education (see national standards below)?
NOTE: Consider using CDC’s Physical Education Curriculum Analysis Tool (PECAT), which is designed to help school districts and schools conduct a clear, complete, and consistent analysis of written physical education curriculum. PECAT results can help districts and schools enhance, develop, or select appropriate and effective physical education curricula for delivering high-quality physical education in schools. The PECAT assesses how consistent curricula are with national standards and can assist users in determining if the curriculum being analyzed is sequential.
3 = Yes.
2 = Some use a sequential physical education curriculum, and it is consistent with state or national standards.
1 = Some use a sequential physical education curriculum, but it is not consistent with state or national standards.
0 = None do, or the curriculum is not sequential, or there is no physical education curriculum.

PA.6 Information and materials for physical education teachers

Are all teachers of physical education provided with the following information and materials to assist in delivering quality physical education?
☐ Goals, objectives, and expected outcomes for physical education
☐ A written physical education curriculum
☐ A chart scope and sequence for instruction
☐ A plan for assessing student performance
☐ Physical activity monitoring devices, such as pedometers, heart rate monitors
☐ Internet resources, such as SHAPE America online tools and resources or PE Central
☐ The Presidential Youth Fitness Program
☐ Protocols to assess or evaluate student performance in physical education
☐ Learning activities that increase the amount of class time students are engaged in moderate-to-vigorous physical activity
☐ Learning activities that actively engage students with long-term physical medical, or cognitive disabilities in physical education
3 = Yes, all teachers of physical education are provided with at least eight kinds of materials.
2 = Teachers of physical education are provided with **four to seven** kinds of these materials.
1 = Teachers of physical education are provided with **one to three** kinds of these materials.
0 = Teachers of physical education are **not** provided with these kinds of materials.

**PA.7 Physical education grading**

Do students earn grades for required **physical education** courses? Do the grades carry the same weight as grades for other subjects toward academic recognition (e.g., honor roll, class rank)?
3 = Yes, students earn grades and the grades carry the same weight as grades for other subjects.
2 = Students earn grades, **but** the grades count less than grades for other subjects.
1 = No, **but** there are plans to change this procedure.
0 = No, **and** there are no plans to change this procedure, **or** there are no required physical education courses.

**PA.8 Prohibit exemptions or waivers for physical education**

Does the school **prohibit exemptions or waivers** for **physical education**?
3 = Yes.
2 = Yes, **but** occasional exceptions or waivers are made.
1 = No, **but** there are plans to start prohibiting exemptions or waivers.
0 = No, **or** there is no physical education.

**PA.9 Students active at least 50% of class time**

Do teachers keep students **moderately to vigorously active** for **at least 50% of the time** during most or all **physical education** class sessions?
3 = Yes, during **most or all** classes.
2 = During **about half** the classes.
1 = During **fewer than half** the classes.
0 = During **none** of the classes, **or** there are no physical education classes.

**PA.10 Individualized physical activity and fitness plans**

Do students design and implement their own **individualized physical activity and fitness plans** as part of the **physical education** program? Do teachers of physical education provide ongoing feedback to students on progress in implementing their plans?
3 = Yes.
2 = Students design and implement their own individualized plans, **but** teachers provide only occasional feedback.
1 = Students design and implement their own individualized plans, **but** teachers provide no feedback.
0 = Students do not design and implement their own individualized plans, **or** there is no physical education program.
PA.11 Health-related physical fitness

Does the physical education program integrate the components of the Presidential Youth Fitness Program?

- Fitness assessment using Fitnessgram®
- Professional development for physical education teachers on proper use and integration of fitness education, fitness assessment, and recognition.
- Recognition of students meeting Healthy Fitness Zones or their physical activity goals.

3 = Yes, all 3 components of the PYFP are integrated.
2 = 2 of the PYFP components are integrated.
1 = 1 of the PYFP components is integrated.
0 = None of the PYFP components are integrated.

PA.12 Promote community physical activities

Does the physical education program use three or more methods to promote student participation in a variety of community physical activity options?

3 = Yes, through three or more methods.
2 = The program promotes participation in a variety of community physical activity options, but through only one or two methods.
1 = The program promotes participation in only one type of community physical activity option.
0 = The program does not promote participation in community physical activity options, or there is no physical education program.

PA.13 Licensed physical education teachers

Are all physical education classes taught by licensed teachers who are certified or endorsed to teach physical education?

3 = Yes, all are.
2 = Most classes are.
1 = Some classes are.
0 = No classes are, or there are no physical education classes.

PA.14/A.1 Address special health care needs

Does the physical education program consistently use all or most of the following practices as appropriate to include students with special health care needs?

- Encouraging active participation; modifying type, intensity, and length of activity if indicated in Individualized Education Plans, asthma action plans, or 504 plans
- Offering adapted physical education classes
- Using modified equipment and facilities
- Ensuring that students with chronic health conditions are fully participating in physical activity as appropriate and when able
- Monitoring signs and symptoms of chronic health conditions
Encouraging students to carry and self-administer their medications (including pre-medicating and/or responding to asthma symptoms) in the gym and on playing fields; assisting students who do not self-carry

Encouraging students to actively engage in self-monitoring (i.e., using a peak flow meter, recognizing triggers) in the gym and on playing fields (if the parent/guardian, health care provider, and school nurse so advise)

Using a second teacher, aide, physical therapist, or occupational therapist to assist students, as needed

Using peer teaching (e.g., teaming students without special health care needs with students who have such needs)

3 = Yes, the physical education program uses all or most of these instructional practices consistently.

2 = The physical education program uses some of these instructional practices consistently.

1 = The physical education program uses some of these instructional practices, but not consistently (that is, not by all teachers or not in all classes that include students with special health care needs).

0 = The program uses none of these practices, or there is no physical education program.

PA. 15/S.1/A.2 Physical education safety practices

Does the physical education program implement and enforce all of the following safety practices?

Practice active supervision

Encourage pro-social behaviors

Use protective clothing and safety gear that is appropriate to child’s size and in good shape

Use safe, age-appropriate equipment

Minimize exposure to sun (including through use of sunscreen), smog, and extreme temperatures

Use infection control practices for handling blood and other body fluids

Monitor the environment to reduce exposure to potential allergens or irritants (e.g., pollen, bees, strong odors)

3 = Yes, all these safety practices are followed.

2 = All these safety practices are followed, but at times our school has temporary lapses in implementing or enforcing one of them.

1 = One of these safety practices is not followed, or at times our school has temporary lapses in implementing or enforcing more than one of them.

0 = More than one of these safety practices is not followed, or there is no physical education program.

PA.16 Professional development for teachers

Are teachers of physical education required to participate at least once a year in professional development in physical education?

3 = Yes, all do.
2 = Most do.
1 = Some do.
0 = None do, or no one teaches physical education.

PA.17 Participation in intramural programs or physical activity clubs

Do both boys and girls participate in school-sponsored intramural programs or physical activity clubs?
3 = Yes, many boys and girls participate in school-sponsored intramural programs or physical activity clubs.
2 = For the most part, many students of only one sex participates in school-sponsored intramural programs or physical activity clubs.
1 = Very few students of either sex participate in school-sponsored intramural programs or physical activity clubs.
0 = There are no school-sponsored intramural programs or physical activity clubs.

PA.18 Availability of interscholastic sports

Does your school offer at least eight different interscholastic sports to both boys and girls?
3 = Yes, our school offers at least eight different interscholastic sports to both boys and girls.
2 = Our school offers five to seven different interscholastic sports to both boys and girls.
1 = Our school offers one to four different interscholastic sports to both boys and girls, or offers five or more sports but only to one sex.
0 = Our school does not offer interscholastic sports.

PA.19 Promotion or support of walking and bicycling to school

Does your school promote or support walking and bicycling to school in the following ways?
• Designation of safe or preferred routes to school
• Promotional activities such as participation in International Walk to School Week, National Walk and Bike to School Week
• Secure storage facilities for bicycles and helmets (e.g., shed, cage, fenced area)
• Instruction on walking/bicycling safety provided to students
• Promotion of safe routes program to students, staff and parents via newsletters, websites, local newspaper
• Crossing guards
• Crosswalks on streets leading to schools
• Walking school buses
• Documentation of number of children walking and or biking to and from school
• Creation and distribution of maps of school environment (sidewalks, crosswalks, roads, pathways, bike racks, etc.)
3 = Yes, our school promotes or supports walking and bicycling to school in **six or more** of these ways.
2 = Our school promotes or supports walking and bicycling to school in **three to five** of these ways.
1 = Our school promotes or supports walking and bicycling to school in **one to two** of these ways.
0 = Our school does **not** promote or support walking and bicycling to school.

**PA.20 Availability of before- and after-school physical activity opportunities**

Does your school offer opportunities for students to participate in physical activity before and after the school day for example, through organized physical activities or access to facilities or equipment for physical activity?
3 = Yes, both before and after the school day.
2 = We offer before school or after school, but not both.
1 = We do not offer opportunities for students to participate in physical activity before or after the school day, but there are plans to initiate it.
0 = No, we do not offer opportunities for students to participate in physical activity before or after the school day, and there are no plans to initiate it.

**PA.21 Availability of physical activity breaks in classrooms**

Are all students provided opportunities to participate in **physical activity breaks in classrooms**, outside of physical education, recess, and class transition periods?
3 = Yes, on all days during a typical school week.
2 = On most days during a typical school week.
1 = On some days during a typical school week.
0 = No, we do not provide students with opportunities to participate in physical activity breaks in classrooms.

**PA.22 Training requirements for sports coaches**

Does your school or district require all **interscholastic sports** coaches to have training in the sport(s) they coach that reflects competency in the skills and knowledge outlined in the National Standards for Sports Coaches (see standards below)?
3 = Yes.
2 = Our school or district requires training but does not require that the training reflect competency in the skills and knowledge outlined in the National Standards for Sports Coaches.
1 = Our school or district does not currently require training, but is in the process of implementing required training.
0 = Our school or district does not require training, or our school has no interscholastic sport coaches.

**PA. 23/S.2 Physical activity facilities meet safety standards**
Does the school ensure that spaces and facilities for physical activity meet or exceed recommended safety standards for design, installation, and maintenance, in the following ways?

☐ □ Regular inspection and repair of indoor and outdoor playing surfaces, including those on playgrounds and sports fields
☐ □ Regular inspection and repair of physical activity equipment such as balls, jump ropes, nets, cardiovascular machines, weights, and weight lifting machines
☐ □ Padded goal posts and gym walls
☐ □ Breakaway bases for baseball and softball
☐ □ Securely anchored portable soccer goals that are stored in a locked facility when not in use
☐ □ Bleachers that minimize the risk for falls
☐ □ Slip-resistant surfaces near swimming pool use
☐ □ Pools designed, constructed, and retrofitted to eliminate entrapment use

NOTE: Please disregard any standard that is not relevant for your campus.

3 = Yes, all these safety standards are met.
2 = All these safety standards are met, but at times the school has temporary lapses in one of them.
1 = One of these safety standards is not met, or at times the school has temporary lapses in more than one of them.
0 = More than one of these safety standards is not met, or there are no spaces or facilities for physical activity.

PA.24/S.3 Athletics safety requirements

Does your school athletic program implement and enforce all the following safety requirements?

☐ □ Require physical examination by physician before participation
☐ □ Avoid excesses in training regime that may result in injuries (e.g., heat stroke, exhaustion, dehydration, sprains, strains)
☐ □ Establish criteria, including clearance by a health-care provider, before allowing further participation in practice or reentry into game play after a head injury
☐ □ Reward good sportsmanship, teamwork, and adherence to safety rules
☐ □ Strictly enforce prohibitions against alcohol and drug use
☐ □ Strictly enforce prohibitions against violence and aggression by students, spectators, coaches, and other persons during sporting events
☐ □ Strictly enforce prohibitions against dangerous athletic behaviors (e.g., spearing in football, high sticking in hockey, throwing bat in baseball)
☐ □ Report all sports-related injuries to the appropriate authority

3 = Yes, all these safety requirements are met.
2 = All of these safety requirements are met, but at times the school has temporary lapses in implementing or enforcing one of them.
1 = One of these safety requirements is not met, or at times the school has temporary lapses in implementing or enforcing more than one of them.
$0 = \text{More than one of these safety requirements are not met, or there is no school athletic program.}$
## Appendix B

### School Health Index Scorecard

**Module 3: Physical Education and Other Physical Activity Programs**

**Score Card**

*Photocopy before using*

1. Carefully read and discuss the Module 3 Discussion Questions (pages 6-18), which contains questions and scoring descriptions for each item listed on this Score Card.
2. Circle the most appropriate score for each item.
3. After all questions have been scored, calculate the overall Module Score and complete the Module 3 Planning Questions located at the end of this module (pages 20-21).

<table>
<thead>
<tr>
<th>Item</th>
<th>Fully in Place</th>
<th>Partially in Place</th>
<th>Under Development</th>
<th>Not in Place</th>
</tr>
</thead>
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<tr>
<td>PA.1</td>
<td>225 minutes of physical education per week</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PA.2</td>
<td>Years of physical education</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PA.3</td>
<td>Time requirement for length of physical education class</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PA.4</td>
<td>Adequate teacher/student ratio</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PA.5</td>
<td>Sequential physical education curriculum consistent with standards</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
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<td>Information and materials for physical education teachers</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>PA.7</td>
<td>Physical education grading</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
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<td>Prohibit exemptions or waivers for physical education</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>Students active at least 50% of class time</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>PA.10</td>
<td>Individualized physical activity and fitness plans</td>
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<td>1</td>
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<td>Health-related physical fitness</td>
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<td>PA.12</td>
<td>Promote community physical activities</td>
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<td>1</td>
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<td>PA.13</td>
<td>Licensed physical education teachers</td>
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<td>PA.14</td>
<td>Address special health care needs</td>
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<td>2</td>
<td>1</td>
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<td>PA.15</td>
<td>Physical education safety practices</td>
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<td>S.1/A.2</td>
<td>Professional development for teachers</td>
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<td>PA.17</td>
<td>Participation in intramural programs or physical activity clubs</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>PA.18</td>
<td>Availability of interscholastic sports</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>PA.19</td>
<td>Promotion or support of walking and bicycling to school</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>PA.20</td>
<td>Availability of before- and after-school physical activity opportunities</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<td>PA.21</td>
<td>Availability of physical activity breaks in classrooms</td>
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<td>PA.22</td>
<td>Training requirements for sports coaches</td>
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<td>2</td>
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<td>PA.23</td>
<td>Physical activity facilities meet safety standards</td>
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<td>2</td>
<td>1</td>
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<td>S.2</td>
<td>Athletics safety requirements</td>
<td>3</td>
<td>2</td>
<td>1</td>
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</table>

**COLUMN TOTALS:** For each column, add up the numbers that are circled and enter the sum in this row.
# Appendix C

## Timeline of Project

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responsible Party</th>
<th>Time Frame</th>
</tr>
</thead>
</table>
| **Step 1** Assess the need for change  
- Include stakeholders  
- Collect internal data about current practice  
- Compare external and internal data  
- Identify the problem  
- Link problem, interventions, and outcomes | Project coordinator, school nurse | |
| **Step 2** Locate best evidence  
- Identify types and sources of evidence  
- Review research concepts  
- Plan the search and review  
- Conduct the search | Project coordinator | |
| **Step 3** Analyze evidence  
- Critically appraise and weigh the evidence  
- Synthesize the best evidence  
- Assess feasibility, benefits, and risks of new practice | Project coordinator | |
| **Step 4** Design the change  
- Define proposed change  
- Identify needed resources  
- Design the evaluation of the pilot  
- Design the implementation plan | Project coordinator | |
| **Step 5** Implement and Evaluate change  
- Implement pilot study  
- Evaluate processes, outcomes, and costs  
- Develop conclusions and recommendations | Project coordinator | |
| **Step 6** Integrate and Maintain change of practice  
- Communicate recommended change to stakeholders  
- Integrate into standards of practice  
- Monitor process and outcomes periodically  
- Celebrate and disseminate results of project | Project coordinator | |
Appendix D

IRB Approval

January 2016

Dear Freshman Parents,

My name is Karen Martin and I am a doctoral student in the College of Nursing at The University of Toledo.

I have received permission from the Lima Senior High School administration to conduct a research project at the school as part of my educational requirements. The project will be conducted with freshman students and it involves 10 minutes of exercise at the beginning of each health class for an entire quarter of the school year.

The exercise will be of moderate intensity and may involve walking outside around the perimeter of the high school or may be simple in class exercises designed to increase the students heart rate and increase awareness of the need for physical activity for healthy living now and in the future.

As part of the project, measurements of height, weight, body mass index, grade point average, and self-reported physical activity will be assessed on the first and last day of the quarter. The data measures will be kept confidential and to help assure students privacy, the data will be kept by me on an encrypted computer that will be accessed with my personal log-in and password.

At the end of the study the two measures will be compared and outcomes will be provided to Lima Senior High School administration. The results will be reported in aggregate and not by individual student.

Participation in this project is completely voluntary and requires no investment of parental time or money. I would appreciate your consideration of your student's participation in this project to exercise for 10 minutes at the beginning of each health class for a period of nine weeks of the school year. If you do provide permission, both you and your child have the option of withdrawing their participation at any time without penalty.

A Parental Permission Form is attached to this cover letter. Please feel free to read it and call with any questions you or your child may have.

Thank you very much.

Karen Martin
Project Co-Investigator

UT IRB APPROVED
PARENTAL PERMISSION FORM
FOR A MINORS PARTICIPATION THE STUDY TITLED
Implementation of Mentor Led Physical Activity
Among Disadvantaged High School Youth

Principal Investigator: Huey-Shys Chen, RN, PhD, MCHES, FAAN
Contact Phone number:

Co-Investigator: Karen M. Martin CNP
Contact Phone number:

What you should know about this research study:

- We give you this parental permission form so that you may read about the purpose, risks, and benefits of this research study. All information in this form will be communicated verbally by the research staff as well.
- The main goal of research studies is to gain knowledge that may help future high school students.
- We cannot promise that this research will benefit your child.
- You have the right to refuse to permit your child to take part in this research, or agree for them to take part now and change your mind later.
- If you decide to let your child take part in this research or not, take part, your decision will not affect your or your child’s relationship with Lima Senior High School or The University of Toledo.
- Please review this form carefully. Ask any questions before you make a decision about whether or not you want to take part in this research. If you decide to permit your child to take part in this research, you may ask any additional questions at any time.
- Your permission and your child’s participation in this research are voluntary.

PURPOSE (WHY THIS RESEARCH IS BEING DONE)
Your child is being asked to take part in a research study of introduction and implementation of 10 minutes of daily physical activity in freshman level health classes. The purpose of the study
is to increase awareness of the need for daily physical activity and the role of daily physical activity in the prevention of chronic disease.

Your child was selected as someone who may want to take part in this study because the freshman level health students have been selected as suggested by school administration and the interest of activities that promote healthy living in connection with health education. The maximum number of students enrolled in the study will be 240. Participation is voluntary and may be discontinued at any time.

DESCRIPTION OF THE RESEARCH PROCEDURES AND DURATION OF YOUR CHILD’S INVOLVEMENT

The following list describes the steps that will take place for this research project and the duration of your child’s participation:

1. Introduction of project to the freshman level health students.
2. Distribution of the Parental Permission Form.
3. An initial assessment of participant’s height, weight, calculated BMI, grade point average, and self-assessment of level of physical activity.
4. Implementation of daily in-class physical activity over 9 weeks.
5. A re-assessment of height, weight, calculated BMI, grade point average compared to control group.
6. Dissemination of results to school administration.

If you decide to let your child take part in this study, they will be weighed and measured for height. Additionally, your child will be asked to complete a 2 question self-assessment of their physical activity. Once this data is measured and compiled in a digital format, your child will be asked to perform 10 minutes of daily in-class physical activity.

Physical activity will be designed according to protocols from SHAPE America and Let’s Move, a federally supported program of healthy living encompassing dietary and physical activity guidelines. Physical Activity Guidelines for Americans were outlined and supported by the federal government.

RISKS AND DISCOMFORTS YOU MAY EXPERIENCE IF YOU TAKE PART IN THIS RESEARCH

This project will involve body movements which may result in sweating, body odor, increased heart rate, and enthusiastic contagious laughing. Health implications are limited but could result in musculoskeletal injury particularly with jumping, jogging, or walking. There is no economic impact, and confidentiality will be protected utilizing alphanumeric identification held only by PI and Co-PI.
POSSIBLE BENEFIT TO YOU IF YOU DECIDE TO TAKE PART IN THIS RESEARCH
Potential benefits of participation in this study are increased awareness of benefits of physical activity, increased grade point average, decreased weight, and increased fun. We cannot and do not guarantee that your child will receive any benefits from this research.

COST TO YOU FOR TAKING PART IN THIS STUDY
There are no costs associated with your child’s participation in this study.

PAYMENT OR OTHER COMPENSATION TO YOU FOR TAKING PART IN THIS RESEARCH
There is no compensation for your child’s participation in this research. Additionally, there is no penalty in grades for non-participation in the project.

PAYMENT OR OTHER COMPENSATION TO THE RESEARCH SITE
The University of Toledo is not receiving money or other benefits from this research.

ALTERNATIVE(S) TO TAKING PART IN THIS RESEARCH
There is no alternative other than choosing not to participate in this project.

CONFIDENTIALITY
The investigator’s will make every attempt to protect and secure your child’s information. In an effort to protect the information they collect, the investigators will utilize an alpha-numeric identification that will only be seen and held by them. The information that we will collected includes measured height weight, grade point average and calculated BMI.

This information will be collected on Day 1 of the project and compared to same data after completion of the 9 week period of 10 minute daily, in-class physical activity. The investigator’s may use this information themselves, or disclose or provide access to the information to school administration of Lima City Schools, Lima Ohio as part of the research study.

By agreeing to take part in this research study, you give to The University of Toledo (UT), the Principal Investigator and personnel associated with this research study your permission to use or disclose information that we obtain in connection with this study. We will use this information only for the purpose of conducting the study as described in this parental permission form.

Under some circumstances, the Institutional Review Board, or the Research and Sponsored Programs of the University of Toledo may review your information for compliance audits. The University of Toledo is required by law to protect the privacy of your information, and to use or disclose the information we obtain about you in connection with this research study only as authorized by you in this form. We will encourage any person who receives your information from us to continue to protect and not re-disclose the information.

Your permission for us to use or disclose your child’s information as described in this section is voluntary. However, your child cannot participate in the research study unless you give us your permission to use or disclose their information by signing this document.
You have the right to revoke (cancel) the permission you have given to us to use or disclose your protected health information at any time by giving written notice to:

**Huey-Shys Chen, RN, PhD, MCHES, FAAN**
College of Nursing, University of Toledo,
Collier Building, Room 4410
3000 Arlington Avenue, MS 1026
Toledo, OH 43614-2598

Your permission for us to use your child’s information expires at end of project data analysis and dissemination of results.

**IN THE EVENT OF A RESEARCH-RELATED INJURY**
The University of Toledo and The University of Toledo Medical Center do not offer reimbursement for medical expenses or other compensation for research-related injuries.

By signing this form you do not give up any of your legal rights if you are injured.

In the event of a research-related injury, contact:

**Huey-Shys Chen, RN, PhD, MCHES, FAAN**
College of Nursing, University of Toledo,
Collier Building, Room 4410
3000 Arlington Avenue, MS 1026
Toledo, OH 43614-2598
Telephone:
Co-PI: Karen M. Martin

**VOLUNTARY PARTICIPATION**
Your child’s participation in this study is voluntary. You may refuse to permit their participation or request they discontinue participation at any time without penalty or a loss of benefits to which your child is otherwise entitled. If you decide not to permit their participation or to discontinue their participation, the decision will not affect your or your child’s future relations with the University of Toledo or The University of Toledo Medical Center.

**NEW FINDINGS**
You will be notified of new information that might change your decision to be in this study if any becomes available.

Please continue to Signature page 6.
OFFER TO ANSWER QUESTIONS
Before you sign this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over. If you have questions regarding the research at any time before, during or after the study, you may contact Karen M. Martin.

If you have questions beyond those answered by the research team or your rights as a research subject or research-related injuries, please feel free to contact the Chairperson of the University of Toledo Biomedical Institutional Review Board at

SIGNATURE SECTION (Please read carefully)

YOU ARE MAKING A DECISION WHETHER OR NOT TO PERMIT YOUR CHILD’S PARTICIPATION IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES THAT YOU HAVE READ THE INFORMATION PROVIDED ABOVE, YOU HAVE HAD ALL YOUR QUESTIONS ANSWERED, AND YOU ARE PROVIDING YOUR PERMISSION.

BY SIGNING THIS DOCUMENT YOU AUTHORIZE US TO USE YOUR CHILD’S INFORMATION AS DESCRIBED IN THIS FORM.

The date you sign this document to enroll in this study, that is, today’s date, MUST fall between the dates indicated on the approval stamp affixed to the bottom of each page. These dates indicate that this form is valid when you enroll in the study but do not reflect how long you may participate in the study. Each page of this Parental Permission Form is stamped to indicate the form’s validity as approved by the UT Biomedical Institutional Review Board (IRB).

Name of Minor Participant (please print)  Name of Person Authorized to Provide Permission (please print)

Signature of Person Authorized to ProvidePermission Date

Relationship to the Subject (Parent or Legal Guardian)

Name of Person Obtaining Consent (please print)  Signature of Person Obtaining Consent Date

YOU WILL BE GIVEN A SIGNED COPY OF THIS FORM TO KEEP.
MINOR RESEARCH SUBJECT ASSENT FORM
Implementation of Mentor Led Physical Activity Among Disadvantaged High School Youth

Principal Investigator: Dr. Huey-Shys Chen PI
Co-Investigator: Karen M. Martin Co-PI

- You are being asked to be in a study to help understand people better.
- You should ask any questions you have before making up your mind.
- You can think about it and discuss it with your family or friends before you decide.
- It is okay to say "No" if you don't want to be in the study.
- If you say "Yes" you can change your mind and then quit the study at any time without any problems.

We are doing a research study about bringing physical activity into the freshman health classroom and encouraging physical activity to avoid obesity. A research study is a way to learn more about people. If you decide that you want to be part of this study, you will be asked to sign this Assent to engage in 10 minutes of physical activity at the beginning of each of your freshman health classes.

We will collect your height and weight measurements and ask you to complete a brief self-assessment of your physical activity at the beginning and end of the project. Physical activity in the classroom may cause sweating, thirst, body odor, and increased heart rate. Increased heart rate is an expected effect of physical activity. You may feel uncomfortable having your height and weight measured, but we will do our best to maintain your privacy and the confidentiality of the data.

Not everyone who takes part in this study will benefit. A benefit means that something good happens to you. We think these benefits might be increased awareness if the need for daily physical activity and the role physical activity plays in prevention of chronic illness and disease.

When we are finished with this study we will write a report about what was learned. This report will not include your name or say that you were in the study.

If you have any questions about the study, you can ask Health Teacher Ms. Weeks, School Nurse Ms. Morman or Study Co-Investigator Karen Martin. You can call the investigator(s) listed at the top of this Assent form if you have a question later.

You do not have to be in this study if you do not want to. You can decide later if you want to think about it for awhile. If you decide to be in this study, please print and sign your name below.

I, ____________________________ want to be in this research study.

(Print your name here)

Date: __________________________

(Sign your name here)

Date: __________________________

(Signature of Investigator conducting the Assent process)

UNIVERSITY OF TOLEDO IRB
APPROVAL DATE: 10/26/2015
EXPIRATION DATE: 10/25/2016
This space for IRB Approval Date Stamp
### Student Demographics

<table>
<thead>
<tr>
<th>Name/DOB</th>
<th>Height (inches)</th>
<th>Weight (pounds)</th>
<th>BMI (percentile)</th>
<th>Class time</th>
<th>Gender</th>
<th>GPA</th>
<th>PACE score</th>
<th>Race</th>
</tr>
</thead>
</table>

### Adolescent Self-Assessment of Physical Activity

**PACE+ Adolescent Physical Activity Measure**

**Physical activity** is any activity that increases your heart rate and makes you get out of breath some of the time.

**Physical activity** can be done in sports, playing with friends, or walking to school.

Some examples of physical activity are running, brisk walking, rollerblading, biking, dancing, skateboarding, swimming, soccer, basketball, football, and surfing.

Add up all the time you spend in physical activity each day (don't include your physical education or gym class).

**P1** Over the past 7 d, on how many days were you physically active for a total of at least 60 min per day?

<table>
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<th>Days</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7 days</th>
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<td>Days</td>
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</tbody>
</table>

**P2** Over a typical or usual week, on how many days are you physically active for a total of at least 60 min per day?

<table>
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<tr>
<th>Days</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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Scoring: (P1 + P2)/2 < 5 indicates not meeting physical activity guidelines.
Appendix F

Student Activity Flow Chart

1. Health Class
   - Aerobic
   - Bone
   - Muscle
   - Alternate by Health Class or Teacher Choice

2. Non-weight Bearing
   - Weight bearing
   - Inside Activity
   - Outside Activity
   - Good Weather
   - Inclement Weather
Appendix G

Administrative Consent

October 19th, 2015

To Whom It May Concern,

I am writing this letter on behalf of Karen Martin and her Let’s Move program. Lima Senior High School has given permission to partner with Karen and this program to increase the in class physical activity of our students and educate them on the need for physical activity as a preventative measure to lead healthy lifestyles.

We are excited to have Karen and her program and hope that it develops into a long standing partnership for our school. If you have any questions please feel free to contact me.

Sincerely,

Alison Van Gorder
Principal
Lima Senior High School