

Translating Research to Practice:
Using the RE-AIM Framework to Examine an
Evidenced-based Physical Activity Intervention
in Primary School Settings

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Master of Health Science



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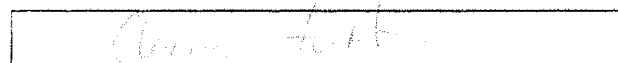
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Translating Research to Practice: Using the RE-AIM Framework to Examine an
Evidenced-based Physical Activity Intervention in Primary School Settings

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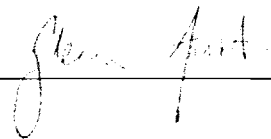
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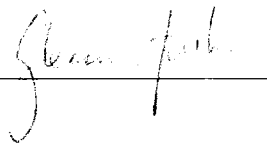
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ABSTRACT

Whilst there has been an increase in the availability of effective, evidence-based physical activity interventions in school settings over the last decade, there is a paucity of published research focusing on the translation of these effective interventions into real-world practice. The purpose of this research was to examine the translatability of an existing, effective, school-based physical activity intervention. More specifically, this research sought to identify the barriers and facilitators in adopting, implementing and maintaining a school-based physical activity intervention utilising the RE-AIM Framework. A total of eight of a possible 49 primary schools in Central Queensland participated in the study. A mixed methods approach was undertaken to identify and examine the barriers and facilitators. Findings indicate the decision to adopt the program was predominately made by key leadership personnel within the schools, with further analysis revealing funding provided and student buy-in for the project as the two predominant facilitators for adoption. The intervention was successfully implemented and maintained for 12 months as intended in all but one of the adopting schools. Major barriers to implementation were identified through interviews and included a lack of staff capacity and stability. Despite these barriers seven out of the eight schools successfully implemented and maintained the intervention. A range of intervention facilitators were identified from interviews. External project support and resources, ease of implementation, aesthetic appeal and congruence with the existing school policies and programs all facilitated intervention implementation. It was concluded that interventions that consider issues around complexity and compatibility with the school setting are more likely to be adopted, implemented and maintained. It was recommended that future evaluations of physical activity interventions should not be limited to testing internal validity, but should consider external validity and ecological aspects, relevant to increasing dissemination in real-world settings.

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I will toast you all.

DEDICATION

This work is dedicated to my “Grams”, who passed in December 2008 only months before I was able to complete this thesis, for her years of unconditional love and encouragement for life; and to my three very own “active kids” Keely Jordyn, Ella Faith and Halle Grace Austin. All four of you have touched and changed my life. Thank you

“Knowing is not enough; we must apply.

Willing is not enough; we must do.”

- Goethe

CHAPTER ONE: INTRODUCTION

1.1 Background

Physical inactivity, is a key risk factor for the development of most chronic diseases and cancers, and is attributable to an estimated 1.9 million deaths worldwide (Dobbins, De Corby, Robeson, Husson, & Tirilis, 2009). In Australia, physical inactivity among adults costs the healthcare system \$1.5 billion a year (Medibank Private, 2007) and is responsible for an estimated 8,000 deaths annually (Bauman, 2004). Conversely, the positive association between physical activity and cardio-vascular disease alone, has been observed and replicated in over five decades of research. Evidence suggesting a dose response relationship, with maximal risk reduction of the disease observed among inactive individuals who move to becoming at least moderately active (Jago & Baranowski, 2004). There is also demonstrated evidence that a combination of modest weight loss, diet and meeting the moderate physical activity recommendations can confer a 50 to 60% reduction in risk of developing diabetes among those already at high risk (Jago & Baranowski). For Queensland, chronic disease is presenting significant challenges for the health of the population. In 2006, in excess of 80% of health problems for Queenslanders were due to chronic disease and this is projected to increase 22% over the next decade (Queensland Health, 2008). To prevent chronic disease it is essential to know which risk factors are most influential and amenable to intervention. Begg et al. (2008) reported that 13 measurable and preventable risk factors cause almost one third of the total impact of ill health and premature death in Queensland, with tobacco smoking and physical inactivity the two largest individual causes of the burden of

disease, these costs to individuals and the health system are avoidable. It is unsurprising therefore, that the promotion of physical activity has been coined ‘today’s best buy in public health’, with significant savings in health care resulting from a mere 10% increase in physical activity levels population wide (Timperio, Salmon, & Ball, 2004).

Prevention efforts must begin at a young age (Franks et al., 2007), as developed countries are now reporting the presence of chronic disease risk factors in children (Naylor & McKay, 2009). Events that occur at the earliest stages of human development even before birth, may have a profound influence on risks for cardiovascular disease, diabetes and other common adult chronic conditions (Kumanyika et al., 2008). Therefore the early years are potentially important focal points for preventative efforts. Additionally, a focus on early prevention is particularly important in view of how difficult it is to achieve and sustain healthy habits including weight loss in later adult years (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2002). Keller (2008) sums up our current predicament stating, “The risk to future generations, who may have little or no knowledge of what constitutes a healthy lifestyle, is upon us” (p. 70).

The 1996 US Surgeon General’s Report on physical activity and health, confirmed that regular moderate to vigorous physical activity positively contributes to the physical and psychological well-being of children and adolescents (United States Department of Health and Human Services [USDHHS], 1996). More specifically, regular moderate to vigorous physical activity increases cardiorespiratory fitness and improves muscle strength, potentially prevents overweight and obesity, enhances self-esteem and self-concept, and has potential to lower anxiety and stress (USDHHS, 1996). Current

research continues to suggest that the best primary prevention strategy for improving the long-term health of children and young people through exercise may be by creating a lifestyle pattern of regular physical activity, that will continue through to the adult years (Dobbins et al., 2001). In 2003, Trost authored a report commissioned by the Australian Department for Health and Ageing, which highlighted physical activity to have an immediate effect on health outcomes with children and youth (Trost, 2003). Such benefits included: decreasing adiposity (i.e., achieving and maintaining body weight, reducing body fat), improving skeletal health (i.e., building and maintaining healthy bones, muscles and joints), and several aspects of improved psychological health. Additionally, Trost also reported several psychological indicators including depression, poor self-esteem, anxiety, stress, and poor self-concept being positively correlated with behaviours such as smoking, alcohol use and illegal drug use. More recently, Warburton, Nicol, and Bredin (2006), in a review of the health benefits of physical activity, reinforced the evidence for the primary and secondary prevention of several leading chronic diseases and illnesses such as cardiovascular disease, diabetes, cancer, hypertension, obesity, depression, and osteoporosis.

For Australians, the overall message that emerges from national surveillance data is that physical activity behaviour has not changed significantly during the last 13 years, remaining virtually the same as it was at the time of the 1996 Surgeon General's report (USDHHS, 1996). Current estimates indicate less than half of Australia's adult population is sufficiently active for health benefits, with about 15% completely sedentary (Bauman, 2004). The recent emergence of both national and state-wide

physical activity reports have provided the first, definitive pictures of physical activity levels for Australian children. Findings from the 2007 Australian National Children's Nutrition and Physical Activity Survey (CSRIO, 2007) were released and reported that on any given day, there was only a 69% chance that any given child would achieve the Australian Physical Activity Recommendations for Children (Department of Health and Ageing [DOHA], 2004) of at least 60 minutes of moderate to vigorous physical activity. Furthermore, there was only a 33% chance that any given child would not exceed the 120 minute guidelines for electronic media use, while overall adolescent girls achieved lower levels of physical activity than boys. In Queensland, findings from the Healthy Kids Queensland Survey 2006 indicated that approximately 16% of Year 1 boys met the daily physical activity recommendations, dropping to 12% by Year 10. By contrast, less than 7% of Year 1 girls met daily physical activity recommendations, decreasing to 5% by Year 10 (Abbot et al., 2007).

In addressing the issue of low levels of physical activity and the subsequent health consequences for Australia's children, a focus on primary prevention offers a viable path forward. Physical activity behaviours learnt during childhood may persist to adulthood, and thus interventions aimed at changing behaviour during this period have potential for establishing healthy behaviours for a lifetime (Kumanyika et al., 2008). Meininger (2000) also reports that interventions which begin early in life are essential for primary prevention of cardiovascular disease and a number of other chronic health conditions because poor health risk factors become established early in life and do track from childhood through to adulthood. More recently Dobbins et al. (2009) reinforced the message that school-based physical activity interventions may be effective in the

development of healthy lifestyle behaviours among children that will then translate into reduced risk for many chronic diseases and cancers in adulthood.

Crucial then to halting and ultimately reversing our current physical inactivity trends in children is the identification of evidence-based strategies, particularly interventions that can be delivered in clearly identifiable settings. There is strong evidence that settings, typically geographical areas (e.g., communities) or institutions with a large captive audience (e.g., schools), can either support or mitigate against physical activity (Tudor-Locke, Ainsworth, & Popkin, 2001). Subsequently, in recent years many school setting physical activity interventions have been developed, trialled, and evaluated. Evidence of the increasing focus on physical activity in the school setting was presented in Brown and Summerbell's (2009) systematic review of obesity prevention studies in the school setting that used physical activity as a component of the intervention. They noted that 20 studies were published in the area of physical activity between 1990 and 2005, with an additional 15 published between 2006 and September 2007, all of which focused on obesity prevention in school children using physical activity as a component of the intervention (T. Brown & Summerbell). Numerous literature reviews have documented the effectiveness of interventions targeting physical activity initiation and maintenance in children and young people (Baranowski et al., 2002; T. Brown & Summerbell 2009; Dobbins et al., 2001; Jago & Baranowski, 2004; Kropski, 2008; Meininger, 2000; Ogilvie, Egan, Hamilton, & Petticrew, 2004; Owen, Glanz, Sallis, & Kelder, 2006; Salmon, Booth, Phongsavan, Murphy, & Timperio, 2007; Thomas, Ciliska, Micucci, Wilson-Abra, & Dobbins, 2004; Timperio et al., 2004; van Sluijs, McMinn, & Griffin,

2007), with most studies providing support for the effectiveness of different interventions, however the magnitude of their effect on physical activity behaviour change varies.

In a 2007 narrative review of interventions to promote physical activity participation among children and adolescents, those that were most effective in the school setting included some focus on physical education, activity breaks, and family strategies (Salmon et al., 2007). Furthermore, school programs that included a focus on aerobic activity versus skill development, resulted in increased overall levels of physical activity, while interventions which were multi-faceted were found to be more effective than classroom only approaches (Thomas et al., 2004). Kropski, Keckley, and Jensen (2008) reported through qualitative analysis, that programs grounded in social learning theory may be more appropriate for girls, while structural and environmental interventions enabling physical activity may be more effective for boys. Researchers, van Sluijs, McMinn, and Griffin (2007) suggest that multi-component interventions that included both school family or community involvement have the potential to make important differences to levels of physical activity and should be promoted. From an education or health promotion practitioner's perspective, the myriad of physical activity interventions and strategies that have been implemented and reported have produced markedly varied results over the last decade, making it difficult to know which combination of school-based physical activity strategies are most effective and should be adopted.

While current research findings at least provide support and promise for increasing levels of physical activity in children, there is scant evidence that these successful (i.e., efficacious) interventions have made the transition to mainstream or real-world practice, once a research project has been completed. The transition from controlled research to determine effectiveness, to the application of an intervention in a real-world setting, can be described as the translation from ‘research to practice’ (Estabrooks & Gyurcsik, 2003). Klesges et al. (2005a) states there is little indication that these efficacious interventions are being disseminated into mainstream practice and in fact, there is evidence they are not. Furthermore Klesges and colleagues (2005a) report that researchers were far more likely to report information on internal validity (i.e., does the intervention do what it purports to do?) compared to characteristics of external validity (i.e., will it work in my setting?). This classic efficacy research environment is fundamentally different from the practice, real-world conditions which exist in our schools. Specifically these differences in schools have included: characteristics of participants, availability of supportive resources, competing time demands and priorities, and the level of expertise of those charged with implementing interventions. Subsequently, research methods and evaluation tools that incorporate aspects of both internal and external validity are needed and would assist in facilitating the transition of intervention research into practice by providing assessment of causal inferences and sound extrapolations to diverse populations and settings (Klesges et al., 2005a).

In response to these concerns and the lack of clear guidelines for assessing the translation of research to practice Glasgow conceptualised the RE-AIM Framework

(Glasgow, Vogt, & Boles, 1999). RE-AIM (i.e., reach, efficacy, adoption, implementation, and maintenance) is a function of five dimensions that considers results not only at an individual level, but also at the setting level (Table 1). The RE-AIM framework, has been adapted and expands on earlier work of diffusion theory (Rogers, 2002), and health promotion planning. A central tenant to the framework is that the ultimate impact of an intervention is a result of its combined effects on the five evaluative dimensions listed above.

Table 1: The RE-AIM Framework

RE-AIM Element	Description
Reach	Who is intended to benefit from the intervention? And will they participate?
Effectiveness	Will the intervention be effective in practice? And what are the likely adverse consequences?
Adoption	Can many settings easily adopt this intervention?
Implementation	Is the intervention feasible to implement and can it be consistently delivered as intended?
Maintenance	What is the potential cost and sustainability of the intervention in practice settings?

(Adapted from <http://www.re-aim.org>, 2007)

According to Estabrooks and Gyurcsik (2003), the dearth of information regarding the translation of research to practice and the public health impact of effective physical activity interventions is potentially the result of two primary mechanisms. Firstly, the goal of physical activity research in the exercise psychology domain has been to

determine the effect of an intervention when tested under optimal conditions. As a result, the goal of strong internal validity (e.g., does the intervention work?) has been paramount, while at the same time the goals of public health translation for physical activity research have received little attention. Secondly, there is no clear criteria for evaluating public health impact or translatability of physical activity promotion interventions (Estabrooks & Gyurcsik).

Whilst numerous national and regional surveys, state health reports, and prospective interventional studies continue to conclude that regular physical activity improves physical, mental, and social functioning and reduces the risk and burden of a range of chronic diseases, there is little wonder the promotion of physical activity is regarded as a ‘best buy’ for improving public health (Ogilvie et al., 2004). So the question begs, if we know physical activity is good for us and we have strong evidence of efficacious interventions across a range of settings, why haven’t population levels of children’s physical activity improved? The challenge now facing the health promotion profession is to further examine and understand the research to practice chasm.

1.2 Purpose of the Research

Aim:

This project was designed to take important steps in bridging our understanding of the gap between efficacy-based intervention research and the translation of these effective interventions to real-world settings. Specifically, the research aimed to examine the elements of a school-based physical activity intervention that both supported and hindered the uptake and ongoing implementation. This study, employed a mixed methods approach to examine and explore factors related to the reach, adoption, implementation, and maintenance of the intervention, while examining the barriers and facilitators of the ‘research to practice’ gap. This is seen as a crucial step for the broader dissemination of physical activity interventions.

Objectives:

1. To engage and describe the process of recruiting primary schools to adopt an evidenced-based physical activity intervention.
2. To identify and describe the barriers and facilitators of implementing an efficacious physical activity intervention.
3. To examine the long term feasibility of implementing the intervention over a 12 month period.
4. To investigate physical activity policy changes related to implementation of the intervention after 12 months.

1.3 Significance of the Research

The concept that physical activity is good for us and the development of effective behaviour change interventions is well established within health promotion and public health literature. Unfortunately, an aspect that has received very little attention is the examination of these effective interventions applied in real-world settings.

Once effective interventions are developed, in this case a school-based physical activity intervention, it is necessary to evaluate if they have broad reach, are able to be adopted, implemented, and maintained at an organisational level. Studies such as this reflect a necessary phase of research that targets systemic use of an intervention and should be the final stop before mainstream dissemination.

This research will be of interest to both education and public health researchers and practitioners as it offers insight into the dissemination of effective interventions. This will be achieved through providing explanation around the barriers and facilitators, which either reduce or increase the likelihood of successful adoption and ongoing implementation of an effective physical activity intervention in the primary school setting.

1.4 Limitations

Although this study provides useful information around the barriers and facilitators of adopting and implementing a physical activity intervention in the primary school setting, it has several limitations, including a small sample size. This is a common limitation of organisational level studies where the organisation is the unit of sampling and analysis. Hence future studies should look to expand the number of participating organisations allowing for further insight into the barriers and facilitators that influence the adoption, implementation, and maintenance of interventions. Another limitation needing consideration is the reliance on self-reported data. Self-reporting methods were used for this study in order to reduce the burden of reporting on participating schools. The main concern relating to self reported data is social desirability (Klesges et al., 2004), which infers that school personnel potentially may report back only favourable responses, wanting their school to appear successful.

Another limiting factor that may have negatively affected the generalisability of the findings was the over representation of the more motivated school settings, who traditionally seek out new programs and interventions (Owen et al., 2006). However, in the real-world it is precisely these more motivated settings that would make use of these kinds of programs. While the disproportionate sample presents a potential methodological weakness, it may also make the findings more salient as a result. In effect, it has resulted in an over sampling of the portion of settings who have more propensity to adopt and implement new physical activity interventions.

Whilst acknowledging that mixed methods research has its drawbacks (i.e., its subjective nature creates difficulties in establishing reliability and validity, and the risk of researcher and participant induced biases), it can lead to a greater depth of information when examining themes from research data. Subsequently, it can lead to a more complex understanding of the topic and elicit data which would not be revealed by either method alone. Therefore evidence derived in this way may be more likely to have practical significance offering guidance on how to create the conditions for successful intervention adoption, implementation, and maintenance.

Finally, it was beyond the scope of this research project to assess both the internal and external validity of the intervention simultaneously. However, as efficacy of the intervention has been previously determined and reported in the literature on numerous occasions (Ridgers, Stratton, & Fairclough, 2006; Ridgers, Stratton, Fairclough, & Twisk, 2007a, 2007b; Stratton & Mullan, 2005; Stratton, Ridgers, Fairclough, & Richardson, 2007), it was not considered necessary as this study set out to examine factors surrounding external validity of the intervention.

Notwithstanding these limitations the findings have implications for education, health promotion, and public health researchers and practitioners in the planning, implementation, and evaluation of school-based physical activity interventions in real-world settings.

1.5 Delimitations

The following delimitations apply to this study:

1. The setting was delimited to primary schools in the Rockhampton Education District of Central Queensland.
2. The study was delimited to examine only four aspects of the RE-AIM framework, including reach, adoption, implementation, and maintenance.
3. The study was delimited to examine the factors associated with external validity, therefore the study did not test the efficacy of the intervention on changing physical activity behaviour in children.

1.6 Operational Definitions

Physical activity: Any bodily movement produced by skeletal muscles that results in an expenditure of energy (The Strategic Inter-governmental forum on Physical Activity and Health (SIGPAH), 2005).

Moderate to Vigorous Physical Activity: A slight, but noticeable increase in heart-rate and breathing ((SIGPAH))

Children: Includes those aged between five (5) and 11 years of age (Timperio et al., 2004)

Adolescents: Includes those aged between 12 and 18 years of age (Timperio et al., 2004)

Intervention Internal Validity: Will the intervention work (i.e., change behaviour) compared to controls? (Klesges et al., 2005a)

Intervention External Validity: Will the intervention work in my setting? (Klesges et al., 2005a)

1.7 Structure of the Thesis

This thesis will use a paper-for-submission approach. It begins with a review of the current physical inactivity problem, highlighting the prevalence and significance of the issue, with a particular focus on children. Chapter two continues the discussion with a focus on the benefits for children who engage in both play and physical activity, following on with a discussion around the complexity of influences for children's participation in physical activity. An overview of the Australian context follows, including current children's physical activity levels, new national recommendations for physical activity and evidence for effective interventions, particularly in the school setting. It concludes by highlighting the gap between efficacy research and the translation of these effective interventions into real-world practice.

Chapter three is the journal article for submission and is written for the Journal of Health Promotion Practice. Chapter three is presented in the style and format required for that publication.

Chapter four provides an overall summary and conclusions for the study and places the research findings in the context of the literature.

The final chapter, Chapter five, makes general and specific recommendations for future research.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter focuses on the multiple factors associated with influencing and subsequently addressing children's physical activity levels. It begins with an overview of the health consequences associated with physical inactivity, and a summary of the known health benefits for active children. It follows with a detailed review of the current Australian context, including current levels of physical activity in children and the release of physical activity recommendations for five to 12 year olds. It then examines the development and reporting on various effective interventions for children, delivered predominately via the school setting. While the research of effective interventions for children is well documented, many researchers are still focusing almost solely on the development of efficacious physical activity interventions, while the translation of these into 'real-world' settings is less prominent. In the following sections the case is then made for the necessary inclusion of factors associated with external validity, acknowledging the complex interplay between efficacy research and the dissemination to the 'real-world'. Critical to wide-scale population shifts of physical activity in children is broad dissemination of effective interventions via the school setting.

2.1 Physical Inactivity as a Population Health Priority

Latest international estimates of causes of death related to poor diet and physical inactivity are of real concern, with a reported 33% increase between the period of 1990 (14%) and 2000 (16.6%) in the United States (Mokdad, Marks, Stroup, & Gerberding, 2004). Poor diet and physical inactivity also demonstrated the largest percentage

increase among all causes of death, with the majority of this burden related to preventable lifestyle diseases such as coronary heart disease, diabetes, colon cancer, hypertension, and overweight and obesity (Mokdad et al., 2004). In Australian adults, the costs of physical inactivity to the healthcare system are \$1.5 billion a year (Medibank Private, 2007), as well as being responsible for an estimated 8,000 deaths annually (Bauman, 2004). The evidence of impact for health related physical activity varies for different medical conditions with stronger evidence for the prevention of cardiovascular disease, diabetes, and colon and breast cancer, with maximal risk reduction observed amongst those individuals who are inactive who move to becoming at least moderately active (Baranowski et al., 2002). There are additional benefits from vigorous physical activity and generally there is a dose response relationship, which is stronger for males than females (Baranowski et al.). There is also evidence that a combination of modest weight loss, diet and meeting the moderate physical activity recommendations can confer a 50 to 60% reduction in the likelihood of developing diabetes among those already at high risk (Jago & Baranowski, 2004). The magnitude of the problem in the adult population, both economically and socially, warrants a focus on promoting positive physical activity behaviours at an early age to prevent the onset of these poor health consequences in later life.

Whilst intuitively known to be the most active segment of our population, studies continue to report significant health issues for children as a result of low levels of physical activity. Indicative of this is that physical inactivity has been shown to be associated with increased risk of a poor cardiovascular disease profiles and overweight

and obesity among children as young as 12 years of age (Baranowski et al., 1992). More recently, in a sample of 5,500 New South Wales school children, almost 20% of 15 to 16 year olds had high insulin concentrations, placing them at risk for the development of type 2 diabetes (Booth et al., 2006). Furthermore, 9% of boys showed early signs of damage to their livers and 10% had existing risk factors for the development of cardiovascular disease. The authors concluded that “The findings of this study are of very real concern” (p. 20). While the clinical manifestations of cardiovascular disease do not occur until middle adulthood, studies are showing that atherosclerosis has its origins in childhood and adolescence, with evidence of tracking of these risk factors from childhood through to adulthood (Eisenmann, 2004). The priority for early investment around the development of healthy, physical activity patterns and habits for children appears well founded.

2.2 Physical Activity and Play

2.2.1 Physical activity

Physical activity can be defined as any bodily movement produced by skeletal muscles that results in expenditure of energy (Strategic Inter-Governmental forum on Physical Activity and Health [SIGPAH], 2005). Evidence for the social, mental, and physical health benefits experienced by physically active children is accumulating, with active children experiencing improved cardiovascular health, increased bone density, being leaner than their inactive counterparts and having increased movement and social skill function (Salmon, Telford, & Crawford, 2004; Trost, 2003). From a social and psychological perspective, reductions in stress, anxiety, depression and enhanced social

skills and self-esteem can also be seen with physically active children (Salmon et al., 2004; Trost, 2003). Along with the direct and often immediate benefits, a physically active lifestyle also appears to be associated with the avoidance of a number of other unhealthy behaviours, such as smoking, excessive alcohol consumption, drug use, and violent behaviour (Trost).

The benefits of physical in activity children extend beyond the interest of the health sector, as evidence for a range of improved cognitive functions continues to emerge. Cross-sectional observations show a positive association between academic performance and physical activity and physical fitness, with physical activity having a positive influence on concentration and memory as well as classroom behaviour (Taras, 2005). Understanding the impact of student health on educational outcomes has major implications for researchers and practitioners, including ramifications of how schools may address current and future health concerns (Taras). Physiologically, physical activity improves general circulation, increases blood flow to the brain, and raises levels of norepinephrine and endorphins – all of which may reduce stress, improve mood, induce a calming effect after exercise, and perhaps as a result improve achievement (Taras). In a recent study, examining the association between time spent in physical education and academic achievement, Carlson et al. (2008) found a small but significant benefit for academic achievement in mathematics and reading for girls enrolled in high amounts of physical education (i.e., 70 to 300 minutes per week), with no effect for boys. Whilst the evidence regarding the association between physical activity and improved academic achievement is not overly strong, Taras (2005) would argue that the

paucity of evidence should not be considered justification to limit school physical education and physical activity programs because they may detract from time spent on other subjects. Finally, the structure of physical activity in schools also provides social benefits that could result in improved academic and behavioural outcomes. Children learn to cooperate, share and abide by rules of group physical activities, and those who learn to discover and test their physical abilities even in individual activities are likely to feel more connected to their school and community and want to challenge themselves (Taras).

2.2.2 Play

Play, which is any non-organised activity of moderate or vigorous intensity, is widely recognised as an important aspect of children's physical, social, and cognitive development (Ginsburg, 2007). Through play, children gain information about themselves, their bodies, their peers, and the physical environment (Waite-Stupiansky, 2001). Play, especially outdoors, provides stimulation of the senses and the body's sense of movement through space, aiding the development of children's perceptual abilities (Waite-Stupiansky). Play research has also shown that children develop social and emotional skills, increased imagination and creativity, and increased discovery, reasoning and manipulative skills (Hernandez, 2001).

2.2.2.1 Social Benefits

The development of social relationships outside the classroom, typically on the playground, can assist children to facilitate relationships and learning inside the

classroom. These social relationships enhance individual students' positive association with the school and provide relief from stress (Waite-Stupiansky, 2001) and according to Jambor (2001), children must function in both the social and cognitive domains if they are to successfully adapt to school and societal norms. Pellegrini and Smith (1993) add that, through play children learn skills of presentation management (e.g., keeping status even after losing a game) and manipulation (e.g., ways of excluding unwanted children from a game). These important social strategies are not necessarily taught in all classrooms. The notion of play as preparation for adulthood is extended to the development of gender roles, with girls play tending to be more cooperative than competitive, occupied in smaller, less diverse groups and with more close and intimate relationships (Pellegrini & Smith). Whereas boys tend to play in larger more heterogeneous groups, with play often involving coordination of the different types of children around a competitive team theme (Pellegrini & Smith). Also during play children learn the art of expressing themselves to others and begin rehearsing behaviours and skills and begin to understand which behaviours result in approval or disapproval from peers. Additionally the development of a positive social and working relationship with peers helps children to develop a sense of social and emotional (Jambor).

2.2.2.2 Educational and Cognitive Benefits

The cerebellum, the area of the brain associated with movement, has been found to be a 'virtual switchboard of cognitive activity', with the performance of complex movements like dancing, throwing a ball or playing tag engaging the same area of the brain as those involved in problem solving, planning, and sequencing (Waite-Stupiansky, 2001). It is

also documented that physical exercise fuels the brain with oxygen and causes the release of mood-enhancing chemicals as well as enhancing the ability of brain neurons to communicate with one another (Waite-Stupiansky). In a recent review by Tomporowski, Davis, Miller, and Naglieri (2007), authors reviewed published studies which examined the effects of physical activity and exercise on children's intellectual function, cognitive ability and academic achievement, concluding that evidence for a positive relation between chronic exercise and children's academic achievement.

Play is also well regarded as a major learning vehicle for children. Through play children are able to answer their own questions and test their own limits in ways which are important to them (Hernandez, 2001). Additionally, during recess play teachers are provided with a unique opportunity to see children outside the confines of the classroom, enabling teachers to observe children and assess patterns of behaviour, development of gender roles and social interactions, offering them a view of the whole child. The provision for active free play with peers also facilitates the encoding and decoding of social signals, mechanisms which are every bit as cognitive as maths seatwork (Bjorklund & Brown, 1998).

2.2.2.3 Physical Benefits

Further to the documented health benefits of physically active children, active play confers additional physical benefits. Children's need for vigorous physical activity has been illustrated previously by the burst of high-intensity physical activity during the first six to seven minutes of recess (Pellegrini & Davis, 1993). Such high intensity, short

duration physical play may be a more effective means of training for muscle strength and cardiac capacity than longer, less intense activity (Bekoff, 1988). It is also essential that children be given the opportunity to expend energy and interact with peers in meaningful ways, with Pellegrini and Davis (1993) reporting that prolonged periods of confinement in elementary school classrooms can lead to increased fidgeting, restlessness, and a subsequent inability to concentrate. Conversely, play allows children to express ideas and feelings, obtain new knowledge and develop oral language skills as they interact with objects and people around them (Hernandez, 2001). Through physical movement and activity, children also become aware of their physical space and begin to understand how their bodies function in space (Jambor, 2001). Later through practice, children can develop greater control of gross-motor manipulative skills (e.g., throwing, catching, bouncing and kicking) while attempts to traverse the monkey bars, negotiate a hopscotch course or toss a ball require development of intricate behaviours of planning, balance, and strength. These are traits to encourage and support in every child as ignoring these developmental functions of unstructured outdoor play potentially denies children the opportunity to expand their imaginations beyond the constraints of the classroom (Jambor).

2.3 Correlates of Physical Activity in Children

Given both the immediate and long-term health risks associated with physical inactivity and the reported benefits of higher levels of physical activity in children, it is important to understand the factors which influence these behaviours, to identify and inform appropriate points for intervention. The complex range of correlates known and reported

to affect children's decisions to be physically active include personal (e.g., biological and demographic) and psychological characteristics, along with both their social and physical environments (Van Der Horst, Paw, Twisk, & Van Mechelen, 2007).

According to Biddle, Gorely, Marshall, Murdey, and Cameron (2004), factors which contribute to the overall inactive nature of our children and young people's lifestyles include the greater availability of television, increased car use, concomitant unattractiveness of cycling and walking, increased perceptions of 'stranger danger', and changes to school curricula which have lead to reductions in physical education and competing demands on young people's time. We also have falling levels of sports participation, decreases in active transport, failure to reach physical education targets, and changes to built environments such as reduced open spaces and disintegration of community focal points, which have all added to the reduced levels of physical activity in our children (Olds & Ridley, 2005).

2.3.1 Individual Correlates (physiological and psychological)

By far the best predictor of the amount and type of physical activity a child enjoys is gender, with overwhelming evidence that boys are more active than girls (Biddle, Gorely, Marshall et al., 2004; Olds & Ridley, 2005; Van Der Horst et al., 2007). After gender the best predictor is age (Biddle, Gorely, & Stensel, 2004), with overall levels of physical activity declining as children get older, with the sharpest falls around puberty (Nader, Bradley, Houts, McRitchie, & O'Brien, 2008; Salmon et al., 2004). The effects of biological variables on physical activity may in part be mediated by gender

differences in socialisation (Sallis, Prochaska, & Taylor, 2000). These gender variances need to be carefully considered as we move toward broader dissemination of interventions, ensuring that girls are not further marginalised in overall physical activity participation.

The greatest decline in physical activity during the lifespan occurs from childhood to adolescence between the ages of approximately 13 to 16 years of age (Keller et al., 2009), reinforcing the need for researchers and practitioners to focus on the development of early, positive physical activity patterns and habits. In boys, physical activity levels at puberty may persist until mid-adolescence (~15 years of age) before decreasing (Katzmarzyk & Janssen, 2004). Comparatively, girls' declines in physical activity persist through adolescence (Trost, Pate et al., 2002), further highlighting the need to carefully consider gender differences and influences for intervention choices. More recently Keller (2008) reported that the largest decrease in all intensities of physical activity occurred between eight and nine years of age in both boys and girls, providing additional justification and need for priority early investment in promoting physical activity among children.

In a review of correlates of physical activity and youth by Van Der Horst, Paw, Twisk, and Van Mechelen (2007), results suggested correlates for children were gender, self efficacy, parental physical activity for boys, and parental support. For adolescents, correlates were gender, parental education, attitude, self efficacy, goal orientation/motivation, physical education/sports participation, family influences, and

friend support. When combining both children and adolescents, gender, self efficacy, and family/parent support were associated with physical activity (Van Der Horst et al.).

There is some good news about physical activity and sports participation though, with Olds et al. (2004) reporting that both are still highly valued by parents and children. The authors contended that 30% of children reported parents as the main influence on their activity choices, via role modelling and provision of logistical support (e.g., transport and costs). Brunton and colleagues' (2003) systematic review on the barriers and facilitators of physical activity among children, also identified a range of factors which referred to parental influence, with authors reporting that creating links with parents appearing to be effective for increasing children's overall physical activity participation. Thus the inclusion of, or links with parents in design and delivery of physical activity interventions would seem a valuable component to consider.

Another psychological determinant that reportedly influences children's participation in physical activity are the experiences of fun and enjoyment. Dishman et al. (2005) provided the first and only experimental evidence from a randomised control trial, directly showing increased enjoyment resulting in increased physical activity for adolescent girls. These experimental findings extend the existing correlational evidence linking enjoyment with physical activity, where it has been reported that building on the social and fun aspects of participating in physical activity should be the starting point for development of effective interventions (Brunton et al., 2003). These social and fun aspects could include participation with friends, and offering a wide range and variety of

physical activity choices. More recently Lonsdale, Sabiston, Raedeke, Ha, and Sum (2009) examined the relationship between students' self-determined motivation and their physical activity behaviour during a structured physical education lesson and a free-choice period in which students were not required to be active. The findings revealed that self-determined motivation, which provided student's opportunities to make choices, was related to greater physical activity. The authors further reported that self-determined motivation is especially important when students are not supervised, intimating that the free choice environment may have satisfied underlying psychological needs of autonomy and competence and the lack of teacher input may have removed feelings of imposed goals, pressure to perform or the possibility of negative feedback (Lonsdale et al., 2009). Fun and choice appear to be critical elements to consider in the design and delivery of physical activity interventions for children. This may have greater significance for girls, with girls having lower overall physical activity levels, compared with boys and more rapid overall declines in physical activity, compared with boys. Keller, Stroschein, Lia-Hoagberg, and Schaffer (2004) concurred stating that it is important to consider the social interaction, and skill development, then competition to promote physical activity, particularly among girls. It seems prudent therefore, to suggest that fun and choice elements should be included as a priority in all children's physical activity interventions.

In an Australian report (Olds et al., 2004), the most commonly cited reason for sport non-participation was insufficient time and other commitments including homework and jobs. Focus groups raised issues around rigid rules, uniforms, training drills,

competition, winning, and fear of injury as barriers to participation in sport and physical activity. Intervention designs and choices therefore, should look to minimise these participation barriers and focus on participation enablers and facilitators, including those around fun and choice to provide the best possible chance of engaging the full spectrum of active and inactive children.

2.3.2 Social Environment Correlates

The influence of social factors on health enhancing behaviours is now widely recognised and accepted in health behaviour research (Emmons, Barbeau, Gutheil, Stryker, & Stoddard, 2007), with it well established that health status of individuals and communities tends to improve with increasing social and economic status. By examining and understanding how key social influences mediate variables related to health behaviours, we can learn more about the types of interventions that might be needed to promote sustained health behaviour change at a population level (Emmons et al., 2007), particularly to reach those most in need.

From a socio-economic perspective, individuals at the highest levels of income and education are more likely to engage in healthy behaviours, as well as tending to adopt more health-promoting behaviours and reduce risk taking behaviours at a faster rate than those who are poorer (Institute of Medicine, 2003). Additionally unequal distribution of physical activity resources (e.g., walking trails) in more affluent communities is also likely to influence opportunities for physical activity participation (Gordon-Larsen, Nelson, Page, & Popkin, 2006).

In terms of socio-economic factors associated specifically with children's physical activity, researchers and the literature are divided, with some authors concluding that it is not possible to establish a clear relation, with further observations needed (Biddle, Gorely, & Stensel, 2004; Sallis et al., 2000). While, on the other hand, other researchers affirm that higher socio-economic status and educational levels of parents are positively associated with levels of moderate to vigorous physical activity in adolescents (Brodersen, Steptoe, Boniface, & Wardle, 2007). A more recent study by Borraccino et al., (2009), examined the relationship between age and gender with physical activity from students across 32 countries, concluding socio-economic status seems to be significantly associated with the amount of moderate to vigorous physical activity declared. In a review by Van Der Horst, Paw, Twisk, and Van Mechelen (2007), 24 studies were identified which examined demographic and biological variables as correlates of adolescents' physical activity. While no association between socio-economic status or Body Mass Index (BMI) were found, the evidence for age and ethnicity was inconclusive (Van Der Horst et al.).

The influences of peer and family support for children to be physically active provides further insight into key aspects when considering the development of successful interventions. Bauman (2004) found a strong relationship for social support from parents and others particularly with adolescent's physical activity, suggesting that parents still play important roles in their teenagers' lives. In fact children with physically active parents are usually far more active than children whose parents are inactive (Bauman, 2004; Ferreira et al., 2007).

Peer relationships are also important for understanding children's involvement in physical activity, with friendships offering important opportunities for companionship and physical activity alternatives to more sedentary behaviours (Salvy et al., 2008). In contrast, social isolation and peer victimisation may impose constraints on access to healthy alternatives, including physical activity participation. Attempts to merely substitute physical activity for sedentary behaviour and eating may not be effective if problematic peer relationships exist, in part because sedentary activities and snack foods are easily accessible and less threatening for socially isolated children (Salvy et al.). The authors further documented that the presence of peers and friends was associated with higher activity intensity, and that time spent alone was related to lower activity intensity. Children were also more likely to report more intense physical activity when in the company of peers or close friends, with overweight children reporting greater physical activity when in the presence of peers, more so than their lean counterparts (Salvy et al.). This finding suggests the 'power' of friendships may be greater for overweight children than those who are lean, highlighting the importance of considering peer relationships and social aspects of physical activity interventions, particularly as we strive to reduce the health inequity gap and provide greater reach of healthy alternatives to more at-risk groups.

2.3.3 Physical Environment Correlates

Although it is obvious that children must be active in some place, research findings regarding access to programs, facilities, and opportunities empirically validate the need for appropriate physical environment supports to enable children's physical activity

(Bauman, Sallis, Dzewaltowski, & Owen, 2002; Davison & Lawson, 2006). Environmental influences may also be especially pertinent to young children, as they tend to have less autonomy about their physical activity behaviour choices (Ferreira et al., 2007). While the structure of neighbourhoods is important for physical activity participation across a number of age groups, including children, the presence of major arterial roads, poor lighting, cul-de-sac street layouts, and the agglomeration of neighbourhood shops into shopping centres are all reported to discourage children's active transport (Olds et al., 2004). Conversely, both the amount of play space available and its layout are known to positively affect physical activity levels of children, with the amount of activity equipment in home and school positively influencing play behaviours (Olds et al.). Hume and Colleague's (2009) examined predictors of children's and adolescents' walking and cycling to and from school over a two year period, with major findings reported for children and adolescence respectively including; social factors (e.g., children whose parents knew many people in the neighbourhood were more likely to increase their active commuting) and physical environment factors (e.g., adolescent parents who perceived there to be insufficient traffic lights and pedestrian crossings were less likely to increase their active commuting). Additionally in a review of environmental determinants of active travel in youth, Panter, Jones and van Sluijs (2008) reported length of route to school to be the significant predictor across all of the studies, with those who had shorter distances being more likely to walk or cycle to school.

Davison and Lawson (2006) provided a more detailed picture of environmental influences on children's physical activity. Variables such as transport infrastructure, proximity of recreational playgrounds and parks, availability of recreational facilities, equipment, and play structures in schools were all positively associated with higher levels of physical activity in children through objective measurement. More specifically, the transport infrastructure studies demonstrated that children were more active when there were sidewalks in the neighbourhood, they had destinations to walk to, public transport was available, there were fewer uncontrolled intersections and traffic density was low. While intervening on these influences has become a priority across a range of sectors, including health, transport, education and local governments, successful intervention efforts require influence, planning and implementation strategies that are complex and substantial in terms of both time and costs.

A more feasible option for promoting physical activity in children could be a focus on recreational physical activity infrastructure, in particular within schools. Davison and Lawson (2006) reported the availability of facilities in neighbourhoods and equipment and permanent activity structures in school play areas were associated with higher levels of physical activity. In particular, a positive association between proximity of parks and playgrounds with children's homes was identified. For the school setting, findings indicated that children who live close to schools were more likely to actively commute. Children were also found to be more active during play periods when characteristics of school play areas, including availability of equipment, permanent play structures and marked courts, were available (Davison & Lawson). The potential to successfully

intervene in the school setting, by focusing on children's play areas potentially offers a less complex and more amenable process for health and education practitioners, than that of community-wide planning and transport infrastructure changes.

Finally, the existence of school physical activity policies is also reported in the physical determinants literature, with investigations by Ferreira et al. (2007), demonstrating that in 60% of cases, where schools had a physical activity policy, schools reported higher levels of children's physical activity. Additionally, school policies have also been found to inhibit active transport to school, through the implementation of grade and or age minimums for travelling to school via active modes (Ahlport, Linnan, Vaughn, Evenson, & Ward, 2008). This work around the influence of policies, has been an emergence in the literature since the time of Sallis and colleagues' (2000) review and reinforces the complex nature of influences and potential intervention points for promoting physical activity in children.

Many factors, determinants and correlates are reported which influence the complex behaviour, promotion of and subsequent levels of children's physical activity. Therefore with physical activity being a multi-faceted behaviour, interventions are required which acknowledge and address multiple determinants at multiple levels, subsequently making efficacious interventions difficult to design and implement (Baranowski et al., 1992).

2.4 The Australian Context

2.4.1 Levels of Physical Activity

There is some evidence to suggest that in recent decades children have become less active than their counterparts 50 years ago (Salmon et al., 2004). Simplistically, this trend has been facilitated by two factors, namely reduced opportunities for incidental physical activity and increased sedentary alternatives (Salmon et al.).

In Australia's first study examining children's levels of physical activity using objective measurement via accelerometers, the Children's Leisure Activities Study (CLASS) reported that between the ages of 5 to 12 years of age, physical activity declines substantially (Salmon et al., 2004). Furthermore, boys were reported as being consistently more active than girls, with boys spending significantly more time outside than girls. Additionally, older children were reported as being only half as active as younger children. In addition to concerns about levels of physical activity it is also important to consider children's sedentary pursuits. Once again Salmon et al (2004), reported significant differences between boys and girls, with older boys spending more time playing electronic games, while older girls spent more time reading, listening to music, doing homework, art and craft and playing musical instruments. It was also reported that nearly one third of 10 to 12 year olds had a television in their bedroom, with children living in households with more sedentary options spending more time being sedentary and having higher, on average, body mass index.

From Western Australia, a survey of over 2,200 children provided a snapshot of a range of incidental physical activity options in an attempt to provide an overview of children's activity levels (Hands, Parker, Glasson, Brinkman, & Read, 2004). Major findings from

the report were that 11% of primary school boys and 13% of girls reported no vigorous sport, exercise or dance, compared with 25% of secondary males and 32% of secondary school females. While approximately 30% of primary school boys and girls reported no active play, increasing to over 50% in secondary school students. Again from a sedentary behaviour perspective, authors added, almost 14% of students reported no sport, exercise or dance activities, with primary school males and females averaging in excess of two hours of watching television on weekdays (Hands et al.). This increased substantially for secondary school students, with males averaging almost four hours on weekdays compared with just over 3 hours for females.

As part of the 2004 New South Wales Schools Physical Activity and Nutrition Survey (SPANS), almost 5,500 school-aged children were surveyed. It was reported that 75% of boys and girls aged 11 to 16 years met the national recommendation of at least one hour of moderate to vigorous physical activity with boys consistently more active than girls (Booth et al., 2006). Additionally, a high proportion of young people spent more than the recommended two hours a day sedentary, with boys spending between 18 to 22 hours a week and girls 13 to 18 hours per week in front of a small screen, most watching television.

In South Australia, a total of 929 nine to 15 year old boys and girls were surveyed in 1985 and followed up in 2004 on usual physical activity behaviour in several contexts (Lewis, Dollman, & Dale, 2007). There were no major differences between surveys for both club and school sport participation, walking to school, and reported enjoyment of

physical activity. However, the percentage of children reporting sitting during school breaks increased from 1985 to 2004, with a decrease in older girls who were active during school breaks.

The Healthy Kids Queensland Survey, commissioned by Queensland Health, provided the first physical activity data for school aged children in the state (Abbott et al., 2007). Major findings from the report included that, on self report, one in six Year 1 boys met daily physical activity recommendations dropping to one in eight by Year 10. Additionally, one in 15 Year 1 girls met physical activity recommendations, decreasing to one in 20 by Year 10. Time spent on screen-based electronic media for entertainment increased with age, with more than two in five Year 10 boys and one in four Year 10 girls exceeding the current daily recommendations. Worthy of note is that school-based sports and physical education were consistently reported in the top two forms of physical activities, while there were no reported differences in physical activity between children in urban areas versus rural areas.

The most recent physical activity report in Australia, the 2007 National Children's Nutrition and Physical Activity Survey, was commissioned by the Department of Health and Ageing, the Department of Agriculture, Fisheries and Forestry and the Australian Food and Grocery Council (CSIRO, 2007). The report provides the first national survey of children's physical activity patterns, revealing that on any given day, there was a 69% chance that any given child would get at least 60 minutes of moderate to vigorous physical activity, with boys more likely to meet the guideline than girls. Additionally,

there was only a 33% chance, that on any given day, a child would not exceed two hours of screen time.

Based on over 10 years of research outlining levels of physical activity in children, it seems reasonable to conclude that current levels of physical activity and sedentary behaviours for Australia's children and young people are less than optimal and should be improved.

2.4.2 Physical Activity Recommendations

The World Health Organisation (2006) states that physical activity includes 'all movements in everyday life, including work, recreation, exercise, and sporting activities'. It can also include aspects of active recreation, sport, dance, exercise, active play, active living, and active transport. The purpose of physical activity recommendations and guidelines and the constructs of intensity, frequency, and duration are considered for the amount of activity required to derive a health benefit along with providing a clear benchmark of activity for various population sub-groups, including adults and children.

In 2004, the Department of Health and Ageing published Australia's first Physical Activity Recommendations for 5 to 12 year olds (Table 2), focusing on the accumulation of bouts of physical activity and maximum periods of time to be spent in sedentary pursuits.

Table 2: Australia's Physical Activity Recommendations for Children (5 – 12 years)

Number	Recommendation Statement
1.	Children need at least 60 minutes (and up to several hours) of moderate to vigorous physical activity every day.
2.	Children should not spend more than two hours a day using electronic media for entertainment (e.g., computer games, television, internet), particularly during daylight hours.

(Source: Commonwealth Department of Health and Ageing, 2004)

Australia's physical activity recommendations are the most recent in a series of activity recommendations from various bodies around the world, including the United States and Canada. Specifically, the recommendations state that children between the ages of 5 to 12 years need at least 60 minutes (and up to several hours) of moderate to vigorous physical activity every day. While young people aged between 12 and 18 years are required to accumulate at least 60 minutes of moderate to vigorous physical activity every day to keep healthy. Additionally young people shouldn't spend more than two hours a day surfing the net, watching TV or playing video games, particularly during daylight hours (DOHA, 2004), highlighting the growing evidence of a relationship between increased sedentariness and poor health.

The recommendations further add, the accumulation of at least 60 minutes of physical activity every day, can be built up with a variety of activities, with physical activity being completed at a moderate (e.g., brisk walking, bike riding, skateboarding or dancing) or vigorous intensity (e.g., football, netball, soccer, swimming laps or sports

training). The recommendations also indicate that any physical activity is good for you and children should attempt to be active in as many ways as they can. Furthermore, they stipulate that variety is important in providing a range of fun experiences, challenges and that it gives children the opportunity to learn new skills (DOHA, 2004).

In terms of sedentary behaviour, the recommendations reflect the research demonstrating that watching television for more than two hours a day when you are young is associated with being overweight, having poor fitness, smoking, and raised cholesterol in adulthood (Trost, 2004). Subsequently, the recommendations are specific in that children and young people should limit the amount of time spent doing sedentary activities, especially during daylight hours and on weekends.

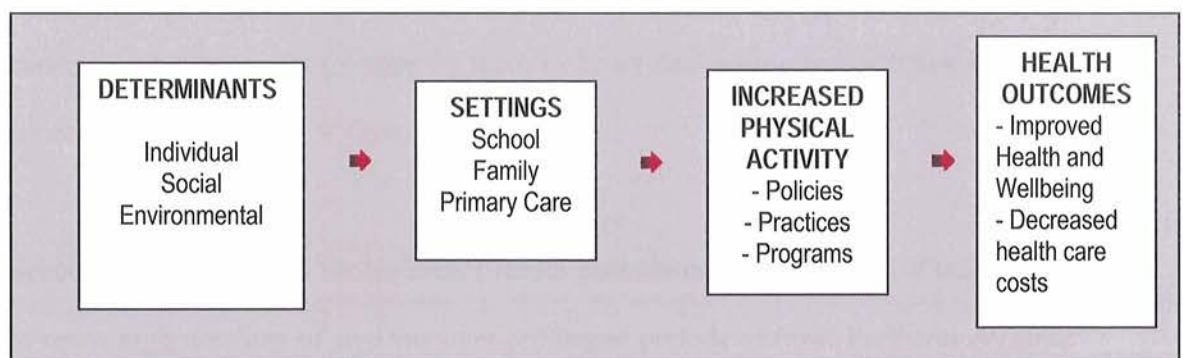
The emergence of the physical activity recommendations provides a clear public health message, enabling us to set targets when working across a range of settings.

2.5 Increasing Levels of Physical Activity in Children

Crucial to firstly halting and ultimately reversing our children's inactivity trends is identifying evidence-based strategies to promote physical activity, particularly interventions that can be delivered in clearly identifiable settings (Timperio et al., 2004). Working through a range of settings provides the opportunity to partner with communities and organisations and to potentially influence policies, practices and programs, to create supportive social and physical environments for physical activity (see Figure 1) (SIGPAH, 2005). These settings, including schools, have the opportunity

to support most people, regardless of their physical activity interests, physical characteristics, skills or competitiveness (Booth & Okely, 2005), as well providing scope to reach those of all socioeconomic levels and various ethnicities. This is an important consideration from a social justice perspective as we attempt to close the gap and reach those most in need of our health promotion interventions.

Figure 1: Overview of determinants and outcomes from increase physical activity



(Adapted from Be Active Australia 2005, p.8)

2.5.1 Health Promotion and Schools

Quality health promotion is a contextual, participatory, multi-strategy, and dynamic process (Ritchie & Rowling, 1997), fundamental to health promotion practice is the concept of inter-sectoral collaboration. Inter-sectoral collaboration, or developing partnerships, has gained acceptance in the field as a strategic approach in promoting health, based on the assumption that the main determinants of health are social, physical, and politico-economic factors and not medical care utilisation (Furber & Ritchie, 2000). Despite a number of known complexities, including having other sectors appreciate the effect their contribution has on health outcomes and being willing to work with the

health sector (Furber & Ritchie, 2000), a partnership approach is at the forefront of contemporary health promotion practice. Potential cross sector partners for the school setting include public health practitioners and tertiary institutions. These setting and partnership approaches are fundamental to health promotion practice as they can focus on the social, physical, and economic environments in which people live, work, and play. Furthermore, working in partnership can also build the capacity of the target setting (e.g., schools) through enhancing their knowledge, skills, resources and management support, thus equipping them to better deal with other or future issues of concern (Mitchell, Price, & Cass, 2005).

Schools are often targets for children's health promotion action because of their ability to reach high numbers of students over prolonged periods of time. Furthermore, since most children attend school, regardless of their socio-economic status or ethnicity, schools present as important settings from a social justice perspective (Mitchell et al., 2005). According to the United States Centre for Disease Control (2003), schools are an ideal setting for primary prevention interventions for children as they provide an excellent opportunity for skill building because of the high enrolled numbers and the continuous contact over a number of years (Story, Kaphingst, & French, 2006). Additionally, schools also have personnel who, with sufficient training and commitment, can design and deliver effective health promotion programs (e.g., nutrition and physical activity), establish and inform policies that support healthy choices and serve as powerful role models for students (Wechsler, Devereaux, Davis, & Collins, 2000). School settings are also ideal environments for population-based interventions

directed at children, as stated previously, children from all risk groups can derive some benefit and interventions can target all children, potentially avoiding stigmatising some and misclassifying others (Dobbins et al., 2001; Thomas et al., 2004).

Schools are clearly convenient sites for health promotion both inside and outside the classroom, as they present opportunities for students to learn about a range of healthy habits, including appropriate nutrition, skin cancer prevention, mental health promotion, and regular physical activity. In particular, the school context supports physical activity health promotion interventions as they provide regular opportunities for participation, including physical education classes, recess periods, extracurricular sports and physical activity programs, access to school gyms, playing fields and playgrounds (Wechsler et al., 2000). An all too often argument against external programs and practices, including health promotion, being directed toward the school setting, relates to the busy, already ‘overcrowded’ curriculum (Booth & Okely, 2005). While this is not disputed, Strong et al. (2005) reports that allocating more time to programs of physical activity in schools does not negatively affect academic achievement, even when time allocated to other subjects is reduced. Furthermore, the authors reported that some results suggest a relative increase in academic performance per unit of increased physical activity time (Strong et al., 2005).

Health and education are interconnected as the physical, social, and psychological environments of schools can affect students health and subsequently have an impact on their ability to learn (Mitchell et al., 2005). Therefore, it could be said through health

promotion initiatives, including the implementation of physical activity interventions, that the health sector can contribute to the core business of education, while conversely the education sector can contribute to the business of health (Mitchell et al.).

2.5.2 Opportunities and Challenges

There is good evidence that settings, including schools, can either support children to be active or mitigate against it. Schools however, are complex busy places where the core business is learning (Wamp, 2009). Subsequently successfully implementing additional, often externally driven priorities, such as health promotion can present significant challenges (Franks et al., 2007). Common barriers noted when implementing preventative programs in schools can include insufficient time, competing priorities, lack of resources, and non-supportive environments (Franks et al.).

For physical activity health promotion, the strengths and limitations of promoting within schools has been reported previously in the literature by Booth and Okely (2005). While it appears that the promotion of physical activity in the school setting is logical and well supported by the literature, there are a number of disadvantages. Selective disengagement, in particular, reflects that not all children enjoy being at, or are engaged with the school (Booth & Okely), and it is often these children who could potentially derive the most benefit from participating in physical activity health promotion programs. Further, schools in general, may only have between three to eight hours per week available for active play, physical education and sport, and with already enormous demands on the school curriculum, many outside groups are already jostling to have 'their' issues covered. Often it is a challenge for school settings to find 'one minute' for

prevention work (Glasgow & Emmons, 2007), while Booth and Okely remind us that we must recognise that other activities compete for this time potentially allocated to physical activity.

While most secondary schools have specialist physical education teachers, this is not necessarily the case for all primary schools. Subsequently, general classroom teachers, who may not be either trained or proficient with physical education or physical activity delivery, can be left to teach and lead physical activity programs. Because they do not feel competent at performing these skills themselves they can struggle to find the time to properly plan and deliver physical activity programs effectively (Booth & Okely, 2005). Furthermore, many schools have a culture which promotes participation in competitive sports and belonging to teams versus a culture of physical activity participation for all students. Physical education and competitive sports are activities where students skills are on public display, potentially exposing those who are less competent to ridicule, teasing and discrimination (Booth & Okely). This school culture does not suit all children, particularly those who can derive the most health benefit, including the least active and overweight or obese children (Booth & Okely).

While the reported barriers are crucial to acknowledge and consider in the development and implementation of physical activity interventions, there are also a range of reported strengths for promoting physical activity in schools, upon which researchers and practitioners can build. Most children are attending school, at least until 15 years of age, providing a large captive exposure time for this target population. This potential reach

ensures that programs have the best possible chance of capturing those most in need and potentially reducing health inequities (Booth & Okely, 2005). While most children do enjoy school most of the time, children can create strong links and identify with teachers with whom they like and respect. These teachers can become important role models, as they are typically seen as credible sources of information, with children trusting and accepting their guidance and advice (Booth & Okely). Additionally, teachers and other school staff can provide important encouragement and support through modelling and offering a breadth of activity experiences that may not be available through a child's family situation. Environmentally, schools provide access to facilities and equipment for physical activity, most of which is done at low cost and is available to those students who may not otherwise have these experiences due to social or economic disadvantage (Booth & Okely).

While there are a range of barriers to promoting physical activity in the school setting, these should not be used as justification to not engage the sector, but should be used to strategically inform intervention design and delivery (Mitchell et al., 2005). Further, like all potentially successful health promotion, it is vital for work with schools to be well planned, implemented and evaluated, have good partnerships, adequate resources and to consider the local setting context (Mitchell et al.). Finally, one of the key challenges for public health and education professionals will be to effectively facilitate and sustain wide scale uptake and implementation of any physical activity program (Naylor, Macdonald, Warburton, Reed, & McKay, 2008).

2.5.3 School-based Physical Activity Interventions

Based on a review of the literature between 1999 to 2003 relating to strategies to promote physical activity in children, Timperio (2004) identified 12 papers reporting on effective interventions in schools. The review concluded that effective interventions generally employed curriculum based strategies, environmental changes and/or policy based strategies. Importantly, each successful intervention reported some contact with children's families and recommended that future studies should take a physical activity promotion focus, rather than weight loss focus. Additionally, strategies should be employed that focus on reducing sedentary behaviours as well as increasing physical activity.

A more recent review of interventions to increase physical activity in children by Salmon (2007), reported that interventions were most effective overall in the school setting if they included some focus on physical education, activity breaks, and family strategies. A review of curriculum only approaches for children, identified five studies, with only one reported as effective, with the review concluding that curriculum strategies are not effective for promoting physical activity when conducted in isolation (Jo Salmon et al.). Two studies were identified which included a combination of curriculum and physical education, both reporting some positive effect on children's physical activity levels. Those interventions which focused solely on physical education lessons with children, reported only a small physical activity effect during the lessons.

Three studies manipulated school physical environments in an attempt to positively influence children's physical activity levels, two using fluorescent playground markings and the other, games equipment and activity cards (Jo Salmon et al., 2007). These environment-only strategies produced small increases in physical activity. Two further studies were identified that targeted changes to curriculum, physical education and school social and physical environments, commonly termed 'whole-of-school approaches', with only one targeting children. Subsequently, conclusions were unable to be drawn regarding the effectiveness of a 'whole-of-school' approach for promoting physical activity. An additional two studies looked at 'Activity Breaks', where 15 minute play breaks during class were introduced. Both studies reported significant effects on children's overall physical activity using either self report or objective measures. Salmon et al. (2007) concluded that although not always reported, such strategies (i.e., activity breaks and simple environmental changes) are likely to be sustainable, with little training of teachers required, and that promoting less structured physical activity (i.e., active play) can be performed any time with little equipment (Table 3).

Table 3: Summary of intervention physical activity outcomes by strategy

Intervention Setting and Strategy	Findings (number of references)
School	
Curriculum only	*(4), ‡ (1)
Curriculum and physical education	‡ (2)
Curriculum, physical education and environment	* (1)
Physical education only	‡ (1)
Physical education and environment	‡ (1)
Environment only	‡ (3)
Activity breaks	‡ (2)
School and family	‡ (8), * (6)
School, family and community	* (3)
Family	
Education	‡ (1)
Education and physical activity sessions	* (2), † (2), ‡ (1)
Education, physical activity sessions, and family nights	† (1)
Day camp and internet deliver	* (1)
Primary Care	‡ (1)
Community	* (1), † (1), ‡ (1)

* - no association; † - positive trend, not statistically significant; ‡ - positive outcome, statistically significant

(Adapted from Salmon et al., 2007)

Thomas and colleagues (2004) reviewed numerous interventions designed to increase physical activity in children and youth. The authors found interventions which produce significant differences were those in schools that implemented the intervention in addition to regular physical education classes. The review also reported that shifting the

balance from skill development to aerobic activity in physical education classes resulted in increased physical activity among students. These findings offer an important insight into the development of interventions that inform high levels of participation versus those focused on mastering fundamental movement skills.

In a separate review of non-curricula approaches for increasing physical activity in youth, Jago and Baranowski (2004) reported that achieving a minimum of 30 minutes of moderate to vigorous physical activity could be attained by modest increases in activity times that may not normally be thought of as activity opportunities, including school break periods or travel to and from school. Recent United States data however, indicates that children engage in less than 50% of school break time (i.e., recess and lunch breaks) in moderate to vigorous physical activity (Jago & Baranowski, 2004). Similar findings were also reported for Australia where children aged 5 to 12 years also spent an average of 50% of break time in moderate to vigorous physical activity (Jago & Baranowski). Therefore, while school breaks present a contextual opportunity for children to be physically active, more work is required to maximise the time engaged in appropriate levels of physical activity.

Finally, in a review by Brunton et al. (2003), it was reported that often the views of children were not considered in the development of effective physical activity interventions. Whilst children have clear views on barriers to and facilitators of their participation in physical activity, these views rarely informed the development of interventions (Brunton et al.). Subsequently, it was recommended that physical activity

intervention design and choice should take into account the views of children, including the provision of a diverse range of activities that relate to aspects children value most, including opportunities to spend time with friends and fun (Brunton et al.).

2.5.4 School Breaks and Playground markings

Physical education and school breaks (i.e., recess) are the two main opportunities that exist within a 'typical' school day where children have the opportunity to be physically active. Perhaps the most common of these in the school context for physical activity is in fact school break periods (Zask, van Beurden, Barnett, Brooks, & Dietrich, 2001). School breaks typically take children from the classroom to the school playground, with the playground representing a context in which all children can engage in physical activity on a daily basis for most of the school calendar year (Mota, Silva et al., 2005). These school breaks are by nature unstructured, subsequently allowing children to spontaneously engage in activities, play and games, potentially adding to the enjoyment and perception of choice known to be important for the young student for physical activity participation (Lonsdale et al., 2009). Recent evidence supports this, reporting that young children accumulated more time spent in moderate to vigorous physical activity during unstructured versus structured play environments (Pate, Baranowski, Dowda, & Trost, 1996).

An additional positive feature of school breaks for promoting physical activity is the apparent equity across genders. Numerous studies have reported the differences in physical activity levels of boys and girls in different settings and with different physical

activity interventions (Sallis, 2000; Trost, Saunders, & Ward, 2002). In general boys tend to be more involved in higher levels of moderate to vigorous physical activity compared to girls, and these patterns of behaviour tend to continue across the lifespan (Santos, Guerra, Ribeiro, Duarte, & Mota, 2003; Trost, Saunders et al., 2002). Playtime available during school breaks, represents the main school context in which girls and boys have equal opportunity to be physically active on a daily basis (Mota, Silva et al., 2005), as well as providing potential to support a socialising aspect known to be an enabler for physical activity in girls (Olds et al., 2004).

School breaks are commonly used by schools for unstructured physical activity and play, and have long been a staple of the school environment (Wechsler et al., 2000). In the United States, the Centre for Disease Control Guidelines for Schools and Community Programs to Promote Lifelong Physical Activity in Youth recommends that schools provide time for unstructured physical activity as a complement to, and not a substitute for physical education (Centres for Disease Control (CDC), 1997). According to Stratton and Mullan (2005), children are more likely to engage in moderate to vigorous physical activity in unstructured play, like recess periods, where they are free to interact with their play area and peers. Furthermore, in terms of preparing children for life-long engagement in physical activity, the school playground provides an environment more similar to adult recreational environments than typical physical education classes (Zask et al., 2001), potentially supporting the concept of promoting a lifestyle pattern of regular physical activity that will carry over to the adult years (Dobbins et al., 2001).

With primary school aged children in Australia experiencing anywhere up to 600 school break periods per year, two to three times a day, five days per week, 39 weeks per year an opportunity exists to maximise this discretionary time to promote and foster greater physical activity participation. Mota et al. (2005), however states that while school recess represents a good opportunity for children to accumulate physical activity over the day, some children will take the opportunity to be active, whilst others may not and individual differences of physical activity levels can be evident (Mota, Silva et al.). Sarkin, McKenzie and Sallis (1997) support this, with their study findings reporting high variability in moderate to vigorous physical activity scores occurred during recess periods because children could freely choose to be sedentary or participate in activities of different intensities. This highlights a potential need to actively promote physical activity opportunities at the individual level during recess periods (Mota, Silva et al.), particularly if this time is to be used as a health promotion intervention point.

Wechsler et al. (2000) reports that schools may attempt to facilitate greater levels of physical activity during recess by having staff encourage students to be active, providing students with space, facilities, equipment and supplies to make physical activity more appealing and providing organised opportunities, like games for those students who want it. Welk, Corbin, and Dale (2000) further suggest, factors that 'enable' children to be physically active, such as playground markings, prompts from teachers, or support from parents, are key to health promotion in young people.

A number of systematic reviews and primary studies have, in the last 10 years, reported on the positive use of multi-coloured playground markings to promote increases in children's physical activity levels (Bissell, 2004; Fairclough & Stratton, 2005a, 2005b; Ridgers, Stratton, & Fairclough, 2005; Stratton, 2000; Stratton & Mullan, 2005). Bissell (2004) reviewed playground markings specifically to determine their effect on children's physical activity levels. The study concluded that the use of playground markings is effective in increasing the amount of physical activity of children and that students utilising playground markings increased their energy expenditure significantly over control groups (Bissell). A more recent study by Stratton and Mullan (2005), investigated whether painting playgrounds with multicoloured markings would increase the percentage of recess time spent in moderate to vigorous physical activity and vigorous physical activity in girls and boys. The study also quantified the contribution recess makes to achieving national recommendations for young people's physical activity. Findings indicated that out of 601 child playtimes assessed, 86 exceeded the 50% moderate to vigorous physical activity threshold (46 intervention and 40 control) before the playgrounds were painted compared to 101 (78 intervention and 23 control) after (Stratton & Mullan, 2005), suggesting that school playgrounds and recess periods offer a sustainable context for promoting physical activity. A further study by Stratton, Ridgers, Fairclough, and Richardson (2007) compared physical activity levels in normal weight and overweight boys and girls during school recess. The authors reported a significant main effect for sex and significant interaction between body mass index and sex for percentage of recess spent in moderate to vigorous and vigorous physical activity. While overweight boys were significantly less active than their normal-weight

counterparts, this difference did not hold true for girls, with normal weight girls the least active group. The results also revealed normal weight boys and girls spent over 30% and 25% respectively in moderate to vigorous physical activity during recess. Both overweight boys and girls spent approximately 30% of recess in moderate to vigorous physical activity.

Beyond its contribution to increasing levels of physical activity, the school break may also have substantial social and educational benefits (Wechsler et al., 2000). Studies of fourth grade students found they were more fidgety and concentrated less on tasks when they did not participate in a school break, and the longer children sat in classrooms without a break, the less attentive they became (Wechsler et al.). Pellegrini and Smith (1998) further described recess as ‘practice for adult life’ as it provides opportunities for children to interact with peers and develop social skills, such as negotiating and cooperating, with minimal adult interference. Additionally, students appear to be learning important conflict resolution skills during school break interactions (Pellegrini & Smith).

In summary, the promotion of physical activity using multi-coloured playground markings during school breaks has shown to be effective at increasing children’s levels of physical activity and energy expenditure for both genders and with some at-risk groups. Furthermore it presents a potentially low-cost, sustainable environmental intervention for schools to implement with relevant ease.

2.6 Translating Research to Practice

The landmark review by McGinnis and Foege (1993), estimated that one third of all deaths in the United States in 1990 were attributable to tobacco smoking, sedentary behaviour or poor dietary habits. In response to this finding, researchers and health professionals over two decades have developed a plethora of efficacious interventions to promote the protective behaviours of smoking cessation, increased physical activity and improved dietary habits. However, to date, there is little indication that these effective interventions are being translated into mainstream practice in real-world settings (Dzewaltowski, Estabrooks, Klesges, Bull, & Glasgow, 2004; Glasgow, Green, & Ammerman, 2007; Glasgow et al., 2006; Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004; Green & Glasgow, 2006; Klesges, Dzewaltowski, & Christensen, 2006; Klesges et al., 2005a; Langberg & Smith, 2006). In fact, there is evidence they are not. History tells us there is often a long lag time between knowing something works and getting it into practice. Case in point, it took 30 years from the time of the United States Surgeon General's watershed report condemning smoking before state-wide tobacco control programs were established across the United States (Ory, Mier, Sharkey, & Anderson, 2007). Dzewaltowski, Estabrooks, and Glasgow (2004) more recently added that only 14% of school-based physical activity intervention studies reported on any issue of external validity related to adoption. While in a content analysis of 1,210 articles from 12 leading public health journals, 89% of studies were classified basic and developmental, 5% as innovation development and less than 1% diffusion and 5% as institutionalisation (Oldenburg, Sallis, Ffrench, & Owen, 1999). This apparent lag time in translation research is not just evident for health promotion and public health

interventions as clinical research also reported it takes an average 17 years for 14% of discovery research to be integrated into practice (Brownson, Kreuter, Arrington, & True, 2006). It would appear that a more concerted effort is required from researchers and practitioners to explore and close this 'lag time' between research and practice if we are to reap the population wide benefits of effective physical activity interventions.

A key message from efficacy based physical activity research, is that what we often 'know' is based on evidence in a very neatly defined test population and this does not necessarily reflect the world in which those most in need of physical activity interventions live or the settings in which they work and play. Whilst there is a well recognised gap between research findings and the implementation of evidence-based strategies in community settings, Dzewaltowski and colleagues (2004) argue that our current and future research should be informing community leaders and facilitating the implementation of proven intervention strategies. They further state, that part of the problem might be due to researchers' attempts to find the most efficacious program rather than a program that could be implemented and delivered with limited resources and people (Dzewaltowski, Estabrooks, Klesges et al.). It would appear that broadening intervention evaluation criteria beyond internal validity elements to describe aspects of external validity will expand the evidence base for decisions regarding dissemination effectiveness (Klesges et al., 2005a).

As is the case for all public health and health promotion interventions, assessing the effectiveness of interventions should not only involve a review of evidence relating to

what works (i.e., outcome evaluation), but also a review of evidence of how and why approaches have worked (i.e., process and impact evaluation). Therefore, if both quantitative and qualitative research methodologies are applied to the study of interventions, a more complex understanding, often transcending mere complementary remarks, may be revealed (Morgan, 1998). Evidence derived in this way is also more likely to have practical significance offering guidance on how to create the conditions for successful intervention dissemination (Heart and Stroke Foundation of Canada, 2005; Morgan, 1993).

One approach to answering these concerns and closing the gap between research and practice is the RE-AIM Framework (Glasgow et al., 1999). RE-AIM helps to bridge the research-to-practice gap by informing the design of intervention programs, providing guidance for people at the community level who want to adopt these programs, and suggesting standard guidelines for designing clinical trials and reporting findings in terms of their public health impact (Ory et al., 2007). The framework provides a method giving balanced attention to both internal and external validity elements of research design and evaluation (Klesges et al., 2005a), further conceptualising the public health impact of an intervention as a function of five factors, including reach, efficacy, adoption, implementation, and maintenance (Table 1). While the representativeness of individuals is an important issue for outcome-based research, the representativeness of settings for public health is equally important. RE-AIM provides a framework for determining what programs are worth sustained investment and for identifying those that translate to real-world settings (Glasgow, McKay, Piette, & Reynolds, 2001).

Additionally, data collection via the RE-AIM framework can serve several evaluative purposes, including assessing an intervention's overall public health impact, comparing public health impact of an intervention across organisational units over time, comparing two or more interventions across RE-AIM dimensions and making decisions about redistributing resource towards more effective programs (Glasgow et al., 1999). RE-AIM also organises intervention planning efforts by asking questions about which interventions to deliver to which target populations, highlighting strategies to improve intervention success and comprehensively evaluating potential dissemination impact of health behaviour interventions. Klesges et al. (2005a) further adds that understanding the potential translation and dissemination characteristics of an intervention might improve the linkage between researchers, program adopters, delivery staff and community settings in improving overall population health. Such linkages and inter-sectoral collaborations are increasingly important in addressing population health issues related to disease prevention and health promotion.

One of the greatest challenges for those concerned with school-based health promotion interventions, will be to develop strategies for wide-spread dissemination (Wechsler et al., 2000). When translating research to practice in the school setting, proven behaviour-change interventions appear most likely to be effective in 'real-world' circumstances when the procedures require minimal change or inconvenience on the part of the implementer (usually the classroom teacher) and the program 'fits' the usual practices and climate of the accepting school (Baranowski et al., 2002). Although these challenges are substantial, experience shows success is possible, as long as a

comprehensive understanding of school practices and engaging all relevant stakeholders with easy to use resources is at the forefront of researchers' and practitioners' planning (Franks et al., 2007). After reviewing evaluation efforts of two large-scale physical activity programs (CATCH and Planet Health), Franks (2007) reported that when looking at dissemination of school-based interventions, they must be easy and inexpensive to implement, allow for flexibility and local adaptation and be aligned with current political constraints and academic mandates to be successful.

While the benefits of physical activity, including play, are well acknowledged from both a health and social perspective, unfortunately a need still exists to try and engage all children in further physical activity participation. Settings and partnerships are at the centre of contemporary health promotion practice, with schools central to efforts for reaching children. There is mounting evidence that supportive physical environments increase physical activity, in particular the use of painted playground markings during school breaks. The use of painted playground markings as an intervention offers much promise, as well as being potentially low in cost and sustainable. There is however an identified 'gap' in the translation and practical application of such 'evidenced-based' strategies, which requires further examination. This study, therefore aims to examine the barriers and facilitators of adopting and implementing an existing physical activity intervention in the primary school setting to bridge our understanding for future dissemination efforts.

CHAPTER 3: JOURNAL ARTICLE FOR SUBMISSION

HEALTH PROMOTION PRACTICE

Written to comply with Author Guidelines for submission to *Health Promotion Practice*

(Appendix 1)

Title

Translating Research to Practice: Using the RE-AIM Framework to examine an evidenced-based physical activity intervention in primary school settings

Introduction and Background

Over twelve years have passed since the landmark United States Surgeon General's Office issued its report on the benefits of physical activity (PA) and the recommendations associated with achieving health outcomes (United States Department of Health and Human Services [USDHHS], 1996). Despite this report and its call for action, physical inactivity is still associated with considerable economic burden, accounting for 1.5 to 3.0% of total direct healthcare costs in developed countries (Oldridge, 2008) or an estimated 1.9 million deaths worldwide (Dobbins et al., 2009; Laura L. Hayman et al., 2007). In 2005, the first PA recommendations for children (5-12 years) and young people (12-18 years), quantifying minimal amounts of PA and maximum amounts of sedentary behaviour were released (Department of Health and Ageing [DOHA], 2004). The guidelines stipulated that children and young people should participate in at least 60 minutes (and up to several hours) of moderate to vigorous physical activity (MVPA) every day. The recent emergence of both national and state-wide PA reports have provided the first, definitive pictures of PA of Australian children (Abbott et al., 2007; Booth et al., 2006; Hands et al., 2004; Lewis et al., 2007; Organisation, 2007; J Salmon et al., 2004). Overall, they concluded that current levels of PA and sedentary behaviours for Australia's children and young people are not optimal

and should be improved. In Queensland, Australia, Abbott et al. (2007) reported that approximately 16% of Year One boys met the national daily PA recommendations, dropping to 12% by Year 10. By contrast, less than 7% of Year One girls met the recommendations decreasing to 5% by Year 10.

The benefits for physically active children and young people include reductions in blood pressure, body fat, and lipids which correspond with decreased risk of chronic disease such as cardiovascular disease and diabetes (Jago & Baranowski, 2004). Additionally, physical inactivity in children has been shown to be associated with an increased risk of atherosclerosis, high blood pressure and overweight and obesity in children as young as twelve years of age (Baranowski et al., 2002), and since these cardio-vascular disease (CVD) risk factors track from childhood to adulthood, the current trends do not appear favourable for future generations (L. L. Hayman & Hughes, 2004).

Promoting PA among children is a complex challenge, involving a range of physiological (e.g., age, gender), psychological (e.g., confidence and enjoyment of PA), socio-cultural (e.g., support from friends and family), and ecological determinants (e.g., access to spaces and places) (Dobbins et al., 2001), making the design of effective interventions difficult. Contemporary health promotion practice has turned away from a strict focus on direct intervention or health education with individuals, with ecological and settings-based approaches now at the forefront of practice (Naylor et al., 2008). These approaches recognise the multiple levels of influence on individual health and behaviour (Leviton, 2008). Schools, in particular, are regarded as logical settings for PA health promotion for children, with no other setting having as much continuous,

intensive contact during the first two decades of life. Furthermore, school setting programs can be low in cost and delivered to children at all socio-economic levels (Owen et al., 2006) without stigmatising some and excluding others (Thomas et al., 2004). Recent studies have shown that incorporating ‘whole-of-school’ approaches, including curriculum, policy and environmental strategies appear to be more effective than those that incorporated curriculum only approaches (Kahn et al., 2002; Timperio et al., 2004), while lunch break, recess and physical education (PE) classes provide natural blocks of time in a school day to train children in developing healthy behaviours (Owen et al., 2006). However, schools are complex, busy places where the core business is learning (Wamp, 2009), with many barriers existing to implementing health promotion and in particular PA (Booth & Okely, 2005; Naylor & McKay, 2009). Therefore, one of the key challenges facing health promotion practitioners is to facilitate wide scale adoption and implementation of PA interventions (Naylor et al., 2008).

The study of PA interventions is regarded as a relatively new area of research (Rabin, Brownson, Kerner, & Glasgow, 2006). However, since the 1996 Surgeon General’s seminal report the last decade has seen an emergence in PA intervention efficacy research, with numerous reviews of intervention studies being published on the effectiveness of PA programs. Specifically for children and young people, the evidence highlights a range of efficacious interventions delivered predominately via the school setting (Baranowski et al., 2002; Dobbins et al., 2001; Jago & Baranowski, 2004; Kahn et al., 2002; Meininger, 1997; Micucci, Thomas, & Vohra, 2002; Jo Salmon et al., 2007; Stone, McKenzie, Welk, & Booth, 1998; Summerbell et al., 2005; Thomas et al., 2004;

Timperio et al., 2004), with most reviews supporting the efficacy to increase PA, whilst the magnitude of effect is varied.

Stratton and colleagues (2000) assessed the PA levels of children before and after a school playground were painted with fluorescent markings. Children's PA was measured using heart rate telemetry during three playtimes before and after the markings were laid down. Children in the experimental and control groups spent 27 and 29 minutes, respectively, in MVPA before the intervention, increasing to 45 and 36 minutes, respectively, during the intervention period. Reported findings included; a significant interaction (group and time) was evident for MVPA and VPA, with time spent in MVPA and VPA increasing significantly in intervention schools as a result of playground markings (Stratton & Mullan, 2005). Results of this and similar studies since indicate that a playground redesign, which utilise multicolour playground markings, is a suitable stimulus for increasing children's school recess PA levels (Haug, Torsheim, Sallis, & Samdal, 2008; Ridgers et al., 2007a, 2007b; Stratton, 2000; Stratton & Mullan, 2005). Beyond their contribution to increasing levels of PA, school breaks may also have substantial social and educational benefits. In a review conducted by Wechsler, Devereaux, Davis, and Collins (2000), it was highlighted that fourth grade students were more fidgety and concentrated less on tasks when they did not participate in a break and the longer children sat in classrooms without a break, the less attentive they became. Additionally, recess has been described as providing practice for adult life (Brenner et al., 2006; Pellegrini & Smith, 1993), with the breaks providing opportunities to interact with other children and develop social skills such as negotiation and

cooperation, importantly with minimal adult interference. Furthermore, students appear to be learning important conflict resolution skills while playing during school break periods (Pellegrini & Davis, 1993).

With PA efficacy studies typically examining interventions under optimal conditions, the results of such studies may not necessarily translate into real-world practices with less motivated individuals (e.g., students), busy practitioners (e.g., teachers) and scarce resources (e.g., in schools) (Reilly & McDowell, 2003). In fact, some researchers suggest that penetration of even the most successful health promotion interventions rarely occurs at a rapid pace (Ginexi & Hilton, 2006). With the recent focus on a greater need for translating research projects into public health practice Glasgow, Vogt, and Boles (1999) conceptualised the RE-AIM Framework. RE-AIM (reach, efficacy, adoption, implementation and maintenance), is the first attempt to develop a comprehensive, systematic model for examining research translation and dissemination (Ory et al., 2007). At its core, RE-AIM seeks to re-direct the emphasis for translational research from one of internal validity (i.e., where we know that something can work), to external validity (i.e., finding out which populations it works for and how best to make it work in those populations) (Ory et al., 2007).

The benefit of any public health intervention is determined not only by its efficacy and effectiveness, but also by the extent to which it is appropriately adopted and implemented, so that there is ultimately an impact on the population-at-large (Oldenburg et al., 1999). This translation from efficacy to effectiveness or from research to practice

presents a variety of barriers and potential facilitators for researchers and practitioners. For example, with school-based prevention programs evidence of program efficacy alone does not ensure that schools can successfully adopt the program (Thaker et al., 2007). There are a combination of factors known to influence adoption, implementation and translation of prevention programs in schools (Elliott & Mihalic, 2004; Hallfors & Godette, 2002; Rohrbach, Graham, & Hansen, 1993) including decentralised decision making, low levels of funding for prevention, lack of adequate infrastructure and lack of program guidance (Backer, Liberman, & Kuehnel, 1986; Hallfors & Godette, 2002; McCormick, Steckler, & McLeroy, 1995; Pankratz, Hallfors, & Cho, 2002). Barriers specific to implementation have included program complexity, lack of fit between the program goals and schools usual practices, lack of prevention infrastructure, lack of teacher training and support, lack of program materials, inconsistent staffing and inadequate district and state support (Ennett et al., 2003; Hallfors & Godette, 2002; Hallfors & Van Dorn, 2002).

With these points in mind, the aim of this research was to examine the barriers and facilitators in adopting, implementing and maintaining a version of Stratton's (2000) PA intervention in primary school settings in the Central Queensland region of Queensland, Australia. The RE-AIM framework (Glasgow et al., 1999) was used to guide the evaluation, focusing on four aspects of the Framework: Reach (i.e., at a setting level), Adoption (i.e., key adoption strategies), Implementation (i.e., as intended by the program) and Maintenance (i.e., follow up over a 12 month period). As efficacy for this particular intervention has been established on a number of previous occasions (Ridgers

et al., 2006; Ridgers et al., 2007a, 2007b; Stratton, 2000; Stratton & Mullan, 2005; Gareth Stratton et al., 2007), this was not the focus of the study.

Methods

Recruitment and Participants

Participating schools were recruited from an 'expression of interest' (EOI), that was emailed to all State, Independent and Private primary school Principals, in the Central Queensland Education Region in February 2006. The EOI (Appendix 2) outlined the aims of the project, what was required from schools for participating in the study, and what each participating school would receive in terms of funding, supportive PA equipment, PA resources and professional development. A total of eight schools responded to the EOI via a fax-back method, out of a possible 49. Telephone interviews were conducted with a subset of non-participating schools (n=16) to identify reasons for non-participation in the project. A nominated representative from participating schools was then invited to an initial project planning meeting, where information sheets were provided and informed consent forms completed. School representatives were also provided with a baseline playground assessment questionnaire to complete, which included questions relating to the quantity and quality of existing playground line-markings and playground equipment, frequency of use of line-markings and equipment, additional time outside of physical education allocated to PA, and the existence of a school PA policy (Appendix 3). Ethical approval was granted by both the Central

Queensland University Human Research Ethics Committee and the Education Queensland Ethics Committee.

Intervention & Evaluation

Participating schools were provided with details of the PA intervention as previously described by Stratton et al. (2000), with the main intervention components including painted playground line-markings, a playground games manual, supportive playground play equipment (e.g., balls and skipping ropes) and an active peer leader training manual. Additionally, as part of the adoption process, the working group undertook an initiative to rename and brand the intervention to give schools and particularly students a sense of ownership and buy-in for the project. The intervention was subsequently renamed PLAY (Promoting Lifelong Active Youth) Zone (PZ) and a new logo was chosen (Appendix 4).

RE-AIM (Glasgow et al., 1999) was used as an evaluation framework to guide the identification of barriers and facilitators for participating schools in adopting and implementing the PZ intervention [Table 4]. A mixed methods approach combining self-administered questionnaires and in-person Key Informant interviews were used to collect the data. Questionnaire data were collected at four time-points; pre-intervention, one month, six months and 12 months post intervention implementation (Appendix 5-7), while Key Informant interviews were completed at 12 months post-implementation

(Appendix 8). The project was officially launched in October, 2006, corresponding with the commencement of Term 4 of that year.

Table 4: RE-AIM Evaluation Dimensions and Process/Outcome Measures

Dimension	Process/Outcome Measure
Reach (setting)	Refers to the proportion and representativeness of eligible schools willing to participate in the study. This was calculated as a percentage by dividing the number of eligible schools by those that answered an 'expression of interest' (EOI) to participate. Reasons for non-participation were gathered via a sub-set of schools who did not respond to the EOI.
Efficacy	As efficacy for the intervention was determined previously this was not the focus of the study.
Adoption (setting)	Refers to the schools decision to install the PA intervention within the organisation and examining the factors that influenced that decision, along with the percentage and number of schools that completed the preparatory implementation strategies.
Implementation	Refers to the extent to which participating schools completed and made use of the various components of the PZ intervention. This was measured by the extent to which the main intervention components; including playground line-marking, playground games, active peer leader training were completed as intended.
Maintenance	Refers to the extent to which schools maintained intervention implementation. This was assessed by monitoring the implementation of the intervention at six and 12 month time periods.

Analyses

All questionnaire data was entered into Microsoft Access database and transferred to and analysed using SPSS ® Version 15.0 for windows. Frequency distributions of all variables were listed with ranges checked and extreme and unexpected values compared with the original questionnaire for verification and correction of any errors (SPSS Inc.,

2007). The qualitative interview data were transcribed verbatim from digital audio files with the transcripts reviewed and corrected by the interviewers for accuracy. Qualitative content analysis was used to identify, code and categorise the data according to pre-determined themes (i.e., reach, adoption, implementation and maintenance) (Morgan, 1993). Initially, transcribed interviews were read, with marginal remarks and memoing used to identify initial units of meaning from the text. The interviews and memos were then read and re-read, and assigned sub-themes which were categorised under predetermined higher order themes according to the RE-AIM Framework. Inter-coder reliability testing was performed with one of the researchers' colleagues to enhance the rigour of themes. Once agreement of the sub-themes and units of meaning were finalised, they were categorised into higher order themes.

Results

Reach

Eight of a possible 49 (16%) primary schools in the Central Queensland education region were recruited to participate in the research project. All participating schools were State Schools (i.e., Education Queensland), with no schools participating from the Private or Independent sectors. Both City and Rural School classifications, as determined by Education Queensland, were represented, with student numbers ranging from 13 to 719 students (Table 5). Due to the small number of responses to the EOI, a sub-set of non-participating schools were contacted (n=16) to identify main reasons for non-participation in the project. Fifteen of the sixteen schools recalled receiving the project EOI to participate, with reasons for non-participation including: (i) school is

focused on other key issues, (ii) lack of time and resources (including teachers), (iii) pre-existing PA program/s running, and (iv) students perceived as active enough. Eleven of the sixteen schools expressed interest in participating in future PZ projects.

Table 5: Participating Schools Characteristics

Characteristics	Participating Schools (n=8)
*Gender	
Boys	52%
Girls	48%
*Education Queensland Zone	
Provincial	50% (4)
Rural	50% (4)
School Type	
State	100% (8)
Private	-
Independent	-
School Student Numbers	
Minimum	13
Maximum	719
'Champion' role in school (average years in position)	
Principal	37.5% (5yrs) (3)
General Teacher	12.5% (3yrs) (1)
PE Teacher	25% (8.5yrs) (2)
Other	25% (4 yrs) (2)

(*Source: www.education.qld.gov.au, 2006)

Adoption

A number of preparatory strategies were designed at the commencement of the project by the PZ working group members, which aimed to facilitate and support the implementation of the main intervention components (i.e., line markings, playground

games and equipment, and student peer leader training). More specifically, these strategies were designed to increase the awareness, knowledge and skills for delivering the PA intervention, as well as enabling student and staff buy-in for the project. The preparatory strategies and their respective school completion rates were: student information session (7/8), playground painting workshop (8/8), project launch event, (7/8) teacher professional development, whereby at least one teacher attended one of the two sessions provided (6/8), project name and logo initiative (8/8), playground plan (7/8), parent information brochure (Appendix 8) (8/8) and working group meetings (8/8).

The decision to adopt the intervention in 50% of schools was a ‘top-down’ decision, made by the school Principal, while the remaining schools were distributed equally between collaborative decision between teachers and management and independently initiated by a teacher. Analysis of Key Informant interviews revealed that the funding, student buy-in, ease of application, packaged program, staff support, under-utilised infrastructure and addressing behavioural problems during school breaks as the main facilitators for adoption of the intervention. According to one Principal “It wouldn’t have happened (without the funding). There’s so many things vying for those dollars and it’s not just in the area of PE, it’s beyond that. We look at what things we can use but then look for what other grant money there is available to value-add to what we’ve got.” With respect to student buy-in, many Principals recalled positive experiences for the students commenting that, “The kids were really keen, they were looking forward to

PZ” and “Kids loved it and that was a real draw and they were waiting and waiting and waiting for PZ to happen, that was really great”.

Implementation

The major intervention components were consistently implemented in all but one of the participating schools (7 of 8). Playground line-markings were completed by 88% schools one month after the official launch, with line-marking numbers remaining constant to the 12 month time point. By the six month period, teaching of playground games was completed by 75% of schools, while 50% had completed the student peer leader training package. Of the 75% of schools who taught the playground games in the first six months, 50% of those schools taught them again over the following six month period. Only one school had not taught any of the playground games by the end of the study. When this issue was raised during interviews the school Principal stated that “It runs itself, there isn’t a need to teach the games”. With regards to the student peer leader training, 50% of schools still had not implemented the package as intended by the end of the study period, with 25% of those schools indicating they already had a similar peer leader program in place.

Barriers to implementation identified from interviews included i) the ‘manpower’ to complete the painting, and ii) issues associated with the ‘champion’ (a charismatic individual who throws his or her weight behind the innovation (Rogers, 2002)) leaving. Comments such as “The manpower to do it, to do the actual ground work as far as the preparation and some of the games and the setting up that was the hard part” and

“nothing gets done without Jane” were indicative of these findings. To a lesser extent, two other reported barriers included Management Buy-in (“it really needs management to push it”) and Teacher Professional Development (“teachers are not bringing back the training and applying it to PZ”).

Facilitators to implementing PZ were also identified during interviews and included, the external support provided, supportive resources supplied, the intervention fitted the school context, was aesthetically appealing and was easy to implement. Comments such as “I thought a positive was the input from outside, the resources and also the support to say okay these programs are valuable and have a bit of research to back it up” and “It can be used in a variety of ways, it’s not just something that has to happen at lunch time or in class time, it’s not something that has to be pulled out and set up, because if it did it wouldn’t happen as much” were indicative of responses provided by interviewees regarding facilitators of PZ. To a lesser extent, the availability of physical space, the launch event, the games and activities, management buy-in and appealing to students were also reported as facilitators to implementing PZ.

Maintenance

All schools who had implemented PZ for 12 months (7 of 8) reported that it was now accepted practice and part of the normal school routine with one Principal indicating that, “In terms of the PZ areas, that’s just running itself. I would think if you came back in another year’s time I would be very surprised if we weren’t saying we’re still using PZ”. Additionally, all participating schools reported that no modifications were

necessary to the intervention in order to maintain PZ, while 86% of the implementing schools also reported noticeable changes in children's behaviours, other than PA, as a result of the intervention. These behaviours included reductions in fighting, reductions in boredom and disruptive behaviour during school breaks, and increased incidents of cooperation, negotiation, and sharing. "The good thing about this is in playing these type of games you learn social skills, obviously hopscotch you have to take turns, skipping, again, someone has to hold the rope and they're incidentally learning all the time and the other thing is that you're taking kids away from being in the situation where they're going to have anti-social behaviour; they're having success and they're happy" was indicative of the comments made by most interviewees.

Discussion

To date, the majority of PA research has been directed towards the investigation of effective evidence-based interventions which has created new opportunities to enhance PA across a range of population groups and settings. However, widespread dissemination and translation are still needed in real-world settings to produce the population PA behavioural shifts required for preventative health benefits (Wilcox et al., 2006). The purpose of this study was to explore this research to practice gap and contribute to the extant literature by examining the barriers and facilitators of adopting, implementing and maintaining a PA intervention in primary school settings utilising the RE-AIM framework.

Reach

The overall participation rate at a setting level was 16% (8 of 49 schools), which was lower than anticipated. However, telephone interviews from the non-participating schools subset revealed the major reason for non-participation was schools being previously committed to other priorities for that year including school anniversary and pre-existing PA, health and science programs with the local university. This finding highlights the growing demand placed on schools and the need for future external projects to allow sufficient lead-in for schools to plan the following year's priorities. Other explanations provided for non-participation included the EOI failing to reach the appropriate decision maker/s, and a staffing perception that students were sufficiently active, especially in smaller rural schools. A more detailed understanding of individual schools and a varied approach to setting recruitment is needed in order to facilitate greater reach of prevention initiatives. Multiple strategies previously reported to extend reach have included: gaining an understanding of the specific characteristics of each school, using the proper lines of authority and communication, identifying gatekeepers and persuading schools of the project's significance, in particular the mutual benefits of health and academic performance (Cleaver & Rich, 2005; Rice, Bunker, Kang, Howell, & Weaver, 2007).

Adoption

Interview responses revealed that the decision to adopt PZ by schools was dependent upon limited school personnel, namely Principals and champions. This finding, whilst not unexpected (Gorely, Nevill, Morris, Stensel, & Nevill, 2009), highlights that further work could be undertaken with these decision-makers and/or gatekeepers in order to

increase adoption rates. Ginexi (2006) states that leadership, vision and staff buy-in are required enablers or de-railers, highlighting that not only are these decision makers critical for extending program reach, but they can further enable or disable the next decision of adopting an intervention. In particular, communications with schools decision-makers could draw on the literature linking PA and health with improved behaviour and educational outcomes, the latter being a school's core business (Wamp, 2009).

The funding, which was used to purchase the paint and materials to complete the playground line-marking, and student buy-in for the project were the two most reported facilitators for adopting PZ. Although the use of one-off funding is often questioned by health promotion practitioners as a mechanism for creating sustainable change (Hartwig et al., 2006), our findings indicated that it was an important facilitator for the initial decision to adopt PZ. This finding provides support to previous research that a lack of funding for prevention activities is a reported barrier (Glasgow & Emmons, 2007) and that funding can provide a necessary kick-start for health promotion projects (Cass, Price, & Rimes, 2005). Further, the intervention usage was sustained for at least 12 months which may have been due to the funding supporting the installation of supportive environment for physical activity by way of multi-coloured playground line markings. Bopp and colleagues (2007) provide support for this finding, reporting that interventions which produced environmental and social changes (e.g., create or enhance access to PA facilities) may have a better chance of sustainability than would interventions that promote only PA.

With regard to student buy-in, our findings support the research positing that engaging and involving students in self-determination of their PA transpires into increased PA (Brunton et al., 2003). Many elements of PZ were flexible and allowed students to contribute to the project, including the naming of the project, its logo selection, and in the case of some schools, the numerous and varied line-marking designs and colours, all providing children with choice regarding the games they wanted to play.

Implementation

A predominant barrier for implementing PZ was the availability of staff to help with tasks, such as painting the playground line-markings, with 63% of schools indicating they had insufficient manpower to assist with these physical tasks. Despite over half of schools citing this barrier, only one school was unable to complete this aspect of the intervention (i.e., complete the painting of their playground line-markings). The fact that 88% of the schools overcame the ‘manpower’ barrier to complete intervention implementation could be resultant of the intervention’s lack of complexity and relevant ease of application. The finding is consistent with previous research purporting that complexity, (i.e., how difficult the intervention is to understand or use), influences the adoption, implementation and sustainability of an intervention (Owen et al., 2006). This finding was further substantiated by interview responses stating that it was a “do-able project” in terms of both adoption (25% of schools) and implementation (57% of schools). The other reported barrier for implementation referred to issues around the project ‘champion’, in particular staff turnover. Teacher turn-over can be a source of

turbulence affecting a school's capacity to implement a prevention program (Thaker et al., 2007), with turbulence affecting the ability of a school to absorb changes, such as adopting, implementing and maintenance of an innovative program like PZ (Thaker et al.). However, again despite 36% of schools reporting turn-over of their PZ champion, only one school was adversely affected and did not implement the program as intended. This finding could again reflect PZ's ease of application and it's compatibility with the school context.

Adequate resources (e.g., training, technical assistance, incentives, time, funding) and external support were the two most reported facilitators for PZ implementation. External support was particularly noted in relation to the facilitation of project meetings and the linking of schools in a collegiate approach. As many settings are inundated with competing demands, often it is a challenge to even find one minute for prevention work (Glasgow & Emmons, 2007), hence incentives from external partners by way of additional resources (e.g., PA professional development and PA playground games manual) and coordinating external support, particularly in partnership with other schools, would appear an appropriate strategy supporting intervention implementation. Glasgow, Lichtenstein, and Marcus (2003a) add support to this finding, asserting that external resources should be provided by researchers to enhance additional dissemination activities, thus supporting practitioners to be more willing to implement and integrate more evidence-based interventions into their practice.

A further facilitator for PZ implementation was the reported aesthetic appeal of the intervention. Some schools reported that PZ line markings made their school grounds more visually appealing (Appendix 9). It was revealed during interviews that some parents and children perceived the school to be a more positive and attractive environment making it more enjoyable to spend time in. The aesthetic domain has been positively linked in previous research to increased physical activity with community level interventions (Brennan Ramirez et al., 2006) and more specifically with adolescents (Mota, Almeida, Santos, & Ribeiro, 2005), providing promise that it may also be an important element in promoting physical activity within the school setting.

Maintenance

An important aspect of organisational capacity is related to its ability to ensure long-term sustainability (Rabin et al., 2006). All of the implementing schools (n=7) reported maintenance of PZ at the 12 month mark, with no reported adaptations required. The high proportion of schools able to maintain PZ for this period suggests it is compatible with the primary school setting and could reflect the low complexity of implementing the intervention over time. Where an innovative program is perceived as fitting the context of the school and practices of the teachers, it is said to be compatible with a given school, according to Steckler, Goodman, McLeroy, Davis, and Koch (1992). These findings were further corroborated by interview responses with many interviewees reinforcing that PZ “fitted” easily within the school context and had an “ease” of application.

While dissemination research is needed to inform public health practice, policies that support adoption of evidence-based physical activity interventions will be required to ensure ongoing maintenance and success. The ‘Smart Moves’ initiative (<http://education.qld.gov.au/schools/healthy/physical-activity-programs.html>), requiring all Queensland Government schools to allocate at least 30 minutes of MVPA daily as part of the school curriculum is an example of such a policy. *Smart Moves*, announced in 2007, aims to increase student participation in PA and to improve the quality of that physical activity. Consequently, with the introduction of this policy requirement from Education Queensland, 100% of the participating schools have indicated, through interviews they would be utilising PZ to meet the reporting requirements of the 30 minute PA, *Smart Moves* policy.

Conclusions

Considerable work is still required to best determine how to effectively implement and evaluate evidence-based PA interventions in school settings. Practitioners often note that intervention research is difficult to apply in ‘real-world’ settings (Oldenburg et al., 1999), with practitioners more concerned about whether research findings will apply to their particular context (Glasgow et al., 2006) . Results of this study indicate that PA interventions such as PZ can be consistently implemented and maintained for at least a 12 month period when issues of compatibility and complexity are considered along with the provision of external support, including resources and funding. While the real-world setting poses unique challenges for researchers compared to efficacy based research, it has the benefits of establishing community and academic working relationships and

advances our understanding of how dissemination of health promotion interventions may be achieved (Owen et al., 2006). Through these partnerships researchers can develop a greater understanding of setting contextual factors for inclusion in evaluation designs, potentially making outcomes more relevant and influential in future reach and adoption efforts. Conversely, practitioners can influence the design and subsequent implementation of more appropriate and compatible interventions, increasing the likelihood of successful dissemination. Finally, perhaps researchers and physical activity program designers should give careful consideration to developing interventions of the minimal intensity needed for behaviour change rather than of maximum intensity, and give greater consideration to factors around intervention complexity and compatibility with settings. Otherwise, it would appear, few practice settings will have the resources or staff expertise required to implement 'effective' interventions, and only a relatively small and unrepresentative proportion of settings will likely continue to volunteer to adopt new innovations (Glasgow & Emmons, 2007).

Limitations

This study has several limitations, including a small sample size and the qualitative nature of the interview data. Both are common limitations of organisational level studies where the setting is the unit of sampling and analysis. Hence, addressing the barriers identified for reach in this study and potentially expanding the adoption of the organisation sample would allow for further insight into the barriers and facilitators that influence implementation and maintenance of PZ. Social desirability is the major concern relating to self-reported data (Klesges et al., 2004), where school personnel

during the interviews, potentially may have reported back only favourable responses, wanting their school to look successful. While this is acknowledged as a limitation of the interview data collected, the evaluation design was chosen in an attempt to minimise the burden of reporting on schools and increase the likelihood of responses. Additionally, whilst qualitative research has its drawbacks, including the subjective nature creating difficulties in establishing reliability and validity, and the risk of researcher and participant induced biases, it provided a greater depth of information and understanding when examining the themes which emerged from the interview data.

An additional factor that may have negatively affected the findings from this study was the over representation of more ‘motivated’ school settings, who traditionally seek out new programs and interventions (Owen et al., 2006). However, in the real-world it is precisely such settings (i.e., ‘motivated’ schools) that would make use of this kind of PA program. Although this disproportionate sample presents a potential methodological weakness, it may also make the findings more salient as a result. In effect, it has resulted in an over sampling of the portion of settings who have more propensity to adopt and implement PA innovations such as PZ.

Future research

It is recommended that future studies incorporate behavioural components, in particular outcomes which are important to school decision makers in order to facilitate greater reach and adoption. Thus evaluations for the school setting could include behavioural components (e.g., classroom and playground), academic achievement, cost-benefit

analysis of intervention implementation and satisfaction and stress for intervention delivery. Such contextual factors may provide relevant program information and support for school setting decision makers to further enhance adoption and subsequently broad dissemination of interventions. Ongoing collaboration between researchers and practitioners is vital in order to understand these contextual issues. In addition to developing PA programs guided by theory and evaluating student level PA outcomes, program developers and researchers should also examine and document organisational and program level factors that facilitate and/or impede adoption, implementation and maintenance (Glasgow, Lichtenstein, & Marcus, 2003b), thus acknowledging that true success might be better defined by the impact a given intervention makes on the population. Therefore, consideration of the RE-AIM framework, including both internal and external validity, in the planning and implementation stages may result in a more comprehensive intervention. It is also recommended that future PA research include student opinions as a starting point, in both the development and decision making processes, potentially increasing the likelihood of maximal participation and enjoyment. Finally, to further close the research to practice gap, remedying the documented barriers for adopting and implementing PZ, should be considered for future research, with PZ further refined and packaged to enhance dissemination of the intervention across a broader range of Central Queensland primary schools.

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CHAPTER 4: SUMMARY AND CONCLUSIONS

Considerable work is still required to best determine how to effectively implement and evaluate evidence-based physical interventions in school settings in order to facilitate greater translation and dissemination. Health promotion practitioners often note that intervention research is difficult to apply in ‘real-world’ settings (Oldenburg et al., 1999), particularly with effective health education and health promotion programs tending to be intensive and demanding for staff and participants (Glasgow & Emmons, 2007). Results of this study indicate that physical activity interventions such as PLAY Zone can be consistently implemented and maintained for up to 12 months when issues around compatibility and complexity are considered and external support is provided, including financial support and access or supply of supporting physical activity resources.

4.0 Reach and Adoption

Schools have become a virtual ‘dumping ground’ for a range of priorities by external agencies, including health promotion interventions, highlighting the need for external agencies to give careful consideration to the school context in order to facilitate greater reach and adoption of interventions. More specifically, it could include collecting evidence from intervention evaluations that is relevant to school ‘decision-makers’ and allowing sufficient planning and lead in time. Crucial to understanding individual school contexts, is acknowledging and working within proper lines of authority and

communication channels as well as identifying knowledge and decision-making ‘gatekeepers’ who can either enable or disable new program reach and adoption efforts. Furthermore, a detailed understanding of individual schools and a varied approach to setting recruitment is needed, if we are to facilitate greater reach of prevention initiatives. Also it appears more typical than not, that the decision to adopt a new program or initiative in primary schools, is made by a Principal or ‘champion’, further highlighting the necessity to have a comprehensive understanding of individual school contexts. The use of ‘kick-start’ funding has been applied sporadically by health promotion practitioners however, in this study it proved a beneficial strategy for the decision to adopt PLAY Zone. Worth noting was that the funding was specifically used for the installation of supportive physical environment for physical activity by way of installing multi-coloured playground line-markings.

Much has been reported and recommended about consulting with children regarding their physical activity preferences, subsequently a number of strategies were implemented to facilitate engaging with the students as part of PLAY Zone. These strategies included re-naming and branding the original program and choices of painted line-markings at their school. Furthermore, the nature of the PLAY Zone intervention was that, whilst the line-markings were a permanent fixture, children were able to choose their own games and activities and freely adapt and develop alternative games as they saw fit. The provision of options and choice for students proved an effective strategy, particularly in relation to adopting the intervention.

4.1 Implementation

Previous research suggests that adoption and dissemination of interventions may be enhanced by implementation characteristics such as low complexity, ease of understanding, compatibility with organisational values, low disruption of the social environment, minimal time investment by the organisation, limited risk of poor or uncertain results, observable intervention, ease of customising, and ability to update and modify over time (Klesges, Estabrooks, Dzewaltowski, Bull, & Glasgow, 2005b). The overall findings from this study add support to a number of Klesges et al. findings, including issues of complexity, ease of use, low disruption, and observable intervention.

The predominant barrier for implementing PLAY Zone related to issues of ‘manpower’ for the initial set up of the intervention, with all but one of the schools able to complete the tasks in full. Whilst this initial set up of PLAY Zone proved a challenge in the first instance for schools, the long-term benefits and low disruption to the overall school context of the intervention were clearly seen as worthwhile. Further, the time investment subsequently required for the ongoing implementation of PLAY Zone was minimal and this also could have provided an important incentive to complete the initial set up of line-markings. An additional element of PLAY Zone was the observable nature of the intervention (Appendix 10). This also could have provided some incentive and motivation for schools to overcome the short-term ‘manpower’ barriers of installing the intervention as the finished product provided clear, observable evidence of the work performed and the intervention.

In terms of facilitators for implementing PLAY Zone, adequate resources, including physical activity professional development, technical assistance with painting, incentives and physical activity equipment and resources along with external support were the two most reported by interviewees. It would appear reasonable to conclude that, with schools seeing the promotion of physical activity as ‘additional work’ and driven by external agencies, that researchers and health promotion practitioners should provide support and incentives to have ‘our’ investments adopted and implemented. Moreover, support and incentives should be targeted to address school setting reported barriers (e.g., funding) or build on reported facilitators (e.g., professional development and technical assistance), thus heightening the likelihood of their success.

Perhaps researchers and physical activity program designers should give consideration to developing interventions of the minimal intensity needed for behaviour change rather than of maximum intensity, and give greater consideration to factors around intervention complexity and compatibility with settings. Otherwise, it would appear, few practice settings will have the resources or staff expertise required to implement ‘effective’ interventions, and only a relatively small and unrepresentative proportion of settings are likely to volunteer to adopt new innovations (Glasgow & Emmons, 2007). Furthermore, reporting for intensive, costly interventions on highly selected participants is often required to produce large effect sizes, however in turn, this reduces the generalisability of study findings and minimises the likelihood of translating the findings to non-research settings (Glasgow & Emmons, 2007). It seems reasonable to suggest that it is

important to recognise interventions that have broad reach but relatively low levels of success.

4.2 Sustainability and Policy Impacts

An important aspect of organisational capacity is related to its ability to ensure long-term sustainability (Rabin et al., 2006), with all seven schools implementing PLAY Zone sustaining the intervention for 12 months. Furthermore, schools reported that no adaptations were required to the intervention in order to sustain it. It could be said PLAY Zone fitted the context of the primary school setting and the practices of teachers. Specifically, this could relate to the intervention's ability to 'build on' the current school context, by way of additional benefits to school break activities, rather than 'adding to' the already crowded curriculum. Additionally, general teachers were not required to have a high level of physical activity skill or knowledge to support the intervention implementation, as it was predominately play based and student directed games.

Policies are regarded as being essential in health promotion to ensure the long-term sustainability of interventions, including physical activity interventions. Fortuitously, for the research project, in 2007 the Queensland Government announced 'Smart Moves', requiring all government schools to allocate at least 30 minutes of daily moderate to vigorous physical activity as part of the curriculum. Whilst the study planned to investigate policy changes at the individual school level as a result of implementing PLAY Zone, Smart Moves superseded this objective by implementing a state-wide physical activity policy for both primary and secondary schools. Consequently, all

participating schools in the study indicated in interviews their intention to use PLAY Zone to meet and report on the requirements of Smart Moves, therefore reinforcing that PLAY Zone was able to become and will continue to be part of the schools' ongoing day to day physical activity practices.

CHAPTER 5: FUTURE RECOMMENDATIONS

Based on the findings of this study it is recommended that future researchers attend to the characteristics of intervention complexity and compatibility, as they can heighten the likelihood of interventions translation from research to practice in the primary school setting. It is therefore necessary to have an understanding of the current practices of the setting in which physical activity interventions are to be delivered. Where possible interventions should reflect the values, experiences and needs of the setting and take into consideration previous experiences they may have had. The intervention should also be easy to understand and implement.

It is also recommended that future school-based physical activity studies for children incorporate a number of behavioural components, important to both health researchers and education stakeholders. Such contextual factors may provide relevant program information and support for school setting decision makers to further enhance broad dissemination of interventions. Outcomes measures to be considered could include: objectively measured physical activity (i.e., accelerometer, pedometer), qualitative measures of children's enjoyment mediates (classroom and playground), cost-benefit analysis and classroom/academic performance (usually a decision maker is concerned about the cost to their organisation in the short-run, rather than the total incidental cost of a program) (Estabrooks & Glasgow, 2006).

In addition to developing physical activity programs guided by theory and evaluating student level outcomes, program developers and researchers should also examine and

document external validity as a priority, including organisational and program level factors that facilitate and/or impede adoption, implementation and maintenance (Glasgow et al., 2003b). Consideration of the RE-AIM framework during the planning stages of a new intervention may result in a more comprehensive intervention that addresses the issues associated with both internal and external validity for public health benefit. Acknowledgement that true ‘success’ might be better defined by the impact a given intervention makes in a population’s everyday ability to do something different is required, as apposed to traditional clinical efficacy measures (Ory et al., 2007).

Furthermore, it is recommended that future physical activity research include student opinions and participation as a starting point, in both the development and decision making processes, supporting previous recommendations from Brunton et al. (2003) and Lonsdale et al. (2009). Future studies could also broaden play-based interventions, such as PLAY Zone and apply it to the secondary school setting, as researchers have discussed the lack of generalisation of physical activity behaviours in secondary schools, and there is emerging evidence for an effect of play-based interventions in high school settings (van Sluijs et al., 2007).

Additionally, future research is warranted in intervention planning stages to consider strategies which may increase reach and adoption in school settings, past those typically motivated to adopt such interventions (e.g., innovators and early adopters), thus potentially enabling greater generalisation of research findings.

Finally, in order to continue the work around closing the research to practice gap, future research should look at strategies to remedy the documented barriers of implementing PLAY Zone, and refine and re-package the intervention accordingly. This may enhance future dissemination of the intervention across a broader range of Central Queensland primary schools. Such re-packaging could also include emerging components of physical activity research by collaboration with Landscape Architects to design a number of 'pre-fabricated' templates for schools (based on those playground markings which were most used) and exploring the potential for linking with employment agencies to enlist voluntary support to undertake the playground painting.

“If we want more evidenced-based practice, we need more practice-based evidence”

(Green & Glasgow, 2006)

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APPENDIX 1: AUTHOR GUIDELINES FOR HEALTH PROMOTION PRACTICE

Submission Guidelines/Instructions for Authors

To submit a manuscript to Health Promotion Practice, you may do so through our online manuscript submission, review and monitoring system, Editorial Manager, at <http://www.editorialmanager.com/hpp>.

Please read the following instructions for authors completely before submitting your manuscript to HPP.

Manuscripts are invited on a variety of topics related to the application of health promotion/health education programs in various settings. Manuscripts addressing the following topics are encouraged:

- * Innovative linkages between academics/researchers and practitioners
- * Community and/or clinical applications of new or state-of-the-art intervention strategies
- * Policy advocacy and social environmental interventions to promote health
- * Evaluations of community and/or clinical interventions focusing on the utility for practitioners
- * Sustainability/durability of interventions and policy initiatives, and
- * Other applied practice topics.

When considering the development and submission of manuscripts to Health Promotion Practice, the journal's mission statement should be considered:

The journal publishes authoritative articles devoted to the practical application of health promotion and education. It publishes information of strategic importance to a broad base of professionals engaged in the practice of developing, implementing, and evaluating health promotion and disease prevention programs. The journal's editorial board has made a commitment to focus on the applications of health promotion and public health education interventions, programs and best practice strategies in various settings, including but not limited to community, health care, worksite, educational and international settings.

Additionally, the journal focuses on the development and application of public policy conducive to the promotion of health and prevention of disease. The journal includes issues related to the professional preparation and development of health educators. The journal recognizes the critical need to (1) promote linkages between researchers in the academic and private sectors with health promotion and education practitioners; and (2) address the health issues of ethnic and racial minority populations. These partnerships and collaborations are reflected in the editorial philosophy and the broad scope of published articles and contributed sections. The journal adheres to the ethical principles of the profession as reflected in SOPHE's code of ethics.

Authors are asked not to use the following terms:

- * Subjects when referring to participants;
- * Target populations when referring to Priority populations

Manuscript Types and Format Guidelines

Please follow the guidelines below based on the type of manuscript you are submitting.

- * Manuscripts should be submitted in English
- * Manuscripts must be typed double-spaced, font size 12-point, Times New Roman
- * 20 pages MAXIMUM, including references, tables & figures (Note: this does not include cover page or abstract)
- * 1" margins on all sides
- * Please include a cover letter
- * Identifying information MUST be placed ONLY on the title page and title page MUST be a separate document from the manuscript
- * Manuscript should not contain any identifying information regarding the author of the paper, acknowledgements, project funding or author's notes
- * Acknowledgements and author's notes should be entered in the "comments" field in Editorial Manager during the submission process

Items Required for Submission

- * Abstract
- * Keywords
- * Classifications
- * Complete name, email address, and one line bios for all authors on the manuscript

Dr. John Q. Public, PhD, is Director of Health Education at Public Health University in Anytown, State. (Longer bios will be edited to fit this example.)

- * Title page
- * Manuscript with tables, charts and figures
- * Transfer of copyright

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- * The entire manuscript, including references and citations, must be written according to the Publication Manual of the American Psychological Association, 5th edition.

Citations in the text should use the author-date method inserted at the appropriate point and are listed alphabetically in the reference section in APA style. For example, in text citations:

It is widely recognized that tobacco prevention and control programs should use policy advocacy interventions (Jones & Brown, 1998; Samson, Robb, and Dunn, 1996).

* All manuscripts not submitted in the correct referencing/citation style will be returned to the author. *

Tables, Charts, Figures and Graphs

Tables, charts, figures and graphs must be in black and white and printed at 1200 dpi or better. Power Point, Excel and Word are encouraged. Tables, etc. should be placed at the end of the paper- placement notations can be made throughout the text (e.g., "Insert Figure 1 here"). Please submit images exactly as you wish to see them when published.

Photos and Grayscale Images

Photos and grayscale images should be scanned in the size they will appear in the journal, or larger. Photos are best sent as originals or scanned in at the correct size and resolution (300 dpi).

Special Guidelines

Applications/Interventions Manuscripts (Peer-Review Article)

Each applications/intervention manuscript must include:

1. Cover letter
2. Title page including title, name and affiliations of authors, address, phone number, fax number and email of corresponding author
3. Abstract of 150 words or less
4. Keywords
5. Maximum length of twenty type written, double-spaced pages (including references, tables & figures). Times New Roman 12-point font, 1" margins all the way around.
6. The following sections should be included:
(Note: It is strongly suggested that you include these titles in your manuscript)
 - * Introduction
 - * Background/Literature Review
 - * Methods/Strategies/Intervention Applications

- * Discussion
- * Conclusions - must include recommendations and implications for applications.
- * References- (Note: All references must be written according to the Publication Manual of the American Psychological Association, 5th edition [i.e. (author, year) inserted in the text.]

Other types of manuscripts such as extensive literature reviews, policy case studies, or commentaries will be accepted (see below).

Literature Review Articles

Literature review articles must be comprehensive in nature, that is, go beyond a cursory review of a topic. Literature review articles must include the following:

1. Cover letter
2. Title page including title, name and affiliations of authors, address, phone number, fax number and email of corresponding author
3. Abstract of 150 words or less
4. Keywords
5. Maximum length of twenty type written, double-spaced pages (including references, tables & figures). Times New Roman 12-point font, 1" margins all the way around.
6. The following sections must be included:
 - * Introduction including rationale/timeliness of topic being reviewed
 - * Extensive literature review
 - * Discussion
 - * Conclusions—implications for applied practice
 - * References (Note: All references must be written according to the Publication Manual of the American Psychological Association, 5th edition [i.e., (author, year) inserted into the text.]

Policy Analysis/Policy Case Studies

Policy Analyses and policy case studies must include the following:

1. Cover letter
2. Title page including title, name and affiliations of authors, address, phone number, fax number and email of corresponding author

3. Abstract of 150 words or less
4. Keywords
5. Maximum length of twenty typewritten, double-spaced pages (including references, tables & figures). Times New Roman 12-point font, 1" margins all the way around.
6. The following sections must be included:
 - * Introduction
 - * Background/Literature Review
 - * Policy Analysis or Case Study
 - * Discussion
 - * Conclusions—implications for applied practice or policy
 - * References (Note: All references must be written according to the Publication Manual of the American Psychological Association, 5th edition [i.e. (author, year) inserted in the text.]

Commentaries

Commentaries on current, timely topics of interest to health promotion and education practice, policy and professional development are encouraged. Commentaries must include the following:

1. Cover letter
2. Title page including title, name and affiliations of authors, address, phone number, fax number and email of corresponding author.
3. Keywords
4. Approximate length of eight to ten typewritten, double-spaced pages.
5. References (Note: All references must be written according to the Publication Manual of the American Psychological Association, 5th edition [i.e. (author, year) inserted in the text.]

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Thank you, again, for your submission to Health Promotion Practice. We hope that you will share in our excitement about Onlinefirst, and look forward to your feedback. If you have any questions, please do not hesitate to contact me directly at (202) 408-9804 or sleonard@sophe.org.

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Email: sleonard@sophe.org

APPENDIX 2: EXPRESSION OF INTEREST



The Physical Activity Capricorn Taskforce, with support from Central Queensland University and Central Area Population Health Services

Presents

“Recess Revival”

Recess periods, which are regularly scheduled periods within the primary school day for unstructured play, provide an ideal opportunity for promoting daily physical activity.

This “Recess Revival” project will develop and implement ‘*a guide for the promotion of physical activity and cooperative play for primary school aged children during school breaks/playtime*’. As a supplementary resource to ‘*Active Playgrounds by Pat Doyle*’, this guide will assist teachers, playground supervisors and student leaders in the promotion of fun and cooperative physical activity on the playground.

An organised approach to an “active recess” will be different for every school. Existing programs, staffing, resources and the playground itself will all affect how “Recess Revival” could take shape at your school.

THE OPPORTUNITY

An opportunity exists for up to **10 schools in the Rockhampton Region** to be part of this physical activity initiative. Details of what is required, what you will receive and what it will cost schools are outlined in more detail below.

If your school is interested please complete the attached ‘Expression of Interest’ form and fax back to **Glenn Austin A/Director Health Promotion, Rockhampton Population Health Unit - 4920 6865 by MONDAY 20TH FEBRUARY**

WHAT’S REQUIRED FROM SCHOOLS?

- Commitment and support to develop and implement “Recess Revival” until the end of the 2006 school year

- Some vacant playground area/surfaces (eg; bitumen, cement or similar) that can be painted with coloured playground markings designed to promote physical activity
- Assistance with design and implementation of an evaluation framework (Note: which will contribute toward the development of a post-doctoral Research Masters at CQU)
- Cluster and school representation on a “Healthy Kids For Life Working Party” (i.e. committee to oversee and monitor project implementation and evaluation)

WHAT WILL SCHOOLS RECEIVE?

- Adapted version of an international evidence-based physical activity intervention (eg; Recess Revival)
- An implementation guide for active school breaks; “Recess Revival” adapted and relevant to the Rockhampton’s regions needs
- Up to 5 coloured playground markings (eg; foursquare, hopscotch, etc)
- Supply of high quality tarmac paint, stencils and equipment for playground markings (total project budget approximately \$7,000)
- Professional development opportunities for a number of teachers and student peer leaders on physical activity, to support the implementation of Recess Revival in your school
- *Active Playgrounds* resource – provides all the details of playground marking designs and games for an active recess (up to 3 per school)
- Development of an ongoing supportive local partnership of interested providers and agencies such as Rockhampton Population Health Unit, Central Queensland University, Sport and Recreation Queensland, Australian Sports Commission, (eg; Healthy Kids For Life Working Party)
- An “Active Kit” to support implementation of “Recess Revival”, Value approximately \$250.00 per school

WHAT WILL SCHOOLS HAVE TO PROVIDE?

- A nominated School Principal Cluster representative for the Healthy Kids For Life Working Party (compulsory)
- A School representative for a Recess Revival Project Team (compulsory)
- Support of a number of teachers and students to attend physical activity professional development sessions
- A financial contribution up to \$500 (depending on size of school) to support supply of paint for playground markings
- Supply the labour for the marking of your playground

Fax to Glenn Austin, Central Area Population Health Services

Fax: 4920 6865
by MONDAY 20TH FEBRUARY

EXPRESSION OF INTEREST TO PARTICIPATE IN 'RECESS REVIVAL'

School name:.....

Primary contact person:.....

Email:..... Phone:.....

School Band:.....

Please tick which sector

Government ☐

Independent ☐

Catholic ☐

APPENDIX 3: BASELINE QUESTIONNAIRE

ID: _____

Survey: _____

PROMOTING LIFELONG ACTIVE YOUTH

A physical activity demonstration project



Name of school: _____

Date completed: _____

INTRODUCTION

The following provides you with details regarding the **PLAY Zone** Physical Activity Demonstration Project, an innovative and unique study being conducted in the Rockhampton education region with a number of Primary Schools. The study is being conducted through the School of Health and Human Performance at Central Queensland University, with assistance from the Central Queensland Population Health Unit.

Australian children's physical activity levels and participation in sports and other active recreational activities is declining. Participation in physical activity is considered important for children to:

- develop good bone strength,
- boost the immune system,
- reduce the risk of developing diabetes and;
- for promoting a healthy weight.

Maintaining a healthy weight offers several advantages to children, including:

- decreased risk of diabetes and sleep problems and;
- increased likelihood of maintaining a healthy weight as an adult.

Crucial to firstly halting and ultimately reversing our current physical activity trends in children and young people and the subsequent poor health outcomes is identifying strategies and programs that are effective at increasing children's physical activity levels. In particular, interventions/programs that can be delivered in clearly identifiable settings, such as primary schools. Furthermore, if we are to enhance the potential for translating these effective interventions/programs into real-world settings, we will need to find an appropriate balance between both internal (i.e. Does this strategy increase levels of physical activity?) and external (i.e. Will it work in my school?) validity in their planning, design, implementation and evaluation.

Therefore, the results of this study will be used to help us understand how we can better translate effective physical activity interventions/programs, such as **PLAY Zone**, into real-world school settings in the Rockhampton education district, and in turn will help improve the health and well-being of our children now and in the future.

All information collected during the project will remain confidential and will not be used by any person outside of the research team. The results of the project will be used to inform part of a Research Masters thesis examining how an effective physical activity intervention is transferable to real-world primary school settings, study results will also be published in academic journals and presented at academic conferences. The information collected will not be presented in a way that will allow for individuals/schools to be identified, and all will be kept on a password protected computer, only accessible by Mr Glenn Austin.

HOW DO I PARTICIPATE IN THE STUDY

The research team at Central Queensland University has selected 10 primary schools in the region to participate in the study. Your school's participation in the study is completely voluntary, and requires very little of your time. The school setting and the associated supportive environments provided by schools, play an important role in shaping the behaviour, including levels of physical activity, of their children. Therefore it is important for us to gather some important information at the school level around these issues. Participation in this study will require you to:

- set up line markings in your schools' playground,
- complete five brief questionnaires and;
- participate in working group meetings /discussions.

The purpose of the questionnaires and working group discussions is to gain an understanding of some important processes and impacts of the **PLAY Zone** Demonstration Project. It is estimated that the questionnaires will take around 20 minutes with more in-depth focus groups planned after 6 and 12 months of implementing the intervention. These are estimated to take around 1-2 hours, with dates and times to be confirmed.

Your school's participation is voluntary and you are free to withdraw from the study at any time for any reason without prejudice. If you wish to participate, please sign the informed consent below.

SCHOOL CONSENT FORM

As the Principal of _____ I am providing consent for participation in the **PLAY Zone** Physical Activity Demonstration Project. In doing so, I agree that I understand the requirements of participation as outlined below:

- I have read and understood the requirements of participating in the study;
- I understand that my school has the right to withdraw from the study at any time with out penalty or prejudice;
- I am aware that a plain English statement of results will be available to me if I request a copy from Mr Glenn Austin;
- I understand that all results of the study will be presented in a way that does not allow for individuals/schools to be identified;
- I understand that I am providing informed consent for my school to participate in the study
- I understand that I can contact Mr Glenn Austin (07) 4920 6980, Glenn_Austin@health.qld.gov.au or Professor Kerry Mummery (07) 4930 6749; k.mummery@cqu.edu.au to discuss any concerns about this project.

Principal Signature: _____

Name (please print): _____

of _____ (school name)

Date: ____/____/2006

INSTRUCTIONS

- The following questions are designed to assess your school's current situation (i.e. PRIOR TO THE COMMENCEMENT OF ANY LINE MARKINGS OR OTHER INITIATIVES RELATING TO PLAYZONE) in relation to playground linemarkings, play equipment and physical activity
- This survey should take approximately 20 minutes to complete
- For each question:
 - ☒ place a tick in the box that best describes your school's current situation
 - feel free to use the space provided beside each question to detail any additional comments that you may have

Note: you may like to involve other key members of staff or school community to assist you in reporting your information as accurately as possible.

QUESTIONS

KEY ACTION AREA 1: Playground Line Markings

Please answer the following questions to the best of your knowledge

We would like to know what the current status is of the playground line marking in your school.

QUESTIONS	RESPONSES	COMMENTS
Are there currently playground line markings in your school? (e.g. Hopscotch, foursquare, etc)	☐ Yes ☐ No	
If there are currently no line markings in your school please move the section on 'Playground Play Equipment'		
How many sets of individual playground line markings are there?	☐ 1-5 ☐ 6-10 ☐ 11+	
On average what is their condition?	☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Are the playground line markings accessible to students during the following school breaks?		
First Break (Morning Tea) Second Break (Lunch) Other (eg Before or After School)	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
How frequently are the playground line markings used by students in the following breaks?		
First Break (Morning Tea)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	

KEY ACTION AREA 1: Playground Line Markings (cont)

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
Second Break (Lunch)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	
Other (eg Before School)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	
(After School)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	

KEY ACTION AREA 2: Playground Play Equipment (supporting the line markings)

Please answer the following questions to the best of your knowledge

We would like to know what the current status of playground play equipment to support your playground line markings is in your school.

QUESTIONS	RESPONSES	COMMENTS
How would you rate your current playground play equipment in terms of:		
QUANTITY		
How much playground play equipment is currently available for use with the playground line markings?	☐ 1-5 pieces ☐ 6-10 ☐ 11-15 ☐ 16+	
Do you think that there is enough equipment to support the current quantity of line markings?	☐ Yes ☐ No ☐ Unsure	
QUALITY		
How would you rate the condition of the playground play equipment?	☐ very poor ☐ poor ☐ average ☐ good ☐ very good	

KEY ACTION AREA 2: Playground Play Equipment (supporting the line markings) (cont)

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
Is the playground play equipment available for use during school breaks (e.g. morning tea, lunch)? <i>Please indicate if playground play equipment is available in each of the following breaks.</i> First Break (Morning Tea) Second Break (Lunch) Other (eg Before or After School)	☐ Yes ☐ No ☐ Yes _____ minutes ☐ No ☐ Yes _____ minutes ☐ No ☐ Yes _____ minutes ☐ No	
Is the playground play equipment available on: Monday Tuesday Wednesday Thursday Friday	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
How frequently is the playground play equipment used by the children? Lower Primary (Years P-3) Middle Primary (Years 4-5) Upper Primary (Years 6-7)	☐ Never ☐ Some days ☐ Most days ☐ Everyday ☐ Never ☐ Some days ☐ Most days ☐ Everyday ☐ Never ☐ Some days ☐ Most days ☐ Everyday	

KEY ACTION AREA 3: Physical Activity

Please answer the following questions to the best of your knowledge

Finally we would like to know the current arrangements for physical activity in your school.

QUESTIONS	RESPONSES	COMMENTS
Is there allocated time outside of regular physical education classes for physical activity?	☐ Yes ☐ No	
If so, how much time is regularly allocated for physical activity outside of physical education class per week?	_____ minutes	
Does the school have a written policy or statement relating to promoting and supporting physical activity at school?	☐ Yes ☐ No	



Thank you for agreeing to participate in the Playzone physical activity demonstration project and for taking the time to fill in this survey. If you have any queries please contact Glenn Austin on 07 4920 6980 or directly on 0407 139 617. I look forward to working with you over the duration of this project.

APPENDIX 4: PLAY ZONE LOGO



APPENDIX 5: 1 MONTH FOLLOW UP QUESTIONNAIRE

ID: _____

Survey: _____

PROMOTING LIFELONG ACTIVE YOUTH

A physical activity demonstration project



Name of school: _____

Date completed: _____

INTRODUCTION

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INSTRUCTIONS

- The following questions are designed to assess your school's current situation, 1 MONTH AFTER LAUNCHING the PLAY Zone project, in relation to playground linemarkings, play equipment and physical activity
- The survey should take approximately 20 minutes to complete
- For each question:
 - ☒ place a tick in the box that best describes your school's current situation
 - feel free to use the space provided beside each question to detail any additional comments that you may have

Note: you may like to involve other key members of staff or school community to assist you in reporting your information as accurately as possible.

QUESTIONS

KEY ACTION AREA 1: Playground Line Markings

Please answer the following questions to the best of your knowledge

We would like to know what the current status is of the playground line marking in your school.

QUESTIONS	RESPONSES	COMMENTS
How many current line markings are EXISTING?	☐ 1-5 ☐ 1-5 New ☐ 6-10 ☐ 6-10 New ☐ 11+ ☐ +11 New	
Is this the number that you had intended to complete as part of the project?	☐ Yes ☐ No	
On average what is their condition?	☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Are the playground line markings accessible to students during the following school breaks?		
First Break (Morning Tea)	☐ Yes ☐ No	
Second Break (Lunch)	☐ Yes ☐ No	
Other (eg Before or After School)	☐ Yes ☐ No	
Were any of the following barriers to implementing the line marking?	Encouragement and support of school management, encouragement and support of staff, time, support for implementation (preparation and painting), supportive equipment to complete the linemarking (equipment), cost, other	
Were any of the following facilitators to implementing the line marking?	Same as above	

KEY ACTION AREA 1: Playground Line Markings (cont)

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
How frequently are the playground line markings used by students in the following breaks?		
First Break (Morning Tea)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
Second Break (Lunch)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
Other (eg Before School)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
(After School)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	

KEY ACTION AREA 2: Playground Play Equipment (supporting the line markings)

Please answer the following questions to the best of your knowledge

We would like to know what the current status of playground play equipment to support your playground line markings is in your school.

QUESTIONS	RESPONSES	COMMENTS
How would you rate your current playground play equipment in terms of:		
QUANTITY		
How much playground play equipment is currently available for use with the playground line markings?	☐ 1-5 pieces ☐ 6-10 ☐ 11-15 ☐ 16+	
Do you think that there is enough equipment to support the current quantity of line markings?	☐ Yes ☐ No ☐ Unsure	
QUALITY		
How would you rate the condition of the playground play equipment?	☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Were there any barriers to accessing the playground play equipment? Same as above		

KEY ACTION AREA 2: Playground Play Equipment (supporting the line markings) (cont)

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
Were there any facilitators to accessing the playground play equipment? As above		
Is the playground play equipment available for use during school breaks (e.g. morning tea, lunch)? <i>Please indicate if playground play equipment is available in each of the following breaks.</i>	☐ Yes ☐ No	
First Break (Morning Tea)	☐ Yes _____ minutes ☐ No	
Second Break (Lunch)	☐ Yes _____ minutes ☐ No	
Other (eg Before or After School)	☐ Yes _____ minutes ☐ No	
Is the playground play equipment available on:		
Monday	☐ Yes ☐ No	
Tuesday	☐ Yes ☐ No	
Wednesday	☐ Yes ☐ No	
Thursday	☐ Yes ☐ No	
Friday	☐ Yes ☐ No	
How frequently is the playground play equipment used by the children?		
Lower Primary (Years P-3)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	
Middle Primary (Years 4-5)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	
Upper Primary (Years 6-7)	☐ Never ☐ Some days ☐ Most days ☐ Everyday	

KEY ACTION AREA 3: Physical Activity

Please answer the following questions to the best of your knowledge

Finally we would like to know the current arrangements for physical activity in your school.

QUESTIONS	RESPONSES	COMMENTS
Is there allocated time outside of regular physical education classes for physical activity?	☐ Yes ☐ No	
If so, how much time is regularly allocated for physical activity outside of physical education class per week?	_____ minutes	
Does the school have a written policy or statement relating to promoting and supporting physical activity at school?	☐ Yes ☐ No	

KEY ACTION AREA 4: Supporting Project Implementation

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
Has the PLAY Zone project been advocated/promoted to the school community (i.e. teachers, parents, students, other staff) via any of the following? Launch, staff meeting, school announcement, newsletter, staff notice board, other.		



Thank you for agreeing to participate in the Playzone physical activity demonstration project and for taking the time to fill in this survey. If you have any queries please contact Glenn Austin on 07 4920 6980 or directly on 0407 139 617. I look forward to working with you over the duration of this project.

APPENDIX 6: 6 MONTHS FOLLOW UP QUESTIONNAIRE

ID: _____

Survey: _____

PROMOTING LIFELONG ACTIVE YOUTH

A physical activity demonstration project



Name of school: _____

Date completed: _____



INTRODUCTION

The following provides you with details regarding the **PLAY Zone** Physical Activity Demonstration Project, an innovative and unique study being conducted in the Rockhampton education region with a number of Primary Schools. The study is being conducted through the School of Health and Human Performance at Central Queensland University, with assistance from the Central Queensland Population Health Unit.

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All information collected during the project will remain confidential and will not be used by any person outside of the research team. The results of the project will be used to inform part of a Research Masters thesis examining how an effective physical activity intervention is transferable to real-world primary school settings, study results will also be published in academic journals and presented at academic conferences. The information collected will not be presented in a way that will allow for individuals/schools to be identified, and all will be kept on a password protected computer, only accessible by Mr Glenn Austin.

INSTRUCTIONS

- The following questions are designed to assess your school's current situation. 6 MONTHS AFTER LAUNCHING the PLAY Zone project, in relation to playground linemarkings, play equipment and physical activity
- The survey should take approximately 20 minutes to complete
- For each question:



- place a tick in the box that best describes your school's current situation
- feel free to use the space provided beside each question to detail any additional comments that you may have

Note: you may like to involve other key members of staff or school community to assist you in reporting your information as accurately as possible.

QUESTIONS

KEY ACTION AREA 1: Playground Line Markings

Please answer the following questions to the best of your knowledge

We would like to know what the current status is of the playground line marking in your school.

QUESTIONS	RESPONSES	COMMENTS
How many sets of individual line markings are there?	☐ 1-5 ☐ 6-10 ☐ 11+	
How long have your new line markings been completed?	_____ Weeks	
On average what is their condition?	☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Are the playground line markings accessible to students during the following school breaks?		
First Break (Morning Tea)	☐ Yes ☐ No	
Second Break (Lunch)	☐ Yes ☐ No	
Other (eg Before or After School)	☐ Yes ☐ No	
How frequently are the playground line markings used by students in the following breaks?		
First Break (Morning Tea)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
Second Break (Lunch)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
Other (eg Before School)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
(After School)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	

Key Action Area 2: Playground Play Equipment (supporting the line markings)

Please answer the following questions to the best of your knowledge

We would like to know what the current status is of the playground play equipment to support the playground line marking in your school.

QUESTIONS	RESPONSES	COMMENTS
How would you rate your current playground play equipment in terms of: QUANTITY How much playground play equipment is currently available for use with the playground line markings? Do you think that there is enough equipment to support the current quantity of line markings? QUALITY How would you rate the condition of the playground play equipment?	☐ 1-5 pieces ☐ 6-10 ☐ 11-15 ☐ 16+ ☐ Yes ☐ No ☐ Unsure ☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Is the playground play equipment available for use during school breaks (e.g. morning tea, lunch)? Please indicate if playground play equipment is available in each of the following breaks. First Break (Morning Tea) Second Break (Lunch) Other (eg Before or After School)	☐ Yes ☐ No ☐ Yes _____ minutes ☐ No ☐ Yes _____ minutes ☐ No ☐ Yes _____ minutes ☐ No	
Is the playground play equipment available on: Monday Tuesday Wednesday Thursday Friday	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
How frequently is the playground play equipment used by the children? Lower Primary (Years P-3) Middle Primary (Years 4-5) Upper Primary (Years 6-7)	☐ Never ☐ Some days ☐ Most days ☐ Everyday ☐ Never ☐ Some days ☐ Most days ☐ Everyday ☐ Never ☐ Some days ☐ Most days ☐ Everyday	

Key Action Area 3: Playground Games and Activities

Please answer the following questions to the best of your knowledge

We would like to know about the playground games and activities, provided in the 'PLAY Zone Activity Manual', that have been taught in your school.

QUESTIONS	RESPONSES	COMMENTS
SECTION A Have playground games and/or activities (as per PLAY Zone Activity Manual) been taught to students?	☐ Yes ☐ No (if no go to Section B)	
When have these games and/or activities been taught? During regular PE classes During regular school breaks (e.g., morning tea, lunch) Before school After school Other (please list) _____	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
Who has been involved with teaching these games and/or activities? PE teacher Regular teacher Peer Leaders Other (please list) _____	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
Approximately how many different games and/or activities have been taught?	☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16+	
How often are playground games and/or activities taught to students?	☐ Weekly ☐ Monthly Other (please list) _____	
SECTION B Do you plan to teach playground games and activities (as per PLAY Zone Activity Manual) in the future?	☐ Yes If yes, when? ☐ This Term (2) ☐ No ☐ Term 3 ☐ Term 4 ☐ Next Year If not ... why? ☐ Lack of time ☐ Limited resources ☐ Already have something in place ☐ Not relevant ☐ Not appropriate Other (please list) _____	

Key Action Area 4 – Student Peer Leader Training Young People Can Take a Lead (YPCTL)

Please answer the following questions to the best of your knowledge

We would like to know about the training of Peer Leaders in your school.

QUESTIONS	RESPONSES	COMMENTS
SECTION A		
Has the student peer leader training been undertaken to support the PLAY Zone project?	☐ Yes ☐ No (if no go to Section B)	
If so how many students have been trained using the YPCTL Resource?	☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16+	
If possible Gender numbers and Grade numbers would be appreciated!	Male Female 	
How were these students selected?	☐ Yes ☐ No ☐ Grade ☐ Student Performance ☐ Leaders ☐ Behaviour ☐ Other (please list) _____	
How useful was the 'YPCTL' resource for planning and delivering the student peer leader training?	☐ Not at all ☐ Somewhat ☐ Very	
How useful was the YPCTL resource for the development of leadership skills to support the PLAY Zone project in your school?	☐ Not at all ☐ Somewhat ☐ Very Go to Key Action Area 5 (page 7)	
SECTION B		
Do you intend to train Peer Leaders to support the PLAY Zone project?	☐ Yes If yes, when? ☐ This Term (2) ☐ No ☐ Term 3 ☐ Term 4 ☐ Next Year If not ... why? ☐ Lack of time ☐ Limited resources ☐ Already have something in place ☐ Not relevant ☐ Not appropriate Other (please list) _____	

Key Action Area 5: Physical Activity

Please answer the following questions to the best of your knowledge

Finally we would like to know the current arrangements for physical activity in your school

QUESTIONS	RESPONSES	COMMENTS
Is there allocated time outside of regular physical education classes for physical activity?	☐ Yes ☐ No	
If so, how much time is regularly allocated for physical activity outside of physical education class per week?	_____ minutes	
Does the school have a written policy or statement relating to promoting and supporting physical activity at school?	☐ Yes ☐ No	

Key Action Area 6: Supporting Project Implementation

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
Has the PLAY Zone project been advocated and/or promoted in the school community after the initial launch? (please tick all those that apply)	☐ Lunch ☐ Staff meeting ☐ School announcement ☐ School newsletter ☐ Community newsletter ☐ P&C ☐ Staff notice board ☐ Other	

Thank you for agreeing to participate in the PLAY Zone physical activity demonstration project and for taking the time to fill in this survey. If you have any queries please contact Glenn Austin on 07 4920 6980 or directly on 0407 139 617. I appreciate your ongoing support through out this project.




APPENDIX 7: 12 MONTHS FOLLOW UP QUESTIONNAIRE

ID: _____

Survey: _____

PROMOTING LIFELONG ACTIVE YOUTH

A physical activity demonstration project



Name of school: _____

Date completed: _____

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Australian children's physical activity levels and participation in sports and other active recreational activities is declining. Participation in physical activity is considered important for children to:

- develop good bone strength,
- boost the immune system,
- reduce the risk of developing diabetes and;
- for promoting a healthy weight.

Maintaining a healthy weight offers several advantages to children, including:

- decreased risk of diabetes and sleep problems and;
- increased likelihood of maintaining a healthy weight as an adult.

Crucial to firstly halting and ultimately reversing our current physical activity trends in children and young people and the subsequent poor health outcomes is identifying strategies and programs that are effective at increasing children's physical activity levels. In particular, interventions/programs that can be delivered in clearly identifiable settings, such as primary schools. Furthermore, if we are to enhance the potential for translating these effective interventions/programs into real-world settings, we will need to find an appropriate balance between both internal (i.e. Does this strategy increase levels of physical activity?) and external (i.e. Will it work in my school?) validity in their planning, design, implementation and evaluation.

Therefore, the results of this study will be used to help us understand how we can better translate effective physical activity interventions/programs, such as **PLAY Zone**, into real-world school settings in the Rockhampton education district, and in turn will help improve the health and well-being of our children now and in the future.

All information collected during the project will remain confidential and will not be used by any person outside of the research team. The results of the project will be used to inform part of a Research Masters thesis examining how an effective physical activity intervention is transferable to real-world primary school settings, study results will also be published in academic journals and presented at academic conferences. The information collected will not be presented in a way that will allow for individuals/schools to be identified, and all will be kept on a password protected computer, only accessible by Mr Glenn Austin.

INSTRUCTIONS

- The following questions are designed to assess your school's current situation. 12 MONTHS AFTER LAUNCHING the PLAY Zone project, in relation to playground linemarkings, play equipment and physical activity
- The survey should take approximately 20 minutes to complete
- For each question:



- place a tick in the box that best describes your school's current situation
- feel free to use the space provided beside each question to detail any additional comments that you may have

Note: you may like to involve other key members of staff or school community to assist you in reporting your information as accurately as possible.

QUESTIONS

KEY ACTION AREA 1: Playground Line Markings

Please answer the following questions to the best of your knowledge

We would like to know what the current status is of the playground line marking in your school.

QUESTIONS	RESPONSES	COMMENTS
Have you added new line markings in the last 6 months?	☐ Yes ☐ No	
On average what is the condition of your original PLAY Zone line markings?	☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Are the playground line markings accessible to students during the following school breaks?		
First Break (Morning Tea)	☐ Yes ☐ No	
Second Break (Lunch)	☐ Yes ☐ No	
Other (eg Before or After School)	☐ Yes ☐ No	
How frequently are the playground line markings used by students in the following breaks?		
First Break (Morning Tea)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
Second Break (Lunch)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
Other (eg Before School)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	
(After School)	☐ Never ☐ Most days ☐ Some days ☐ Everyday	

Key Action Area 2: Playground Play Equipment (supporting the line markings)

Please answer the following questions to the best of your knowledge

We would like to know what the current status is of the playground play equipment to support the playground line marking in your school.

QUESTIONS	RESPONSES	COMMENTS
How would you rate your current playground play equipment in terms of: QUANTITY How much playground play equipment is currently available for use with the playground line markings? Do you think that there is enough equipment to support the current quantity of line markings? QUALITY How would you rate the condition of the playground play equipment?	☐ 1-5 pieces ☐ 6-10 ☐ 11-15 ☐ 16+ ☐ Yes ☐ No ☐ Unsure ☐ very poor ☐ poor ☐ average ☐ good ☐ very good	
Is the playground play equipment available for use during school breaks (e.g. morning tea, lunch)? Please indicate if playground play equipment is available in each of the following breaks. First Break (Morning Tea) Second Break (Lunch) Other (eg Before or After School)	☐ Yes ☐ No ☐ Yes _____ minutes ☐ No ☐ Yes _____ minutes ☐ No ☐ Yes _____ minutes ☐ No	
Is the playground play equipment available on: Monday Tuesday Wednesday Thursday Friday	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
How frequently is the playground play equipment used by the children? Lower Primary (Years P-3) Middle Primary (Years 4-5) Upper Primary (Years 6-7)	☐ Never ☐ Some days ☐ Most days ☐ Everyday ☐ Never ☐ Some days ☐ Most days ☐ Everyday ☐ Never ☐ Some days ☐ Most days ☐ Everyday	

Key Action Area 3: Playground Games and Activities

Please answer the following questions to the best of your knowledge

We would like to know about the playground games and activities, provided in the 'PLAY Zone Activity Manual', that have been taught in your school.

QUESTIONS	RESPONSES	COMMENTS
SECTION A Have playground games and/or activities (as per PLAY Zone Activity Manual) been taught to students in the last 6 months?	☐ Yes ☐ No (if no go to Key Action Area 4 page 6)	
When have these games and/or activities been taught? During regular PE classes During regular school breaks (e.g., morning tea, lunch) Before school After school Other (please list) _____	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
Who has been involved with teaching these games and/or activities? PE teacher Regular teacher Peer Leaders Other (please list) _____	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No	
Approximately how many different games and/or activities have been taught?	☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16+	
How often are playground games and/or activities taught to students?	☐ Weekly ☐ Monthly Other (please list) _____	

Key Action Area 4 – Student Peer Leader Training “Young People Can Take a Lead” (YPCTL)

Please answer the following questions to the best of your knowledge

We would like to know about the training of Peer Leaders in your school.

QUESTIONS	RESPONSES	COMMENTS
SECTION A Has the student peer leader training been undertaken to support the PLAY Zone project using the YPCTL resource in the last 6 months?	☐ Yes ☐ No (if no go to Key Action Area 5 page 7)	
If so how many students have been trained using the YPCTL Resource?	☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16+	
How were these students selected? Grade Student Performance Leaders Behaviour Other (please list)	☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No ☐ Yes ☐ No 	
How useful was the ‘YPCTL’ resource for planning and delivering the student peer leader training?	☐ Not at all ☐ Somewhat ☐ Very	
How useful was the YPCTL resource for the development of leadership skills to support the PLAY Zone project in your school?	☐ Not at all ☐ Somewhat ☐ Very Go to Key Action Area 5 (page 7)	

Key Action Area 5: Physical Activity

Please answer the following questions to the best of your knowledge

Finally we would like to know the current arrangements for physical activity in your school

QUESTIONS	RESPONSES	COMMENTS
Is there allocated time outside of regular physical education classes for physical activity?	☐ Yes ☐ No	
If so, how much time is regularly allocated for physical activity outside of physical education class per week?	_____ minutes	
Does the school have a written policy or statement relating to promoting and supporting physical activity at school?	☐ Yes ☐ No	

Key Action Area 6: Supporting Project Implementation

Please answer the following questions to the best of your knowledge

QUESTIONS	RESPONSES	COMMENTS
Has the PLAY Zone project been advocated and/or promoted in the school community in the last 6 months? (please tick all those that apply)	☐ Lunch ☐ Staff meeting ☐ School announcement ☐ School newsletter ☐ Community newsletter ☐ P&C ☐ Staff notice board ☐ Other	

Thank you for agreeing to participate in the PLAY Zone physical activity demonstration project and for taking the time to fill in this survey. If you have any queries please contact Glenn Austin on 07 4920 6980 or directly on 0407 139 617. I appreciate your ongoing support through out this project.




APPENDIX 8: KEY INFORMANT INTERVIEWERS SCRIPT

PLAY Zone Physical Activity Demonstration Project

Thank you for allowing us to visit [school name] on [insert date] to understand how the school adopted, implemented and maintained PLAY Zone.

This survey will take approximately 20 minutes of your time.

Background

1. How would you best describe your role?
 - ☐ Principal
 - ☐ Teacher – general
 - ☐ Teacher – PE
 - ☐ Administrator
 - ☐ Other (please specify) _____
2. How long have you worked for this school? Years __ Months __
How long have you been in your current position? Years __ Months __

Adoption of PLAY Zone

4. In general how does your school make decisions about adopting new physical activity programs or practices?
5. What were some of the key aspects that led your school to adopt PLAY Zone?

NOTE TO INTERVIEWER. Did he or she mention.... (check all that apply)

- ☐ Staff buy-in for the program
- ☐ Accepted by students
- ☐ Equipment
- ☐ training
- ☐ novelty
- ☐ providers
- ☐ comfort with approach
- ☐ self-efficacy to implement effectively
- ☐ advantage over other programs
- ☐ compatibility with the school setting,
- ☐ complexity (simplicity)
- ☐ trial ability,
- ☐ observability
- ☐ funding

Implementation of PLAY Zone strategies

6. How did your school support the implementation PLAY Zone? For example; What events took place in the earlier phases of implementation?

NOTE TO INTERVIEWER. Probe for:

- ☐ Pilot testing
- ☐ Staff involvement
- ☐ Student involvement
- ☐ Training and education of teachers

7. What challenges arose for the school in implementing PLAY Zone?

NOTE TO INTERVIEWER. Did he or she mention.... (check all that apply)

General

- ☐ Poor acceptability by staff
- ☐ insufficient knowledge and skills of staff
- ☐ Poor acceptability by students
- ☐ Insufficient resources
- ☐ Inadequate infrastructure
- ☐ Incompatible with school system
- ☐ Physical environment constraints

Intervention

- ☐ High costs of implementing
- ☐ intensive time demands
- ☐ High level of staff expertise
- ☐ Difficult to learn or understand
- ☐ Not packaged or "manualised"
- ☐ Not developed for school needs
- ☐ Not self sustaining
- ☐ Not modularized or customizable

Setting

- ☐ Competing demands
- ☐ Program imposed from outside
- ☐ Financial instability
- ☐ Limited resources
- ☐ Limited time
- ☐ Limited organizational support
- ☐ Prevailing practices work against intervention
- ☐ Perverse incentives or regulations
- ☐ Challenges implementing interventions with quality

8. What factors supported the school to implement PLAY Zone?

NOTE TO INTERVIEWER. Did he or she mention.... (check all that apply)

- ☐ Influence of the “champion”
- ☐ Personal or organizational experience with PLAY Zone
- ☐ Sufficient resources attached to project
- ☐ Well planned implementation approach
- ☐ Involvement of students and teachers
- ☐ Fit with school context
- ☐ Necessary knowledge and skills to support implementation

Institutionalisation of PLAY Zone

9. Is PLAY Zone now an accepted and/or routine part of the schools physical activity programs? YES/NO

- i. If not, why do you think this is the case?
- ii. If so, what changes were necessary in order for PLAY Zone to be a routine and accepted program?
- iii. Have any extensions been made to any aspect of the program? (e.g., additional line markings, more equipment purchased)

NOTE TO INTERVIEWER. Did he or she mention.... (check all that apply)

- ☐ Changes in staffing
- ☐ Changes in staff training and support
- ☐ Changes in policies
- ☐ Changes in relationship with key partners (Queensland Health, CQU)

10. Have any changes been noticeable in the school due to the ongoing implementation of PLAY Zone?

NOTE TO INTERVIEWER. Did he or she mention.... (check all that apply)

- ☐ Learning
- ☐ Physical activity
- ☐ Social aspects of children’s play
- ☐ Behaviour

Lessons Learned

11. How would you describe the school’s overall experience with being involved in the PLAY Zone project? (a concluding statement of the experience)

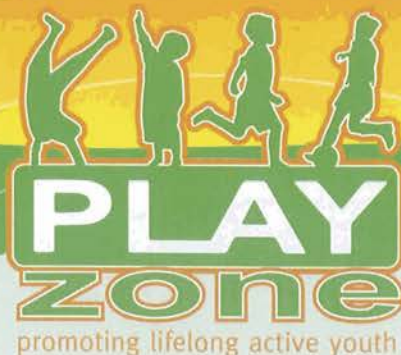
12. Is there anything else we ought to know about how your school's PLAY Zone experience? Did we miss anything?

Interviewer: _____

Key Informant: _____

Notes:

APPENDIX 9: PARENT INFORMATION BROCHURE



Dear Parent/Carer

Your child's school was recently selected to participate in a physical activity demonstration project called **PLAY Zone**.

The **PLAY Zone** project is based on a successful model from overseas and uses painted playground markings (e.g. hopscotch and foursquare) to encourage, support and most importantly make physical activity FUN.

PLAY Zone will officially launch in your school in Term four this year. Until that time a lot of 'behind the scenes' planning is taking place to ensure the project is a success.

PLAY Zone is needed because levels of physical activity have been declining in our children for the past 10-20 years. Reasons for the decline in activity levels are multiple and varied, however **PLAY Zone** focuses on some positive solutions for our children based around 'play' and 'fun'.

The benefits to children and young people of regular physical activity are numerous and include both immediate and long-term effects.

Physical activity:

- Reduces the risks for developing obesity, diabetes and other chronic diseases
- Is associated with improved academic performance
- Helps children feel better about themselves
- Reduces the risk for depression and the effects of stress
- Helps children prepare to be productive, healthy members of society and,
- Improves overall quality of life



BE PART OF THE SOLUTION

Physical activity and healthy eating go hand-in-hand for a healthy lifestyle and should be promoted together. Students, families, teachers, principals and community leaders each play a role in making school a place that supports increased physical activity and healthy eating.

Students:

- **PLAY** – to look and feel your best
- get informed and get involved
- set activity goals for yourself
- serve as a role model to younger students
- eat a healthy breakfast, lunch, snacks and dinner
- participate in physical activity at least **60 minutes a day**

Families:

- **PLAY** – children are watching you
- support schools implementing healthy school meals and nutrition education
- advocate for increased physical activity in schools
- provide healthy snacks and/or fun physical activity for parties and events
- monitor and limit your child's TV time to **2 hours during the day**
- be physically active with your children
- take advantage of opportunities for physical activity in your community (e.g. in the park)

Visit www.healthyactive.gov.au for more information about a healthy active lifestyle

Get Moving!



Queensland Government
Queensland Health



APPENDIX 10: PLAYGROUND PICTURES





