

**The Red Fox Program for Aboriginal Children and Youth:
An analysis of the benefits of exercise used to assist in
management of typical health concerns present in this demographic**



**Kinesiology 469
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Preface

What do we know about our population?

It is important to note the vast diversity among Canada's Aboriginal population. Many European Colonists have assumed that majority of the Canadian Aboriginal population were much of the same. Unfortunately, this mentality has contributed to the loss of Aboriginal culture, pride and self-agency. While we do recognize the great diversity within the Canadian Aboriginal population, the following preface will outline common experiences that many Aboriginal communities have likely faced since colonialism.

Canada's Indigenous population suffers from a variety of mental and physical diseases, much as a result of the long history of problems caused by colonization, oppression, discrimination, as well as loss of land, culture, language and cultural identity. Much of the Aboriginal demographic was deeply afflicted not only by the residential schools of recent history, but also by government control of Aboriginal identity. The problems caused by residential schools are widespread and largely unresolved in this population, manifesting in depression, suicide, and substance abuse (Canadian Mental Health Association, 2011). Many residential schools have resulted in large fractures in the social framework of Aboriginal culture; as Aboriginal children were subject to physical abuse and deprivation of their language and culture, alienating them from their communities.

Many of those children who encountered physical abuse and cultural assimilation within residential schools grew to be troubled adults, which likely contributed to the "sixties scoop". This occurred during the 1960 's when Canadian government officials deemed it necessary to remove aboriginal children from their families and place them in the care of (mostly) Euro-ethnic families (Sinclair, n.d.). This completely physically removed Aboriginals from their culture and home communities. Further divisions are continually made to the Aboriginal community through government regulations of Indian identity. Reserve housing and resources are made available to those who meet the policy regulation criteria. All Aboriginals that do not meet criteria have no access to support or living space on reserve territory and are forced to urban areas (Lawrence, 2000). Section 12 of the Indian Act, before the 1985 amendments of Bill C-31, was an example of such divisive policy. This section ruled that women who married non-Indian men were not eligible for Indian Status, and were consequently forced to leave their community (Department of Indian Affairs and Northern Development, 1995). Those Aboriginals who were forced, alienated or ostracized from their reserves comprise are often referred to in contemporary literature as the "Urban Natives", those of aboriginal descent living in low-income neighborhoods of large cities (Shorten, 1991).

The Urban Native youth, aside from possessing troubling family history and a legacy of mental and physical disease, are removed entirely from their home communities and resources.

Introduction:

The youth and children division of the Red Fox Program focus on active play, food security as well as leadership training for young people in the community. The British Columbia Provincial Government has challenged its citizens to increase physical activity by 20% (City of Vancouver, 2011). To help reach this goal, the Vancouver Parks Board has started the Active Communities Vancouver project. Red Fox is one of the projects initiated by the Vancouver Parks Board, also in partnership with the Vancouver Native Health Society and the Vancouver Board of Education. Red Fox is promoting physical activity through their programs for young people. These programs provide unique equipment such as stilts, pogo sticks, hula hoops, and skipping ropes. Activities such as these give participants options other than competitive and mainstream sports to get healthy and active. It also gives youth and children an alternative to structured games and sports with lots of rules. Some of the Vancouver community centres Red Fox has worked with include Hastings, Trout Lake, Strathcona, Britannia, Kensington, Ray-Cam and Sunset (Red Fox Program, n.d.). The goal of this program is to promote health and wellness to Aboriginal and low income families of these Communities.

To better understand specific issues at Red Fox, our group developed and administered a survey to many of the youth leaders and staff at Red Fox. Much of Red Fox's staff are from the community and have been trained by Red Fox to run activities through the program. The staff is composed of mature, energetic, fun individuals that set good examples for children within the program. The questions within the survey were regarding feelings towards working with youth and issues that arise during the program. One respondent wrote that they are involved with Red Fox "to be a positive role model [for] youth," and another said that they "love working with youth." The staff also alluded to feelings of pride in working with this community. Having such a positive and motivated team of staff allows participants to feel comfortable, appreciated and happy. Problems noted in regards to working with the children include communication and language barriers, as well as trust issues between youth and staff. One of the respondents said that the hardest part about working with the Red Fox Program was that the "kids have short attention [spans]." The positives and negatives of this survey display how the staff are working to help children in this community feel welcome and get active.

Exercise is beneficial in many ways, most commonly it is known to improve health and general well being. Exercise may also be the key to helping with issues that may be present with young people in this community. The issues to be focused on include:

- Attention Deficit Hyperactivity Disorder (ADHD)
- Fetal Alcohol Syndrome (FAS)
- Depression

Additionally, cognitive function may improve with the addition of exercise to a child's lifestyle. Socio-cultural considerations should be also taken into account

regarding access and feelings towards exercise. Finally, in addition to exercise, proper nutrition is an essential part of a balanced and healthy life which Red Fox addresses within the program.

Red Fox- Depression

Through the work we did with Red Fox we identified that depression could be a major potential issue that the children in the program could face.

Overview

Depression is a serious mental illness that can affect people of all ages. Children with minor depression are at risk for developing major depression, bipolar disorder and are more susceptible to substance abuse (Tomson et al, 2003). It is normal for people to feel down, sad, disappointed or empty, these feelings are a part of life and typically will pass after a brief period of time. However, in people who are suffering from depression, these feelings can become an illness when these feelings become more severe and last for as long as several weeks or longer. These feelings can change a person's behaviour and body functions and also interfere with their daily activities (Canadian Mental Health Association, 2011).

Research has shown that the chances of depression continuing on from childhood through to adolescence and adulthood is very strong, and in particular, depressive mood increases dramatically in adolescence compared with childhood (Tomson et al, 2003). Depression in childhood or adolescence is a very serious problem because research has shown that it can be associated with an increase risk of suicidal behaviour and in more severe cases, children and adolescents with sustained depression, many have either contemplated or attempted suicide (Tomson et al, 2003).

Signs/Symptoms

There are many symptoms associated with depression that one may feel when depressed such as:

- Feeling worthless, helpless, hopeless
- Sleeping more or less than usual
- Eating more or less than usual
- Difficulty concentrating or making decisions
- Overwhelming feelings of sadness or grief
- Thoughts of death/suicide
- Loss of energy/feeling tired

(Canadian Mental Health Association, 2011a)

Signs of depression include:

- Avoidance of people
- Lack of energy, appears tired
- Lack of interest in taking part in activities
- Difficulty in concentrating on tasks or making decisions

(Canadian Mental Health Association, 2011a)

What are the key issues?

We know that depression is a serious mental illness that can affect people of all ages

- Depression can be combated easier if detected early on in life
 - Therefore education and proper screening is important
- It is Important to detect and screen in child and adolescent ages due to the chances of carrying depression into their adulthood
- We know that depression has many different signs and symptoms that individuals may experience, and may be different from one person to the next.
- Are anti-depressants the best method of treatment?
 - Research shows that there is a link between exercise intervention and depression

There can be many factors that can cause depression

- Family history (Parent had depression)
- Family problems
- Living environment
- Poverty
- Loneliness
- Loss of a loved one
- Abuse (mental/physical)
- Illness/sickness

(Centre for Addiction and Mental Health, 2011)

Aboriginal individuals can be affected by these factors but can also face other challenges to their lives which may play a role in developing depression, these issues include:

- The long-term effects of residential school experiences on family members
- Sadness from losing one's culture and heritage
- Higher rates of alcoholism and substance abuse
- Greater incidences of violence and sexual abuse
- Living in poverty

(Public Health Agency Canada, 2009)

These factors are important because according to Health Canada, 2007:

- Suicide and self-inflicted injuries are the leading causes of death for First Nations youth and adults up to 44 years of age.
- First Nations youth commit suicide about five to six times more often than non-Aboriginal youth.
- The suicide rate for First Nations males is 126 per 100,000 compared to 24 per 100,000 for non-Aboriginal males.
- For First Nations females, the suicide rate is 35 per 100,000 compared to only 5 per 100,000 for non-Aboriginal females.

(Health Canada, 2007)

Intervention

- Research has shown that early intervention has a positive influence on depression (Luby, 2010)

- Amongst children, research has shown that early intervention is important because at an early age, treating depression is easier as opposed to later on in life due to neuroplasticity,
 - Meaning the brain's ability to change at early stages in the child's development such as during critical periods in development where skills and language are easier learnt (Luby, 2010).
- Researchers believe that critical periods of emotion development occurs early in life, thus making intervention at an early age ideal as opposed to later in life (Luby, 2010).

Treatment

There are a few methods of treatment for depression

- Clinical: family doctor, psychiatrist, registered psychologist, registered clinical counsellor
- Psychotherapy: cognitive behavioural therapy, interpersonal therapy, group therapy
- Antidepressant medication: help relieve depressive symptoms but carry potentially harmful side effects
 - Selective Serotonin Reuptake Inhibitors (SSRI)
 - Side Effects include: stomach upset, nausea, fatigue, headache, insomnia
 - Tricyclics
 - Side Effects include: dry mouth, postural blood pressure changes, constipation, difficulty urinating, blurred vision, weight gain and drowsiness. (overdosage is lethal)
 - Monoamine Oxidase Inhibitors (MAOI)
 - Side Effects: risk of dangerously high blood pressure if certain foods or medications are consumed while on a MAOI

(Chong, 2006)
- Individuals that are prescribed anti-depressants must finish their medication in order to have its full effect. There has been research done that have determined that a serious side effect of anti-depressants were that individuals had become suicidal while on the drugs or have become addicted and suffered from distressing symptoms when trying to stop taking the medication (Johnson, 2010).
 - There has also been research done that shows that medication only seemed to have an effect on severely depressed individuals and no effect on mild to moderately depressed individuals (Johnson, 2010)
- While these are all possible methods of treating depression, it has been proven through research that exercise can lessen the effects of depression. (Tomson, et al, 2003).

Exercise prescription

- Due to concerns about side effects and effectiveness of anti-depressants, it is recommended that more novel methods of treatment be used, particularly when treating children and youth (Johnson, 2010).
- In a study done by Tomson et al, 2003, researchers investigated whether physical activity had any impact on childhood depressive symptoms and found that:
 - Children aged 8-12 were prescribed a mile run and given surveys (done by parents and PE teacher) regarding physical activity levels within and outside of school.
 - For boys:
 - Those classified as inactive by their parents were more likely to have depressive symptoms at 19% (Tomson et al, 2003).
 - For girls:
 - 6.5% of inactive girls as classified by their parents were found to have depressive symptoms
 - Alternatively, 20% of inactive girls when classified by a PE teacher, had depressive symptoms (Tomson et al, 2003).
 - This study also found that:
 - 10.5% of boys that did not participate in sports outside of school had depressive symptoms.
 - Researchers determined that the relative risk of depressive symptomatology for boys who didn't play sports was 2.4 times higher than those that did (Tomson et al, 2003).
 - Researchers also investigated whether body composition had an effect on depressive symptoms and found that boys that did not meet body composition standards were 4 times more likely to have depressive symptoms and 12.8% amongst girls

(Tomson et al, 2003)

By looking at this study, the results show that exercise can have a significant effect on childhood depressive symptoms and could be used as a way of helping treat children with depression.

- Alternatively, a study done by Sund et al, studied youth aged 12 to 14 from Norway over the course of a 1 year longitudinal study
 - Found that low levels of vigorous exercise were a predictor of depressive symptoms.
 - High levels of time spent on sedentary activities among boys were predictors of high levels of depressive symptoms 1 year later.
 - Researchers in this study believed that during depression, levels of monoamines, specifically noradrenalin and serotonin, are reduced but with hard physical activity, neurotransmitters and endorphins increase, thus helping to alleviate depressive symptoms .

- It was determined that there was a correlation between vigorous exercise and stressful events. Researchers found that vigorous exercise provided a stress buffering effect when stressful events were high

(Sund et al, 2010)

- Also, in a study done at Duke University psychiatric researchers looked in to whether exercise or anti-depressants were more effective in treating subjects with major depression, and found that while both methods of treatment provided benefits, subjects that were exercising had a lower rate of relapse and benefited from the therapeutic effects of exercise (Johnson, 2010).
- By looking at the research that has been done, alternative methods of treating depression should be explored. Studies have shown that exercise can help treat depression amongst people of all ages and should be used as an alternative treatment to anti-depressants due to the dangerous side effects and concerns over its effectiveness.

Attention Deficit Hyperactive Disorder

Overview

Attention deficit hyperactivity disorder (ADHD) has been identified as one of the most common mental health disorders suffered amongst the children at Red Fox. Through exploring the causes and behavioral symptoms of ADHD, the relevance of exercise and its therapeutic role in managing ADHD becomes apparent. Getting children physically active is the main focus of Red Fox, and in turn, has a direct positive affect on the management of the mental health issue ADHD.

ADHD results from an issue in the area of the brain that controls activity level and attention (MFMER, 2011). Malfunction to this area of the brain can come from many different sources. These sources include: heredity, maternal smoking and drug use, brain damage, childhood exposure to environmental toxins and/or food additives (MFMER, 2011). Furthermore, James Perrin, a professor of pediatrics at Boston's Mass General Hospital for Children speculates that increasing rates of ADHD can be attributed to the increase in sedentary lifestyle and decrease in exercising children (Van Cleave et al, 2010). A child diagnosed with ADHD has a wide range of behavioral symptoms, which include problems like inattentiveness, over-activity, impulsivity, or a combination of these. At one point or another, most children occasionally show signs of ADHD like forgetting their homework, daydreaming during class, acting without thinking, or getting fidgety at the dinner table. However, chronic inattention, impulsivity, and hyperactivity are also signs clinical ADHD, which can pose greater issues further down in life if not properly treated.

For children with ADHD, the region in the brain controlling attention and level of activity experiences a malfunction. This malfunction involves the improper regulation of dopamine and norepinephrine (important chemicals for normal brain activity regulation),

which lead to the key behavioral issues involved with ADHD. Dopamine is the neurotransmitter that plays a vital role in motivation, goals, drive, emotion and learning. Norepinephrine is the neurotransmitter involved in the detection of important stimuli and helps maintain a state of alertness. Children with ADHD are unable to properly regulate dopamine and norepinephrine, resulting in many consequential behavioral issues. ADHD can lead to problems at home and school, and affect the child's ability to learn and get along with others. Amongst the children at Red Fox, ADHD has been identified as one of the most common mental health issues. ADHD can be very challenging to live with, however with proper treatment, such as exercise, the symptoms can be effectively reduced. Fortunately, through the benefits of exercise, Red Fox is actively helping children affected with ADHD to manage symptoms and live healthier and happier.

Key Issues with ADHD

Inattention behavioral symptoms:

- Difficulty paying attention to detail
- Tendency to make careless mistakes
- Difficulty staying focused; is distracted easily
- Appears not to listen when spoken to
- Has trouble following instructions and remembering things
- Has difficulty with organization, finishing projects, and planning ahead
- Gets bored with a task before it is completed
- Frequently loses or misplaces things (Smith et al., 2011)

Hyperactivity behavioral symptoms:

- Constantly fidgets and squirms
- Constantly moving around; often runs or climbs inappropriately
- Talks an excessive amount
- Has difficulty relaxing or playing quietly
- May have a quick temper (Smith et al., 2011)

Compulsivity behavioral symptoms:

- Acts or speaks without thinking of the possible consequences
- Difficulty with patience; waiting for his or her turn
- Often interrupts others
- Inability to control powerful emotions, resulting in angry outbursts or temper tantrums
- Guesses, rather than taking time to solve a problem (Smith et al., 2011)

There are significant behavioral issues associated with children affected by ADHD, however, with the help of exercise, ADHD can be effectively managed. Exercise is known to target the neurophysiological issues associated with ADHD and in turn, decrease the behavioral side effects. According to John J. Ratey, a clinical associate professor of psychiatry at Harvard Medical School and author of *Spark: The*

Revolutionary New Science of Exercise and the Brain, exercise is highly beneficial for children faced with ADHD. He explains that exercise elevates dopamine and norepinephrine levels almost immediately and keeps them up for a period of time. He elaborates by explaining that exercise helps to still the impulsivity as it works to turn on the attention system within the frontal cortex, which improves executive functions: sequencing, working memory, prioritizing, inhibiting and sustaining attention. On a practical level, it causes children to be “less impulsive, which makes them more primed to learn”(Ratey et al., 2008).

Exercise has been shown to improve the behavioral symptoms of ADHD through increasing the dopamine and norepinephrine levels in the brain. To be more specific with regard to type of exercise, Ratey suggests that the most important thing is that the activity is fun, so that the children stick with it (Ratey et al., 2008). It is not necessary for children with ADHD to participate in highly vigorous exercises in order to derive the benefits from exercise. As long as they are getting active, and having fun benefits will be seen.

Fetal Alcohol Syndrome

Overview

Fetal Alcohol Syndrome (FAS) was identified as one of the main issues within the survey taken by the Red Fox Staff. FAS is a permanent birth defect caused by maternal consumption of alcohol during pregnancy. FAS is characterized by cognitive and behavioral dysfunction. Those diagnosed with FAS often endure lifelong physical, intellectual, cognitive, and behavioral disabilities. These disabilities often accompany secondary emotional and behavioral issues such as low self-esteem, depression, academic difficulties and criminality when the syndrome fails to be correctly diagnosed and addressed (Astley & Clarren, 1996). FAS is currently the leading cause of mental disability in the Western World (Astley & Clarren, 1996). Each day in Canada 20 babies are born with FAS, this is specifically problematic within the Aboriginal population as one in five Aboriginal babies have some form of FAS (Liberty, n.d).

The Saskatchewan Institute on Prevention of Handicaps (n.d.) describes the development of FAS within an unborn baby as the following,

‘An unborn baby is nourished through mother’s placenta. When the mother consumes alcohol when pregnant, alcohol passes freely through the placenta to the unborn baby or fetus.’

As the liver of the fetus is not yet developed, it will not work as functionally as that of the mother. Consequently, alcohol stays within an unborn baby much longer than that of the mother causing much developmental damage (*Saskatchewan Institute on Prevention of Handicaps*, n.d.). While no one can predict how much alcohol consumption will affect the development of a baby there are four factors that influence how severe FAS will be: the time of alcohol consumption during pregnancy, the amount of alcohol consumed during pregnancy, the individual’s susceptibility to alcohol and the quality of the mother’s food nutrition (*Saskatchewan Institute on Prevention of Handicaps*, n.d.).

Key Issues with FAS

Children with FAS are denied essential nutrients during fetal development. Consequently children with FAS have several developmental issues, the following will outline issues that often are a direct result of alcohol consumption during pregnancy (primary symptoms) and other issues that occur as a result of primary issues (secondary symptoms).

The following chart outlines the primary symptoms that children with FAS often face (Saskatchewan Institute on Prevention of Handicaps):

Growth Deficiency	‘Those born with FAS are generally smaller than healthy children. Their growth will typically not be equal to that of healthy children.’ (Saskatchewan Institute on Prevention of Handicaps, n.d.).
Central Nervous System Dysfunction	‘Poor growth of the central nervous system may result in intellectual and developmental disabilities including, a short attention span, learning disabilities, hyperactivity, poor muscle tone and poor coordination.’ (Saskatchewan Institute on Prevention of Handicaps, n.d.).
Facial Abnormalities	The face of babies born with FAS do not form in a usual manner. Although symptoms may vary to amount of alcohol consumed and stage of gestational development, children with FAS often have small eye openings, droopy eyelids, a flat and wide nose bridge and upper lip, a flat groove between the nose and the upper lip. (Saskatchewan Institute on Prevention of Handicaps, n.d.).

Secondary Symptoms of FAS Children (Liberty, n.d.):

Children afflicted with FAS usually present with:

- Extremely high or low activity levels
- Impulsive, inattentive and easily distracted behavior
- Poor sense of body awareness
- Delayed gross motor skills
- Poor coordination
- Poor sense of rhythm and time
- Slow response to verbal instruction
- Preference for familiarity and need consistency
- Poor spatial awareness
- Difficulty with motor planning
- Difficulty calming down

Benefits of Exercise for FAS

Exercise can be counter the impact of FAS as it can be a tool that aids in the development of those areas that are most affected by FAS. Both primary and secondary symptoms of FAS can be aided through exercise, these specific benefits are outlined below.

Primary Symptoms:

Benefits of Exercise and Stimulating Physical Growth:

As noted above children with FAS often have growth deficiencies, physical activity and exercise has shown to promote physical growth and development. A long-term study by Rogol, Clark, and Roemmich (2000) looked at the correlation between physical activity and growth, and shows that ‘In general, boys who participate in sports have normal growth rates and are normal or advanced for their state of skeletal and sexual maturation. The advanced states of maturation in male athletes may be attributed to the power and performance advantages.’ While this study specifically examined boys who participated in competitive sports, their findings could also be applicable to children with FAS.

Benefits of Exercise and CNS Dysfunction:

CNS dysfunction is another symptom for children with FAS. Studies have shown huge benefits to exercise with CNS development. It is generally agreed that physical activity promotes the connections between brain cells, ultimately leading to growth and better health of the CNS (Gomez-Pinilla & Kesslak, 1998). While there has been little testing done on brain growth on children due to ethical reasons, Brown et al. (2003) found in their study on mice that that physical activity such as voluntary running stimulate the parts of the brain involved in improving memory and learning new tasks. Brian Christie (2008), states that ‘exercise promotes the growth of new neurons (brain cells) in FASD brains, and that these neurons are better able to communicate with each other’. Exercise should be a key treatment for all children with FAS.

Aerobic physical activity (meaning physical activity at moderate to high intensity lasting longer than two minutes) has been shown to promote cognitive development in children. Hillman et al. (2009), conducted a study on children comparing aerobic fitness and cognitive performance. Hillman et al. found that those children with higher aerobic fitness outperformed children with low aerobic fitness on cognitive performance tests. While this study was not conducted on children with FAS, it supports that exposure to aerobic physical activity would increase cognitive development.

Secondary Symptoms:

Benefits of Physical Activity with Limiting Impulsive Behaviours and Distractibility:

Physical activity can aid children with FAS better control themselves cognitively through neural activation (meaning thoughts and stimuli are processed better in the brain) and ultimately contributing to improved behaviours and increased mental focus. John Ratey Harvard Medicine Professor (n.d) states that,

‘ Exercise turns on the attention system, the so-called executive functions-sequences, working memory, prioritizing, inhibiting and sustaining attention, on a practice level it causes kids to be less impulsive which makes them more primed to learn.’

Repeated exposure to physical activity would greatly aid FAS children’s behaviour and mental focus.

Spatial, Body Awareness Gross Motor Skills:

Poor spatial (pattern recognition) and body awareness are other symptoms of FAS which physical activity can help improve. Peters and Wright (1999) found that repeated exposure to specific movements through physical activity improved the spatial and body awareness of children with cognitive disabilities. These findings demonstrate that the use of specific movements can have a direct effect on body awareness, spatial awareness, movement organization, and ability to plan activity. Their study also found that 12 out of the 14 children tested had improved gross motor competence with exposure to specific physical movements. Physical activity can greatly aid children with FAS become better general body movers and ultimately improve their long-term health.

Arguably, the largest benefit children with FAS might receive through exercise is socialization. Children with FAS often exhibit feelings of social isolation and estrangement from their peers. Group physical activity can serve as a means to interact, bond and laugh with children their own age.

Suggested Methods of Physical Activity for Children with FAS:

Any form of physical activity can be beneficial to children diagnosed with FAS, however, experts have identified the following types of exercise as being specifically beneficial:

- When working with any children who have cognitive, mental or behavioral disorders, consistency is essential; a broken routine might result in behavioural issues (*Child and Youth Mental Health Plan for British Columbia, 2003*). Children with FAS should be given simple tasks that can be broken down easily (Liberty, n.d.). For this reason we suggest that physical activity should be done with very basic components and little to no formal rules or regulations. Children with FAS need structure and familiarity within their environment (Liberty, n.d.), for this reason we also suggest that physical activity be structured and consistent, but not to the point where it is a strict regiment. For example, a child with FAS may go play at an open gym every Wednesday afternoon; however, it is not

- important that they complete x amounts of pushups for benefits.
- Because children with FAS have a tendency to be impulsive and misbehave, constant supervision is required when conducting physical activity, for this reason we suggest that when dealing with children with FAS there should be several staff/ qualified adults available to aid children. If a child with FAS misbehaves or is unable to complete a task correctly it is best to redirect them rather than criticizing or changing the task completely, for example “hey, why don’t you try hitting the ball in the middle of the racquet?” rather than “Don’t hit the ball with the handle!” Remember when giving tips to children with FAS while doing physical activity, positive reinforcement works better than negative. (*Committee on Psychosocial aspects of Child and Family Health, 1998*).
 - If a certain movement or task in physical activity is too complicated for a child with FAS it can be broken down into components, broken exercise means to teach specific fundamental aspects of a certain skill in different components. Both broken and consecutive exercise have benefits for children with FAS.
 - In order to promote and develop spatial awareness, body awareness and motor awareness exercise should incorporate a variety of movements. Ideally, there should be a variety in levels of difficulties so the children can start with success and gradually challenge themselves to develop their skills.
 - Exercise should include both anaerobic and aerobic components. Anaerobic meaning fast and hard exercise, like running from one end of the soccer field to the other, hard enough to be out of breathe. Where as aerobic would be running for 2-minutes around the block and breathing heavily but not to the point where you cannot talk. Having a mix of both will help promote physical growth, better bone density and improve cognitive development.
 - Exercise with children should always be simple and fun! Exercise should allow children to develop confidence, not only physiological skills (Kennedy, 2011).

While there are physical benefits in both individual and group physical activity, children with FAS would specifically benefit to participate in physical activity in a group setting. This would give the opportunity for socialization and personal growth in self esteem.

Aboriginal Youth and Red Fox Activity:

During our community service experience with the Red Fox program we observed several components in their routine that would be beneficial to children with the disorders previously discussed.

Variety of Activities with Simple Tasks:

Many of the activities focused on the development of basic fundamental skills. Some skills could be as basic as kicking a soccer ball or throwing a beanbag into a basket. Red Fox provides children with the option to move on when they became bored with a certain activity or to more complex tasks. Children could then make tasks more challenging by trying more complex maneuvers and patterns. The activities also varied in

types of movements and demand, giving children the opportunity to experience more specific movement that would facilitate physical and cognitive development.

The Youth Leaders within Red Fox did an excellent job of breaking down tasks for children and supervising the children safely. They provided positive instructions for techniques and tricks for children to try new skills such as jump rope or walking on stilts. Having such staff that could break down skill sets is a huge asset for these children. Red Fox follows a set routine by providing children with consistent opportunities to exercise and also bringing in the same equipment on a weekly basis. The consistency of their program is essential with the likelihood of success in physical development of children with FAS, Depression and ADHD.

Physical Development for Children Within Red Fox:

Red Fox had a variety of equipment that targets several physical components of children development. The following table outlines how several of the stations at Red Fox helps develop certain skills that are significant for this child populations.

Bean Bag Throw	<ul style="list-style-type: none"> - Fine Motor Development - Spatial awareness - Gross Motor Development - Body Awareness - Coordination. - Concentration Skills
Devil Sticks	<ul style="list-style-type: none"> - Gross Motor Development - Spatial Awareness - Body Awareness - Coordination - Concentration Skills
Diablo	<ul style="list-style-type: none"> - Fine Motor Development - Body Awareness - Coordination - Concentration Skills
Fox Tails	<ul style="list-style-type: none"> - Gross Motor Development - Spatial Awareness - Body Awareness - Coordination - Concentration Skills
Two Hand Finger Twirling	<ul style="list-style-type: none"> - Fine Motor Development - Spatial Awareness - Coordination - Concentration Skills
Basketball Dribbling	<ul style="list-style-type: none"> - Fine Motor Development - Body Awareness - Coordination - Concentration Skills

Soccer Ball Kicking	<ul style="list-style-type: none"> - Gross Motor Development - Body Awareness - Coordination - Concentration Skills - Potential Socialization
Stilts	<ul style="list-style-type: none"> - Spatial Awareness - Body Awareness - Coordination - Gross Motor Development - Concentration Skills - Balance
Jump Rope	<ul style="list-style-type: none"> - Rhythmic Development - Spatial Awareness - Body Awareness - Gross Motor Skills - Coordination - Concentration Skills - Fine Motor Development (if spinning rope) - Anaerobic Fitness (depending on intensity and duration) - Anaerobic Fitness (depending on intensity and duration) - Bone Density Development - C.N.S. Development
Hula Hoop	<ul style="list-style-type: none"> - Spatial Awareness - Body Awareness - Gross Motor Development - Spatial Awareness - Body Awareness
Tug-of-war	<ul style="list-style-type: none"> - Gross Motor Development - Body Awareness - Anaerobic Fitness (depending on intensity and duration) - Anaerobic Fitness (depending on intensity and duration) - C.N.S. Development - Socialization - C.N.S. Development
Pogo Stick	<ul style="list-style-type: none"> - Gross Motor Development - Spatial Awareness - Body Awareness - Spatial Awareness - Body Awareness - Anaerobic Fitness (depending on intensity and duration)

	<p>duration)</p> <ul style="list-style-type: none"> - Anaerobic Fitness (depending on intensity and duration)
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Suggestions for Red Fox- What Would Improve their Program?

Red Fox currently does do a great job of promoting physical activity, growth and development for children. The following is a list of suggestions that could better their success while working with these children.

Longer Duration in Activities	While any activity is better than no activity the majority of Red Fox’s activities at their stations generally were short in duration. If Red Fox could find a way to make some stations more continuous therefore using the aerobic energy system they might be more successful in promoting cognitive development.
Use of Cue Words in Instructions	The Youth Leaders were great at providing simple, clear and positive instructions. They might, however, be more successful with children if using a maximum of three cue words to highlight what the focus is on a specific task. For example, ‘pull, reach and release!’
More Activities	We recognize Red Fox is limited financially on activities, however, if they were to receive funding for more equipment this would further aid the development of children, it would provide more movement opportunities and keep children interested in returning to Red Fox.
More Group Activities	While meeting the interests of everyone at Red Fox is extremely difficult, having more group activities might increase socialization for children.
Specialized Staff	Again, we recognize Red Fox is limited financially, however, whenever possible bringing in specialists such and Mental Health Specialists, Occupational Therapists or Kinesiologist to help create more activities that would target the specific needs of children would certainly be beneficial.

Red Fox and Nutrition:

From our visit to Red Fox we were able to determine two major areas through which Red Fox helps to promote proper growth and development to the children in the program.

1. The Nutritious Red Fox Feast
2. Giving the children a place to exercise

The feast that the Red Fox employees put on for the Children on Monday evenings has two major benefits which we were able to see. First, the feast provides the children with a nutritious meal which is free of cost to them. The meal that we witnessed at Red Fox was 'sloppy joes', which consists of ground buffalo meat which was served on bread with celery, carrots, water and juice boxes. The meal provided protein, grain products, vegetables, and also calories, all of which were important to the children in the program. It was important for the children from the surrounding Strathcona community because most of the children come from low-income families where they may not be necessarily getting nutritious meals. Furthermore, some of the children may have not had a proper meal from the night prior, and therefore, this meal becomes important especially after the children had just participated in an hour and a half of exercise. The second benefit that we were able to witness from the feast was that it provides some of the children with a safe family environment. The environment in which the kids eat is free of pressure and this allows the children to focus on what important for them, being children. Furthermore, it gives the children a place to bond with the leaders, and also other children. The leaders act as positive role models to these children, which is something that is important to vulnerable children.

The second important thing that Red Fox provides is exercise promotion and a safe place to play. Red Fox serves as a location where children can come and play and have growth motor development. Some of the children we witnessed displayed delayed motor development. The delay was witness with some children in their reactions to an external stimulus was poor. An example of this was one child was playing catch with one of our group members and was witnessed watching the ball go by him before he was able to interpret what was happening and reach for the ball. The different games and toys that are provided through Red Fox may give them one of their only chances to have meaningful exercise, which can help them develop their motor skills. Also a study conducted by Elaine Power (2004), examined what the determinants were for Canadians of low-incomes, found that people from low-incomes were more likely to consume foods that were higher in fat and eat less vegetables, fruits and milk products of low fat values. Therefore, it becomes increasingly important for these children from low-income households to have access to exercise opportunities which will allow them to maintain their weight and balance their caloric intakes with caloric expenditure.

Children and Proper Nutrition:

- Children require calories for growth and development (Minister of Health Canada, 2007).
- In the United States few children meet their dietary requirements for the day.

- Children displayed low consumptions of:
 - Fruits
 - Dairy products and
 - Vegetables
- High consumptions of:
 - Saturated fat
 - Soft drinks and
 - Snack foods high in sugar (Taylor et al, 2005).
- The same study found that from provisional data similarities exist between children in the United States and Canada (Taylor et al, 2005).
- It is suggested that improper eating habits during childhood may result in improper eating habits into adolescence and adulthood.
 - Which may interfere with growth and development in children (Taylor et al, 2005).

Boys:

Age	Caloric Intake per day
4-6 years old	1700 Calories
7-10 years old	2000 Calories

(Weichselbaum and Buttriss, 2011).

Girls:

Age	Caloric Intake per day
4-6 years old	1550 Calories
7-10 years old	1750 Calories

(Weichselbaum and Buttriss, 2011).

In Summary, it is important to understand that most children either do not consume enough calories, or consume too many calories as are required for their proper growth and development. This is important because improper nutrition can lead to various health problems as well as improper growth and development.

Improper Nutrition:

- Power (2004), conducted a study that found that low-income families may be limited by their incomes to purchase adequately nutritious foods. This leads to many health risks because less nutritious food is more likely to be high in fat, cholesterol, salt, and high in calories, such as is found in fast food chains.
- Obesity is caused by an energy imbalance, meaning that we consume more energy through food and drink than we expend through exercise (Hills et al, 2011).
- Findings that were released by the National Study Health and Examination Survey (NHANES) showed that in Canada in 1996 children aged seven to thirteen were 33% overweight for girls and 26% overweight for boys (Cosoveanu and Bulucea, 2011).
 - Furthermore, 10% of girls and 9 % of boys were obese (Cosoveanu and Bulucea, 2011).

- It was also found that American First nations, and Alaskan Native Children have a 21.2% obesity rate, which is very high (Cosoveanu and Bulucea, 2011).

To summarize, it may be possible to improve population health in low income communities by promoting healthy eating (Power, 2004).

This is important because the Red Fox initiative that we witnessed and worked with was a population made up of a majority of aboriginal children who by being both Canadian and of Aboriginal decent have a high chance of being overweight. The work that the Red Fox staff are doing is a front line battle to improve the lives that the children involved with their program may go on to live. The nutritious meals that they provide combined with a proper exercise program which for children involves more play than anything else, is invaluable to battling the disorders that these children may face.

It is possible that improper nutrition and Obesity and low levels of physical activity can cause:

- Heart Disease
- Various Forms of Cancer
- Diabetes

(Power, 2004) (Hills et al, 2004)

It is important to note though that the risk for these disorders can be decreased by minimal increases to physical activity and health eating (Hills et al, 2004).

It should also be understood that in most cases if we promote a healthy lifestyle to children, then these children are more likely to become healthy adults. Therefore, the contributions that Red Fox is making are of major relevance because as Power (2004), stated if we could promote healthy eating to low income families we would see “significant improvements in population health” (Power, 2004). Furthermore, it is understood that a proper diet and exercise work together to decrease body weight, and obesity, which will result in significant decreases in the prevalence of Cardiovascular Disease, Type 2 Diabetes and some forms of cancers (Hills et al, 2011). Lastly, according to the Canada Food Guide, parents should not avoid giving their children foods that are high in fats, however, if these foods are consumed then exercise should be implemented to offset the negative effects that these foods can have (Minister of Health Canada, 2007).

Looking Forward: Other possible benefits to this demographic

Recent school trends have shown that students spend an increasing amount of time sedentary in classrooms and a decreasing amount of time obtaining physical activity due to less recess and play time (Barnett, 2011). Many studies have proven that exercise provides physical benefits and decreases the risk of getting physical disabilities such as hypertension, cancer, type II diabetes, and osteoporosis (Ehrman et al, 2009). Moreover, exercise is physiologically beneficial for cognition as it induces proper regulation of hormones such as serotonin, dopamine and norepinephrine which facilitate information processing of the brain (Ploughman, 2008). However, it is still uncertain whether

exercise can enhance cognitive function in developing children. Therefore, several studies were done recently due to the rising interest, and the results are showing positive impacts of exercise on cognitive function. Consequently, schools should be concerned about encouraging children to be more physically active not solely for the sake of promoting healthy lifestyles but also for academic performance.

It has been shown that after children had performed an acute exercise, both simple reaction time and choice response improved. It is very important to determine these two factors because they are the most basic components of the central nervous system. One study had one group of children exercising and another group watching TV before testing their simple reaction time and response time. The simple reaction time is the time it takes to respond to one stimulus. This time reflects the stimulation identification, response selecting and response programming. The choice response time is the time it takes to distinguish between more than two stimuli and this time reflects the cognitive arousal and process (Elleberg & St-Louis-Deschênes, 2010). This study shows significant improvements in both responses for the exercising group. Furthermore, difference in choice response time and simple reaction time was 75ms and 34ms between the two groups, respectively (Elleberg & St-Louis-Deschênes, 2010). This can be detected by EEG that moderate exercises induced cognitive arousal level (Ploughman, 2008). These abilities guide faster cognitive processing speed of the brain, and can therefore help children to finish and understand the task faster.

From the neurological perspective, when aerobically-trained participants were compared with anaerobically-trained participants, the aerobic participants showed greater activity in the task-related area of the brain, prefrontal and parietal cortices, when observed through neuro-imaging (Petrovitch & White, 2005). Also, during brain development, exercise can induce neurotrophins, chemicals that facilitate brain cell growth and induce dendritic branching, or rather the new connections between brain cells (Ploughman, 2008). Since brain development occurs rapidly in children, it is critical for them to exercise to facilitate the neurotrophins, which can accelerate their learning.

Previously, many studies were done using older adults to determine the effects of exercise on cognitive performance and the results have shown that there is a positive correlation between aerobic exercise and cognitive performance. The greatest increase was seen in executive function. This is related to strategy selection and planning that organizes the intended action (Tomporski et al., 2008). In other words, executive function is involved with focusing on relevant tasks, working memory, mental representation, and inhibiting responses (Tomporski et al., 2008). This finding can also be applied to children to predict that exercise can impact them similarly. It is important to know that several clinical disorders, such as ADHD, which are characterized by lack of behaviour control, attention and judgment, are related to poor executive function (Tomporski et al., 2008). Therefore children who cannot behave themselves, lack in attention and judgement would face difficulties in staying in classrooms and learning at the same rate as other students.

It was asserted by Tuckman that chronic exercise could enhance creative thinking (Tomporski et al., 2008). Tuckman's study consisted of 154 children randomly distributed into two groups that had 12-week intense exercise regime and regular physical activity program. After both groups completed their exercise routine, each group took a cognitive function test. The result revealed that the intense training did not influence perceptual motor skill or visual-motor coordination skill but rather showed significant difference between two groups in a creativity test, which required children to think creatively by naming the object and its various functions as much as they could (Tomporski et al., 2008). Another study done by Hinkel showed similar results. In this study, 85 children were randomly assigned to two groups that consisted of aerobic running program and basic physical education class. After they finished the programs, their creativity was measured by Torrance Test of Creativity Thinking, which measures verbal and figural divergent thinking. It was shown that aerobic exercise group had better performance on the test (Tomporski et al., 2008). Creativity is very important to human nature because it is the creative aspect of the cognitive function that birthed most of modern technology.

Exercise is widely known to enhance children's fitness and reduce their risk of getting illness. However, recent studies have provided much evidence to support the fact that exercise can also enhance cognitive function in children. It was also shown that the amount of physical fitness level has been strongly correlated to the academic achievements according to the California Department of Education statistics in 2004 (Tomporski et al., 2008). Therefore, exercise can improve children's quality of thinking leading to better adjustments to school curriculum and education. Furthermore, better education will guide children in learning about the importance of active and healthy lifestyles, which will decrease their chances of developing illnesses and help reduce healthcare spending in Canada.

Conclusion

This report has reviewed the Red Fox program for children in Vancouver, B.C. While Red Fox is open to all children of a low-economic status, a large portion of children who currently attend Red Fox are of Aboriginal decent. The staff and youth leaders identified several issued they encountered when working with Aboriginal children at Red Fox. Our goal for this report was to provide suggestions on how to improve physical activity experiences within these reported issue. Within this report we have outlined several independents studies that have shown the positive effects that exercise can have with children who are diagnosed with depression, ADHD and FAS.

Red Fox is currently providing many opportunities for young people to improve their health and well-being by providing a safe and positive environment for children to come and play in. Additionally, Red Fox is creating great options for youth to get active through the after school open gym time at community centres, and lunchtime activities at elementary schools, Red Fox Feasting, and more. Red Fox is able to potentially decrease negative health issues and in turn improve the lives of youth and children in these communities drastically.

Our hopes are that this report can not only be used as a tool for increased health promotion and awareness, but that it can be ultimately used to help create self-agency and better the quality of life for the Aboriginal community on the Vancouver East Side.

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