

FINAL COMMUNITY REPORT

HEALTH AND SOCIAL IMPACTS AND FITNESS TESTING  
AT THE  
2008 NORTH AMERICAN INDIGENOUS GAMES

COWICHAN, BRITISH COLUMBIA

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Huy tseep q'u! Thank you!

## Table of Contents

<b><u>ABOUT THE RESEARCHERS</u></b>	<b><u>II</u></b>
<b><u>ACKNOWLEDGEMENTS</u></b>	<b><u>III</u></b>
<b><u>TABLE OF CONTENTS</u></b>	<b><u>IV</u></b>
<b><u>EXECUTIVE SUMMARY</u></b>	<b><u>6</u></b>
<b><u>NORTH AMERICAN INDIGENOUS GAMES BACKGROUND</u></b>	<b><u>8</u></b>
<b><u>STATISTICAL SUMMARY OF THE 2008 NAIG</u></b>	<b><u>9</u></b>
<b>GENDER ANALYSIS OF SPORTS</b>	<b>9</b>
<b><u>RESEARCH DESIGN AND METHODS</u></b>	<b><u>10</u></b>
<b><u>HEALTH AND SOCIAL IMPACT SURVEY</u></b>	<b><u>11</u></b>
<b>DEMOGRAPHIC INFORMATION</b>	<b>11</b>
NATION	11
GENDER	12
PLACE OF RESIDENCE	12
PREVIOUS PARTICIPATION IN NAIG	12
MOTIVATION FOR PARTICIPATING IN THE NAIG	13
HOW TRIP WAS FUNDED	13
PHYSICAL OR DEVELOPMENTAL CHALLENGES	14
<b>PHYSICAL, MENTAL/EMOTIONAL, COMMUNITY/FAMILY AND SPIRITUAL CULTURAL IMPACTS</b>	<b>14</b>
IMPACT ON SUBSTANCE USE	14
PHYSICAL IMPACTS	15
EMOTIONAL AND MENTAL IMPACTS	15
SPIRITUAL AND CULTURAL IMPACTS	16
COMMUNITY AND FAMILY IMPACTS	16
<b>SATISFACTION WITH THE 2008 NAIG VENUE AND FACILITIES</b>	<b>17</b>
<b><u>FITNESS TESTING</u></b>	<b><u>18</u></b>
<b>HEIGHT, WEIGHT AND BMI</b>	<b>19</b>
<b>30 M SPRINT</b>	<b>19</b>
<b>SIT AND REACH</b>	<b>19</b>
<b>CADENCE PUSH UP AND SIT UP</b>	<b>20</b>
<b>T-TEST</b>	<b>20</b>

<b>BEEP OR LEGER TEST</b>	<b>20</b>
<b>SUMMARY OF FITNESS TESTING</b>	<b>20</b>
<b>CONCLUSION</b>	<b>22</b>
<b>FUNDING RESEARCH</b>	<b>22</b>
<b>EDITING AND ADMINISTERING THE SURVEY</b>	<b>22</b>
<b>DEVELOPING A RESEARCH COMMITTEE FROM NAIG COUNCIL</b>	<b>23</b>
<b>DEVELOPING A COMPREHENSIVE VIRTUAL SPACE FOR ALL RESEARCH ASSOCIATED WITH THE NAIG AND INDIGENOUS SPORT</b>	<b>23</b>
<b>CONCLUSION</b>	<b>23</b>
<b>REFERENCES</b>	<b>24</b>
<b>APPENDIX A - PROCEDURES FOR FITNESS TESTING</b>	<b>25</b>
<b>APPENDIX B – COWICHAN TRIBES ETHICAL GUIDELINES FOR RESEARCH</b>	<b>28</b>

## EXECUTIVE SUMMARY

Individuals involved in sport and recreation, particularly those involved in the North American Indigenous Games (NAIG) are aware of the tremendous positive impact sport can have on individuals and communities. There is also an awareness of how sport and recreation can have negative impacts when delivered in a detrimental way. In order to know what athletes really think about their involvement in organized sport and how they might benefit research is needed. This research explored that very question, specifically the perceived health and social impacts of participating in the 2008 North American Indigenous Games. In addition, fitness testing was conducted on the athletes to measure their muscular strength, flexibility, cardiovascular endurance, speed, and agility. To our knowledge, no similar research has been conducted with athletes at the NAIG.

The health and social impact survey delivered to 297 athletes (9.1% of the athletes) at the 2008 Games was designed to explore the physical impacts, including impacts on substance use, emotional and mental impacts, cultural and spiritual impacts, and impacts related to family and community. The results of the survey were extremely favourable, demonstrating the tremendous holistic benefits that athletes experienced because of their involvement in the NAIG.

The impacts of the NAIG clearly extend beyond sport, recreation, or physical activity. Athletes who reported substance use strongly agreed or agreed that participation in the NAIG help them quit or cut down the use of illicit drugs (84%), smoking cigarettes (78%), and drinking alcohol (73%). Involvement in the NAIG made people more aware of their nutrition with 62% strongly agreeing or agreeing that participating in the NAIG encouraged them to eat healthier. From a psychological standpoint, youth who participate in the NAIG reported feeling more respect for themselves (89% strongly agreed or agreed) and their community (88% strongly agreed or agreed), felt a strong sense of cultural pride, and were able to experience and learn about other Indigenous communities. The NAIG helped build excitement in their communities and helped them develop their leadership skills, as well as look to other Indigenous people as role models.

Some of the less favourable findings relate to how far the NAIG can really go in dealing with societal issues that are rooted in historic trauma and intergenerational grief. While 62.5% athletes agreed or strongly agreed that participating in the NAIG provided an escape from pressure, 22% stated there was no change. Just under half of the athletes agreed or strongly agreed that the NAIG improved their communities and brought their families closer together. So although 90% of the athletes agreed that the games were fun, the respite of the NAIG may not be very long lasting when faced the pressures of Indigenous adolescent life. However, because of the reported positive impact on self-respect and other individual constructs, it is hoped that the NAIG could provide a catalyst for on-going change. Further research on the long-term impacts of the NAIG is warranted to see the lasting impact of participation.

The fitness testing results should be interpreted with caution due to the small and potentially biased sample. The athletes who had extra time to find their way to the testing facility may have fallen out of competition thereby causing the sample to be comprised of less competitive athletes. Having said that, the fitness results fall short of some of the national norms which further indicates the importance of Indigenous involvement in physical activity. The fitness results coincides with the health and social impact survey results where only 42% agreed or strongly agreed that participation in the games helped them lose weight.

The fitness testing results indicate that the NAIG is less about high performance sport and more about getting out and getting active all within a framework of strong Indigenous culture. When framing the NAIG for funders this is an important consideration, particularly for funders focusing on physical activity and not sport. The fitness results demonstrate that the NAIG is more about getting active and less about 'elite athletics'. Further research is warranted to further explore this notion.

Although we caution using the fitness testing results to paint a blanket picture of NAIG athletes, future coaches and those involved in Indigenous sport and recreation should take a keen look at the fitness levels of their athletes and incorporate proper coaching and training for events such as the NAIG.

In summary, the results of the research substantiate the anecdotal reports regarding the holistic benefits of the NAIG. The NAIG and related activities can serve as a catalyst to become more active, have greater self-respect, and foster leadership skill development. The NAIG builds pride in communities and with individuals. Indigenous communities are healing and will continue to heal with holistic and cultural programs such as that offered with the NAIG.

## NORTH AMERICAN INDIGENOUS GAMES BACKGROUND

The framework for the North American Indigenous Games was developed in the 1970s by visionaries such as Willie Littlechild, Billie Mills, Charles Woods, John Fletcher, Alwyn Morris and Harold Burden who hoped to promote Indigenous cultures and support Indigenous youth through sport. Recreation and sport are tremendously important to North American Indigenous communities because of the association between sport, health, and wellbeing. Haslip (2001) and Aboriginal Olympic athlete, Alwyn Morris (1984 gold and bronze in the kayak competitions) agreed that sport is a medicine to Aboriginal peoples. The following quote from the NAIG highlights the importance of sport and recreation for Aboriginal people:

Thousands of years before European contact, Aboriginal people held games throughout the continent of North America. Historical records dictate that many modern team sports were derived from traditional Indigenous games. What is not well known is that these games taught personal and social values, which were a curriculum for their way of life. These practices taught each generation values and personal qualities that are reflective throughout Indigenous lifestyles and cultures to the present day. Qualities such as honesty, courage, respect, personal excellence, and gratitude for the guidance of parents, elders, and communities, prepared children and youth for the responsibility of adulthood (Canadian Heritage, 2003).

The NAIG aims to improve the health and wellbeing of Aboriginal people by promoting self-determination in sport and cultural activities. For many Indigenous people, the physical realm is only one component of health. Health and wellbeing go beyond the physical body to include emotional, spiritual, and mental wellbeing. One component cannot be mutually exclusive. Physical health and physical activity directly impact spiritual, mental, and emotional wellbeing. Therefore, from an Indigenous theoretical perspective, the importance of the NAIG and similar physical activity, sport and recreation programs go far beyond the physical benefits.

The mission of NAIG is “to improve the quality of life for Indigenous Peoples by supporting self-determined sports and cultural activities which encourage equal access to participation in the social/cultural fabric of the community in which they reside and which respects Indigenous distinctiveness” (Canadian Heritage, 2003). The Royal Commission on Aboriginal Peoples Report (1996) recognized NAIG as an inspirational initiative to encourage Aboriginal sport and well being. It stressed the importance of building leadership and promoting future Aboriginal coaching development.

The visionaries' dream from the 1970's came to fruition when the first games were held in 1990 in Edmonton, Alberta with 3000 athletes in attendance. Since that time games are held approximately every three years in Canada or the United States. The NAIG Council consisting of representatives for Canada and the United States oversee the function of the games. The NAIG event includes an intense week of friendly competition that combines 'mainstream' events such as basketball and baseball and traditional events such as canoe racing. Cultural events and activities are held prior and throughout the games.

Participation is open to all amateur athletes of North American Indigenous ancestry. Although participants range in age from 13 to over 50, the NAIG targets Aboriginal youth; more than 60% of participants at the 2002 NAIG in Winnipeg were under the age of 18 (Canadian Heritage, 2003) and 88% of participants at the 2008 NAIG in Cowichan, British Columbia were under the age of 18.

The past games have been held with the corresponding amount of athletes:

1990 – Edmonton, Alberta / 3,000

1993 – Prince Albert, Saskatchewan / 4,400

1995 – Blaine, Minnesota / 11,000

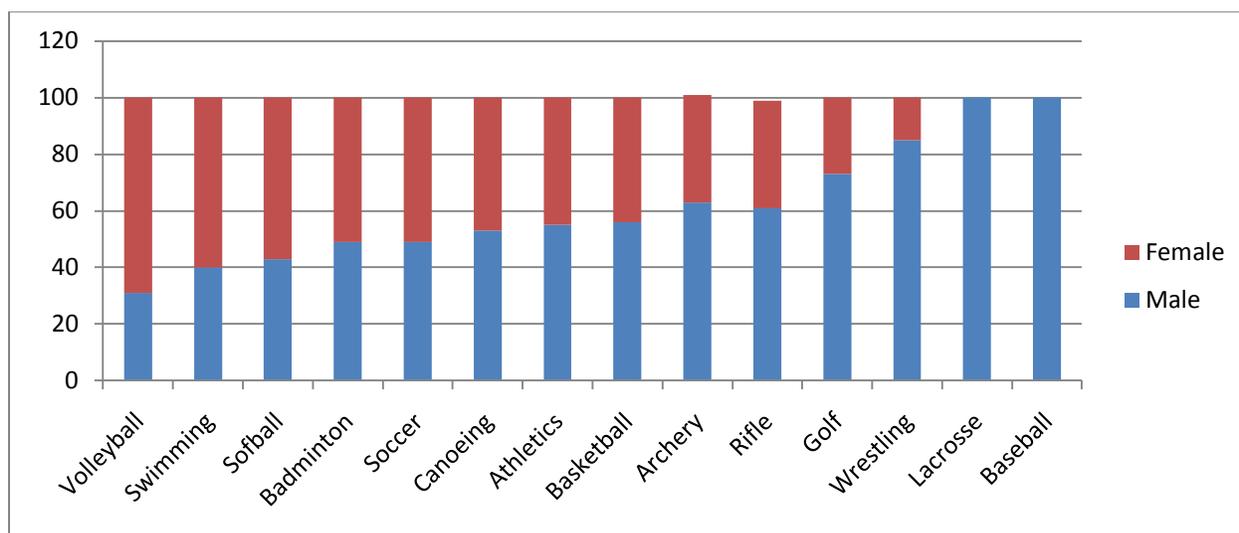
1997 – Victoria, British Columbia / 5,000 (with participants from New Zealand and Australia)

2002 – Winnipeg, Manitoba / 5,428

2006 – Denver, Colorado / number of athletes not confirmed

2008 – Cowichan, British Columbia / 3,210

## STATISTICAL SUMMARY OF THE 2008 NAIG



There were a total of 3210 athletes registered for the 2008 NAIG. 2963 were between the ages of 13-18 and 247 were 19 or older. 46% of the athletes were female and 54% were male.

\*Volleyball – 423 athletes (31% male; 69% female)

\*Swimming – 172 athletes (40% male; 60% female)

\*Softball – 385 athletes (43% male; 57% female)

\*Badminton – 106 athletes (49% male; 51% female)

\*Soccer – 456 athletes (49% male; 51% female)

\*Canoeing – 165 athletes (53% male; 47% female)

Athletics – 324 athletes (55% male; 45% female)

Basketball – 587 athletes (56% male; 44% female)

Archery – 116 athletes (63% male; 38% female)

Rifle – 52 athletes (61% male; 38% female)

Golf – 97 athletes (73% male; 27% female)

Wrestling – 98 athletes (85% male; 15% female)

Lacrosse - 160 athletes (100% male)

Baseball – 128 athletes (100% male)

\* Sports with a higher than average percentage of female participants

Two sports were cancelled but had the following athletes registered: taekwondo – 67 athletes (48% male; 52% female) and boxing – 27 athletes (77% male; 22% female)

### Gender Analysis of Sports

Overall, a slightly higher percentage of males participated in the 2008 NAIG (54% male compared to 46% female). The highest percentage of female participation was in the sport of volleyball (69%) followed by swimming (60%), softball (57%), Taekwondo (52%) badminton (51%), soccer (51%), and canoeing (47%). Two sports did not have any female participants (Lacrosse and Baseball). Females were under-represented in wrestling (15%), boxing (22%), golf (27%) archery (38%), and rifle (38%).

Research demonstrates that female participation in sport and recreation decreases in adolescents compared with males. Therefore, it is recommended that sports that attract female participation should be encouraged. For instance, taekwondo was a sport that had a higher than average percentage of females but the sport was not included in the 2008 games. Perhaps future host societies and the NAIG Council could ensure inclusion of this sport and other sports with high female involvement (i.e., volleyball) be continued in the future.

## RESEARCH DESIGN AND METHODS

The idea for fitness testing and the health and social impact survey came from the host society – Cowichan Tribes in British Columbia. To the knowledge of the host society and researchers, there is no baseline data on NAIG athletes' fitness levels or information on athletes' perception of the health and social benefits of the NAIG.

The host society arranged for the fitness testing and survey administration to occur at the Duncan Curling Club. Athletes had to take NAIG transportation to the testing venue. It was not within walking distance of the main Athlete Centre or athletes' residences.

Ninety-eight athletes attended the testing facility and completed the fitness testing and survey. On the final days of the NAIG the researcher and research assistants went to various locations (Athlete Centre, Cultural Village, game venues) in order to obtain a higher response rate for the survey. An additional 193 surveys were completed. In total, 98 athletes completed the fitness testing (3.1% of the total participants) and 291 athletes completed the survey (9.1% of the total participants).

The fitness testing took an average of 40-50 minutes to complete while the survey took approximately 10-15 minutes.

In order to encourage participation, a raffle for two iPods donated by Cathexis Consulting was held on the final day of the games.

## HEALTH AND SOCIAL IMPACT SURVEY

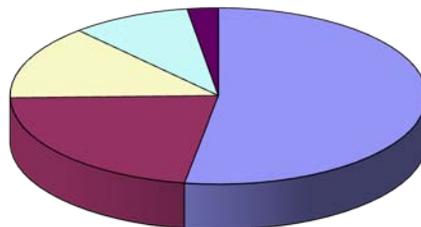
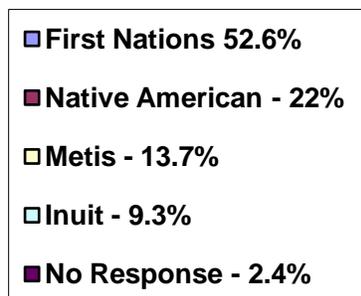
The health and social impact survey incorporated some of the questions of the Arctic Winter Games<sup>1</sup> survey and questions that were deemed appropriated by the host society. The survey questions were categorized based on physical, mental/emotional, cultural/spiritual and family/community impacts. In addition, general demographic data such as age, gender, nation, and previous participation in the NAIG were included. Finally, there were five questions related to the athletes' satisfaction with the 2008 NAIG. The survey underwent a review by community members, Indigenous researchers, and Indigenous sport leaders whereby they rated the importance of each question and provided general feedback. Subsequently, the survey was piloted with 10 youth in British Columbia and 10 youth in Ontario. Minor modifications were made based on the pilot.

### Demographic Information

#### Nation

The survey asked if people self-identified as First Nations, Native American, Métis, or Inuit. Most Indigenous participants from the United States identified as Native American. However, some Indigenous peoples whose community crosses both Canadian and American borders also identified as Native American, so we cannot assume that 22% of the survey participants were from the United States.

A comparison cannot be made with the 2006 Canadian census data regarding the percentage of First Nations, Inuit, and Métis within the Aboriginal population in Canada for many reasons, including the issue of status and non-status First Nations which the Census captures and our survey did not. However, considering that Aboriginal people in the 2006 Census comprised approximately 60% First Nations, 33% Métis, and 4% Inuit (Statistics Canada, 2006), the percentage of Métis participants in this survey was significantly lower. Efforts should be made to attract more Métis athletes to future NAIG events.

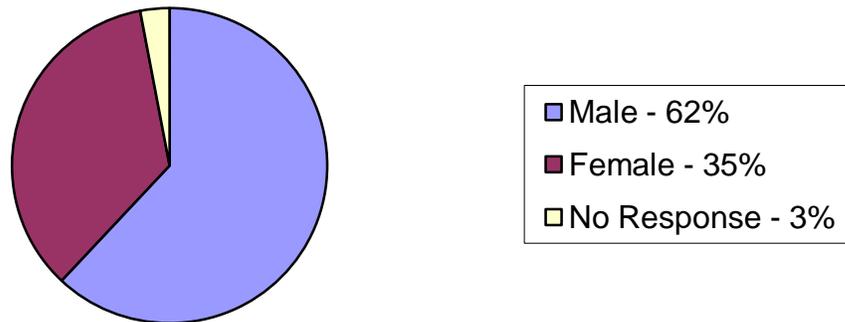


<sup>1</sup> The Arctic Winter Games is similar to the NAIG in that they both are games for Indigenous people, however, the Arctic Winter Games incorporate traditional Indigenous sports.

## Gender

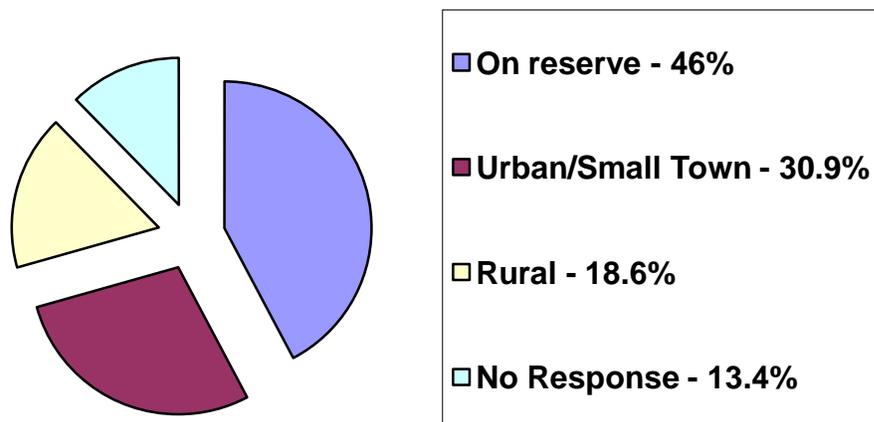
The survey participants somewhat reflected the gender representation at the NAIG with fewer females participating in the survey. 35% of the survey participants were female compared with 46% attending the games and 62% of survey participants were male compared with 54% attending the games.

Unfortunately, transgender was not a category included on the survey. Although sporting events generally require identification of either male or female gender due to competition categories perhaps future surveys can include transgendered as a response category.



## Place of Residence

Participants were asked if they lived on-reserve or reservation, in an urban area or town, or in a rural setting. Again, comparison cannot be made directly with the Canadian census but these statistics are similar to the reported data of the 2001 Census (Statistics Canada, 2001) where about half of Canada's Aboriginal peoples lived on reserve.

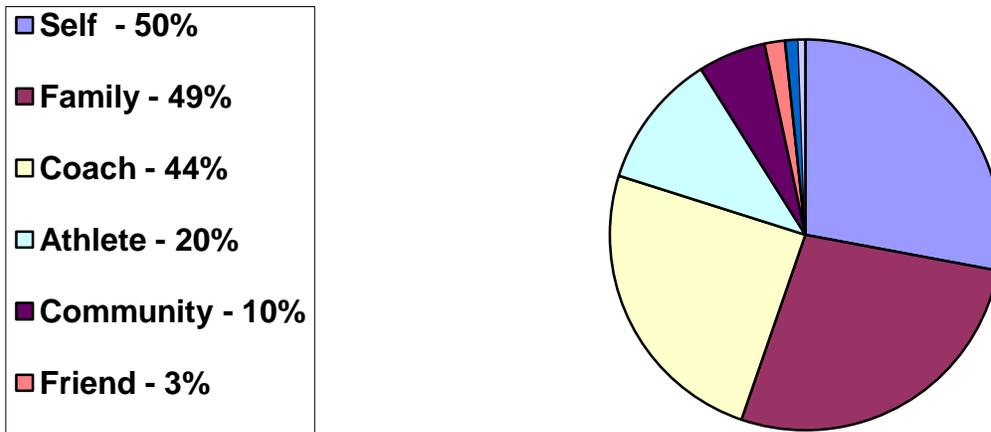


## Previous participation in NAIG

For 66.7% of the participants, this was the first time they participated in NAIG. 31.6% had previously attended the NAIG. Most had participated as athletes at previous games.

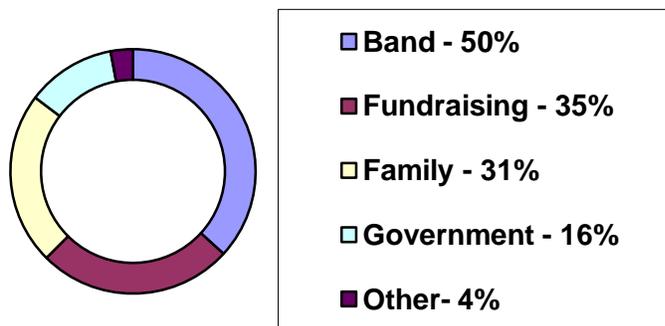
## Motivation for participating in the NAIG

Athletes were asked what motivated them to participate in the NAIG and were able to provide more than one response. Most athletes reported self-motivation as their reason for participating in the NAIG, although their family and coach also played a strong role in their motivation. Perhaps future research could further explore the self-motivation and delve deeper into motivating factors so that more can be done to encourage others to become physical active.



## How trip was funded

Participants were asked how their trip was funded. They could provide more than one answer. It is clear that most participants do not have one source of funding but require various supports in order to attend the games. In addition, support from their Band Council indicates that participants who are status and identify with a reserve community may have better supports than non-status Indigenous peoples. However, fundraising to supplement any financial support appears to be something that is required even for those who obtain Band funding.



## **Physical or Developmental Challenges**

10.3% of the participants stated that they had a physical or developmental challenge. The survey did not probe further into their specific challenges. If this question is to remain on future surveys perhaps another sub-question could be added asking for clarification on the type of physical or developmental challenge.

80.4% felt that the NAIG should have a Special or Para games for athletes with physical and/or developmental challenges. Given the high percentage of athletes who agreed that the NAIG should have a Special or Para games this may be a consideration for future host societies and the NAIG Council.

## **Physical, Mental/Emotional, Community/Family and Spiritual Cultural Impacts**

The next series of questions captured specific information about physical and social impacts of the NAIG. A statistical analysis (factor analysis) was done to determine if any of the questions clustered into categories. The questions under physical impacts formed two clusters, one related to use of substances (cigarettes, drugs, and alcohol) and the remaining related to eating, feeling fit and losing weight. The remaining three categories (mental/emotional, community/family and spiritual/cultural impacts) formed clustered with a few questions being outliers. Based on the factor analysis and other recommendations stemming from this research a modified survey for use in future games has been developed.

### **Impact on Substance Use**

Athletes were asked if participation in the NAIG had an impact on cutting down or quitting smoking, drugs, or alcohol. 56.1% indicated that they had never smoked cigarettes, 56.6% had never done drugs, and 40.5% stated that they do not drink alcohol. Of those who did smoke, experiment with drugs or alcohol, 84% strongly agreed or agreed that participating in the NAIG helped them quit or cut down on doing drugs, 78% strongly agreed or agreed that participating in the NAIG helped them cut down or quit smoking and 73% strongly agreed or agreed that they quit or cut down drinking alcohol.

In Canada, 60% of on-reserve First Nations people between the ages of 18-34 currently smoke (70% of Inuit in the north between the ages of 18-45 currently smoke, almost half of Inuit (46%) who smoke started at age 14 or younger) and a majority of on reserve First Nation people who smoke (52%) started smoking between the ages of 13-16 (Health Canada, 2007a). Eighty-eight (88) percent of NAIG athletes were between the ages of 13-18, which is a critical time for the commencement of smoking and experimenting with drugs and alcohol. The NAIG and similar sport, recreation, and physical activity programs can act as a deterrent to these activities.

The percentage of participants who smoke cigarettes, do drugs or drink alcohol, particularly for this younger age group of predominantly 13-19 year old is comparable to statistics for non-Aboriginal youth in Canada. For instance, a 2006-2007 Canadian youth smoking survey identified the average age of trying smoking for the first time is 11.8 years and the percentage of youth in grades 10-12 who have not tried smoking is 51.8% (Health Canada, 2007b). It was difficult to find comparable statistics for youth and rates of drug use and alcohol. A recommendation for future administration of the survey is have a specific question on whether participants have quit any of the above substance use activities. In addition, in order to be comparable to other surveys administered to youth, asking specific questions about frequency of use may be appropriate. For instance, asking if they use drugs daily, weekly, monthly, etc.

## Physical Impacts

- 77% agreed or strongly agreed that participation in the games made them feel stronger.
- 77% agreed or strongly agreed that participation in the games made them feel more fit.
- 62% agreed or strongly agreed that participation in the games influenced them to eat more healthy.
- 42% agreed or strongly agreed that participation in the games helped them lose weight.

While the games made people feel strong and more fit, fewer agreed that it influenced them to eat healthy and even fewer identified that it helped them lose weight. This may be due to the fact that participants did not feel need to lose weight. Based on the fitness testing results BMI was within normal limits. However, as age increased so did BMI so recommendations for coaches working with future athletes are to increase awareness about weight and include nutritional counseling and identify any barriers to healthy eating.

## Emotional and Mental Impacts

- 94.8% agreed or strongly agreed that participating in the NAIG gave them the opportunity to see other places.
- 90.7% agreed or strongly agreed that participation in the games was fun.
- 90.4% agreed or strongly agreed that participating in the NAIG helped them meet new people.
- 88.7% agreed or strongly agreed that participating in the NAIG helped them to respect themselves
- 86.5% agreed or strongly agreed that participating in the NAIG helped them develop their sport skills
- 82% agreed or strongly agreed that participating in the NAIG helped them development leadership skills.

While the above noted impacts demonstrate high agreement, the following two impacts were not as high.

- 62.5% agreed or strongly agreed that participating in the NAIG provided an escape from pressure. 22% stated there was no change.
- 35.4% agreed or strongly agreed that participation in the games had them do better in school or work. 44.%% felt there was no change in their school or work performance and 8.2% disagreed or strongly disagreed that the NAIG helped them do better in school or work.

The reason for a less favourable response to escaping from pressure or doing better in school or work may be due to larger societal impacts such as poverty and racism. Sport and recreation cannot be seen as a magic bullet to fight all the social ills in which we find many Aboriginal peoples, However, based on the other responses under substance use, physical, mental/emotional, family/community and spiritual/cultural impacts, the NAIG definitely has a positive impact on the lives of these athletes.

82% agreed or strongly agreed that participating in NAIG helped them develop leadership skills. This is an excellent opportunity for athletes to further develop their coaching skills by teaming up with a mentor after NAIG. This will encourage and enable athletes to coach for the next NAIG and develop teams when the athletes are back in their own communities. They will have more confidence and experience to share what they have learned and encourage more participation at the next NAIG.

## Spiritual and Cultural Impacts

- 86.7% agreed or strongly agreed that the games allowed them to interactive with people from other cultures.
- 83.8% agreed or strongly agreed that participation in the NAIG allowed them to take pride in their culture.
- 83.3% agreed or strongly agreed the games allowed them to enjoy other cultures.
- 80.7% agreed or strongly agreed that participating in the NAIG helped them understand more about other cultures.
- 62.5% agreed or strongly agreed that participating in the NAIG helped them understand more about their own culture.

Most of the spiritual and cultural impacts rated favourably. However, there were a lower percentage of people responding favourably to understanding more about their own culture. This may be due to the athletes already knowing about their culture. A recommendation for a future survey is to include a question about how well the athlete knows their own culture.

A recommendation for coaches is to infuse cultural teachings within practice and sport. Research has indicated that offering sport within a cultural context is important (Delgado, 2000; Lavallée, 2008). For those in an urban environment, offering sport, recreation or physical activity within an Aboriginal cultural centre (i.e., Friendship centre) might allow athletes to participate in other cultural activities occurring in the same building. In addition, incorporating Aboriginal teachings within sport and practice, such as the medicine wheel teachings related to physical, mental, emotional and spiritual well-being being important in balancing the life of the athlete, would allow the athlete to learn more about their own culture.

## Community and Family Impacts

- 88.4% agreed or strongly agreed that participating in the NAIG brought recognition to their communities.
- 86.8% agreed or strongly agreed that participating in the NAIG brought recognition from others.
- 82.3% agreed or strongly agreed that the NAIG helped build excitement in their communities.
- 82% felt they acted as role models.
- 79.5% agreed or strongly agreed that participating in the NAIG helped them look to others as role models,

The above noted community and family impacts were rated quite favourably. While the impacts noted below were not as highly rated. As noted in the emotional/mental impacts, some of the circumstances found in Aboriginal communities have a long history related to colonization, racism and poverty. While the NAIG may not have such an impact on bringing families closer together or improving communities, there is an impact related to role models. The NAIG is relatively young and with time, as more and more athletes from more and more communities gain recognition we will see a greater impact directly on our communities and families. A recommendation for future research and evaluation is to capture the long-term impacts of the NAIG by interviewing past NAIG athletes and communities that have sent athletes to the NAIG.

- 50.8% agreed or strongly agreed that their community was brought closer together. 39.1% felt there was not change.
- 47.5% agreed or strongly agreed that participating in the NAIG improved their community. 42% felt there was no change.
- 47% agreed or strongly agreed that participating in the NAIG brought their family closer together. 44% felt there was no change.

The importance of role models was confirmed in the Royal Commission Aboriginal People's report. There is a significant lack of Aboriginal role models for Aboriginal youth, particularly female sport role models. To better bridge the athletes and community, role models should be widely utilized within communities, perhaps similar to the role model program run out of the National Aboriginal Health Organization. Incidentally, many of the past role models of NAHO have been involved in sport. Having a positive role model to look up to for inspiration and guidance can increase the likelihood of future athletes following in their footsteps and contributes to a more healthy community.

## Satisfaction with the 2008 NAIG Venue and Facilities

The following chart outlines participants' satisfaction with the 2008 NAIG.

	Excellent	Very Good	Good	Not very good	Poor	Not Applicable
<b>Room and accommodations</b>	20.3%	19.9%	41.4%	13.7%	3.5%	1.2%
<b>Food</b>	10.5%	12.5%	41.6%	21.4%	13.2%	.8%
<b>Athlete Care Centre</b>	34.6%	26.5%	33.5%	3.5%	.8%	1.2%
<b>Free time activities</b>	28.5%	24.6%	32.8%	10.5%	2.7%	.8%
<b>Transportation</b>	34.5%	26.7%	27.1%	7.5%	3.1%	1.2%

Satisfaction with food rated the poorest. Athletes were given food vouchers redeemable at the Athlete Centre Cafeteria. There was not a lot of variety in the food selection. It is recommended that future games considering increasing the variety of food available including the type, location and number of vendors available.

The response to the room and accommodations was a little more favorable. However, the accommodations varied significantly from team to team. Most teams were in school gymnasiums on cots or mattress pads while others were in dormitories. The variation in accommodations needs to be considered when interpreting these statistics.

The athletic centre was very well received and was centrally located. The pre-arranged transportation got the athletes from event to event without having to incur any of the costs to themselves.

Free time activities included visiting the Culture Village which included numerous vendors (crafts, food, etc.) and traditional music events.

## FITNESS TESTING

The following nine standard fitness tests were conducted on 98 athletes:

- weight
- height
- sit and reach
- push up
- curl up
- 30 m sprint
- vertical jump \* data not reported due to inaccurate measurement
- T-test
- Leger (beep) test

Athletes were required to take the NAIG transportation to the Curling Club which was quite a distance away from the main venues. For this reason, athletes who had a bit of extra time on their hands were better able to participate in the fitness testing. Therefore, this data may represent a biased sample of athletes who had fallen out of competition. Many athletes are busy the entire length of the games. It is recommended that future fitness testing be conducted either with individual teams prior or after the NAIG, or the fitness testing venue at the NAIG be set up in close proximity to the cultural village and other areas that have more traffic. It should also be noted that fitness testing should be conducted after competition to avoid interfering with training or incurring possible injury. The fitness testing venue at the 2008 NAIG was reviewed by a physician prior to the testing.

Approximately 25 volunteers from the North West Territories were trained by one of the research assistants on the proper administration of each test. See appendix for specific instructions for each test.

Ninety-eight athletes completed the fitness testing. This amounts to 3.1% of the total participants of the games.

The following chart outlines the averages of each test by age category and gender. Any further analysis (i.e. by team, sport, or Nation affiliation) is not reported due to the potential biased sampling and misrepresentation of data.

<b>Male</b>	<b>weight</b>	<b>height</b>	<b>sit and reach</b>	<b>push ups</b>	<b>curl ups</b>	<b>30 m sprint</b>	<b>T-test</b>	<b>beep test</b>	<b>BMI</b>
Bantam 13-14	131.27	164.37	19.67	14.64	42.93	5.28	13.24	7.04	22
Midget 15-16	153.58	172.40	28.92	22.00	73.00	4.80	12.27	8.56	23.4
Juvenile 17-19	172.72	177.69	18.43	25.80	92.25	4.75	12.51	7.78	24.8
Senior 20-49	200.14	177.21	26.79	23.00	94.50	4.99	12.50	4.36	28.9

<b>Female</b>	<b>weight</b>	<b>height</b>	<b>sit and reach</b>	<b>push ups</b>	<b>curl ups</b>	<b>30 m sprint</b>	<b>T-test</b>	<b>beep test</b>	<b>BMI</b>
Bantam 13-14	129.50	158.56	21.56	6.75	47.38	5.55	14.85	6.86	23.4
Midget 15-16	147.33	169.00	28.00	15.00	70.67	5.40	13.70	8.50	23.4
Juvenile 17-19	155.00	166.00	28.47	9.67	35.33	6.01	15.23	3.75	25.4

Comparing these average fitness tests with national norms needs to be interpreted with caution because of the previously stated sampling bias. However, it is hoped that this data could be used by future coaches to be thinking about the fitness level of their athletes and incorporate proper training principles. In addition, the average of these specific fitness tests will vary greatly based on sport. For instance, certain sports inherently require better cardiovascular fitness and these athletes may score better on the beep test but not as well on the curl-ups. All of these factors need to be taken into consideration when looking at these statistics and in future testing of athletes.

## Height, Weight and BMI

Height and weight for all categories fluctuated significantly. BMI was calculated based on height and weight. A BMI of less than 25 is considered neither underweight nor overweight in adults. However, BMI cut off for being overweight in those under 18 is as follows:

Age	Overweight Cut-off Male	Overweight Cut-off Female	Obese Cut-off Male	Obese Cut-off Male
13	21.91	22.58	26.84	27.76
13.5	22.27	22.98	27.25	28.20
14	22.62	23.34	27.63	28.57
14.5	22.96	23.66	27.98	28.87
15	23.29	23.94	28.30	29.11
15.5	23.60	24.17	28.60	29.29
16	23.90	24.37	28.88	29.43
16.5	24.19	24.54	29.14	29.56
17	24.46	24.70	29.41	29.69
17.5	24.73	24.85	29.70	29.84
18+	25.00	25.00	30.00	30.00

(Cole, Bellizzi, Flegal, et al., 2000)

While the BMI for most of the youth at the NAIG was under 25, when considering the adolescent chart for BMI, the averages are at or slightly exceed the cut-off for being overweight.

## 30 M Sprint

The following are national norms for 16 to 19 year olds for the 30 M sprint. Comparison data for those under the age of 16 was not found. Both the average scores for females and males in the 16 – 19 categories are ranked as poor based on these norms.

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	<4.0	4.2 - 4.0	4.4 - 4.3	4.6 - 4.5	>4.6
Female	<4.5	4.6 - 4.5	4.8 - 4.7	5.0 - 4.9	>5.0

(Davis, Bull, Roscoe, & Roscoe, 2000)

## Sit and Reach

The sit and reach is a test of flexibility where the participant sits on a floor with feet at a box and reaches forward beyond the toes. The distance reached beyond the toes is calculated. For all age categories and gender, except for male midgets (age 15-16), sit and reach averages and

medians were poorer than national norms. The following are national norms in centimetres for sit and reach:

	<b>11-14 years</b>	<b>15-19 years</b>
<b>Boys</b>	21 mean / 22 median	24 mean / 24 median
<b>Girls</b>	28 mean / 29 median	30 mean / 29 median

(Tremblay, Shields, Laviolette, Craig, Janssen, & Gorber, 2010)

## **Cadence Push Up and Sit Up**

The testing conducted for muscular endurance (cadence push-up and curl-up) count the maximum number of repetitions performed to exertion. This test has replaced the more traditional test which counted the number of repetition achieved in one minute because the cadence test is seen as more safe. However, it is difficult to find average for youth on the cadence tests.

## **T-Test**

The t-test is a timed test of agility where the participant runs and pivots 90 degree in the shape of T (see appendix for instructions on test). Because this test is typically used in sports and not in obtaining national averages, it was difficult to obtain general population and adolescent averages. The appendix contains a chart for average scores for adults. The scores obtained by the NAIG athletes were slightly slower than the average scores but this is expected given that this sample was primarily non-adults.

## **Beep or Leger Test**

The beep test is a test of cardiovascular endurance. Participants run in time with a CD and when unable to run the necessary distance in the allotted time they stop their test at that particular level. The level is then calculated into a cardiovascular estimate of  $V_{O_2}$  maximum. However, calculation estimates for children are different compared with adults. See appendix for instructions on test.

The averages found for the beep test level were mostly for high performance athletes and predominantly those over the age of 18. To provide some perspective, the employment standard for Canadian military is 4 for females and 6 for males, while 9 and over is standard for many international sports. The average scores for the NAIG athletes were well above the Canadian military standard (ranging from 6.86 for females 13-14 and 8.56 for males aged 15-16). However, the male adult (20-49 years) average score was quite poor at 4.36.

## **Summary of Fitness Testing**

While the tests provide interesting data on the athletes, it should be interpreted with caution. The research does provide excellent recommendations for future research and fitness testing of athletes.

- Only those tests with stated national norms for the specific age category should be used in order to provide a better comparison. For instance, those test conducted by Tremblay et al. (2009) that obtained national averages could allow for a direct comparison. Alternatively fitness testing could only be used for comparison data for the individual to measure their own progress and/or progress within a team.
- Future research should employ research assistants with expertise in fitness testing.
- If fitness testing is conducted at future NAIG games and events, the testing should be conducted in a main area of the venue to allow as many athletes as possible to participate.
- Future research should capture the sport of the athlete because this may impact the testing. For instance, wrestling athletes did extremely well on the cadence push-up and sit-up. However, in

order to run proper statistical analysis the number of athletes per sport would need to be substantial.

- Other tests should be considered to measure health such as:
  - Waist to hip ratio
  - Canadian aerobic fitness test (in place of beep test)
  - Partial curl-up (maximum in one minute) following strict form guidelines to ensure safety
  - Grip strength
  - Sum of five skin folds or other body fat measure
  - Diabetes testing
  - Other non-invasive measures of health

# CONCLUSION

## Funding Research

The lack of funding for this research had a negative impact at various levels. The host society paid the wages of three staff, Dano Thorne, Katie Day and Tara Thorne, however, their duties extended beyond this research. All three, as well as Lynn Lavallée from Ryerson University helped to administer the survey and conduct the survey. Lynn Lavallée received funding from her university to travel to Cowichan for the NAIG. Cathexis Consulting, contracted by Sport Canada to conduct an evaluation of the games, provided two iPods for the raffle and \$1000 to help with data analysis. The contracts for the three staff of the host society were completed one to two months after the games, yet the research report had not yet been completed. This posed challenges in putting together the final report. In keeping with an Indigenous protocol for research, NAIG Council members were sought to assist with finalizing this report.

It is recommended that future research be funded to allow for the following activities:

- Administer the survey by kiosks placed in high traffic areas. This will allow for a potentially higher response rate, limit the amount of errors on the survey, and eliminate the data input phase.
- Administer a pre-post design and/or timed series follow-up to determine the lasting impacts of NAIG
- Provide better incentives for athletes to participate in the survey.
- Allow for another method of data collections such as sharing circles. The initial design of this research involved sharing circles but with the limited staff on the ground we were unable to execute this aspect of the research.
- Provide funding for a research coordinator and more staff, from the research design phase through to completion of the report. Lynn Lavallée is a researcher and professor at Ryerson University and while it is expected that she conduct research, without research assistant support, the task of analyzing the data and producing a research report was daunting.

## Editing and Administering the Survey

The original survey has been edited and can be obtained by contacting Lynn Lavallee [lavallee@ryerson.ca](mailto:lavallee@ryerson.ca).

It is recommended that the survey be administered at each NAIG and/or other Indigenous games and perhaps obtain longitudinal data on the athletes.

Other methods should be explored for administering the survey, including kiosks at the event and/or an online survey within one month following the games. Completing the survey online or on a kiosk will also limit the amount of errors or accidental omission of responses. It is important to administer the survey immediately following the NAIG as athletes' recollection of events is fresher. However, measuring the longer term impacts of the NAIG (i.e., one year and five years after the NAIG) is also recommended. This would require redevelopment/revising the survey.

More incentives should be provided for athletes who complete the survey, such as t-shirts for everyone who completes the survey, coupons for food vendors, cash or coupons, and raffle for larger items.

## **Developing a Research Committee from NAIG Council**

In order to ensure that research being conducted with Indigenous athletes associated with the games undergoes ethical standards that are in alignment with Indigenous ways of knowing, it is recommended that the NAIG Council develop research guidelines. At the 2008 NAIG games, the host society developed a list of ethical guidelines for research (see appendix). This should be done in all future research.

In addition, a research committee could ensure that results of research are interpreted by Indigenous people. For instance, the physical fitness data associated with the 2008 NAIG was problematic with respect to selecting a bias sample which could have had detrimental impacts on how Indigenous communities/peoples are perceived. Ensuring Indigenous involvement by people familiar with sport will ensure a measure of ethical conduct with respect to research.

## **Developing a Comprehensive Virtual Space for all Research Associated with the NAIG and Indigenous Sport**

One of the challenges in developing this research was seeking past literature and research on the NAIG. Most NAIG events have had evaluations conducted primarily by the funders. However, this literature is difficult to obtain because it is not part of the public domain. In addition, NAIG Council does not have a repository of information (for example a website that contains information about past and future games). In addition, all of the website associated with past games eventually are not available, sometimes soon after the games. A lack of continuous record is problematic from a research perspective. It is recommended that a virtual space for public material related to the NAIG, including research and evaluation associated with the games be held in a public website that has longevity.

## **Conclusion**

In summary, this research provides empirical evidence related to the health and social impacts of the NAIG, as well as demonstrates the fitness level of some of the athletes. In addition, there are many recommendations for future research such as where to locate research at future games, following up with athletes who previous participated in the NAIG to see how the impacts of their involvement may change over time, and ensuring proper funding and support for future research.

This report provides individuals and communities working in activities related to the NAIG and other Indigenous games, sport, recreation, and physical activity with information that will be helpful in leverage funding for further activities in their communities. It also addresses aspects that the NAIG Council and other Indigenous communities may want to pay attention to in future games, such as ensuring the involvement of girls and young women, Métis peoples, and urban Indigenous peoples. The report may be of interest to coaches, Aboriginal and Indigenous provincial/territorial and state bodies, and athletes themselves.

For further information about this research please feel free to contact Lynn Lavallée, Ryerson University, 350 Victoria University, Toronto, ON M5B 2K3 (416) 979 5000 x4791 - [lavallee@ryerson.ca](mailto:lavallee@ryerson.ca) .

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# Appendix A - Procedures for Fitness Testing

## 1. Height Procedure:

Height was measured in centimeters using a standard wall measuring tape.

## 2. Weight Procedure:

Weight was measured in pounds with a standard scale. The scale was calibrated at regular intervals.

## 3. Cadence Curl-Up Test Procedure:

Subject lies supine on mat with knees bent at 90° and feet on floor. The arms are extended to sides with fingers touching a piece of masking tape. A second piece of tape is placed beyond the first piece:

- 12 cm apart for subjects less than 45 years of age
- 8 cm apart for subjects 45 years or older

Set metronome at 40 beats per minute. At the first beep, the subject slowly lifts the shoulder blades off the mat by flexing spine until finger tips reach the second piece of tape. At the next beep, the subject slowly returns shoulder blades to mat by flattening lower back. Subject repeats curl-up in time with the metronome (20 curl-ups per minute). One repetition is counted each time shoulder blades touches the floor. Subject performs as many curl-ups as possible without stopping, up to a maximum of 75 repetitions. The test is terminated if the cadence is broken. Allow the subject to practice a few repetitions before test begins. Instruct the subject to breathe easily during the exercise so as not to invoke the Valsalva maneuver. Make sure that the fingertips are not beyond the first line in the starting position.

Since elevation of the trunk to 30° is the important criteria, alternative techniques can be considered:

- placing hands on thighs and curling up until hands reach knee caps.
- hands positioned across chest with head activating a counter when spine is flexed 30°.
  - Note: may be slightly more difficult since weight of arms are positioned further up from spine articulation (shifts center of gravity away from fulcrum(s) essentially creating longer lever arm)

## 4. Cadence Push Up Procedure:

The 90° push-up to an elbow angle of 90° is the recommended test for upper body strength and endurance. Test administration requires little or no equipment; multiple students may be tested at one time, and few zero scores result. The 90° push-up has generally been shown to produce consistent scores but reliability depends on how it is administered. Objectivity, or the ability of different observers to attain the same results, is a factor in this item because of the necessity of judging the 90° angle. Before test day, students should be allowed to practice doing 90° push-ups and watching their partner do them. Instructors should make a concerted effort during these practice sessions to correct participants who are not achieving the 90° angle. In this manner all participants will gain greater skill in knowing what 90° “feels like” and “looks like.”

**Test Objective** To complete as many 90° push-ups as possible at a rhythmic pace.

**Equipment and Facilities** The only equipment necessary is an audiotape with the recorded cadence. The correct cadence is 20 90° push-ups per minute (1 90° push-up every 3 seconds). The PACER test CD or tape contains a recorded 90° push-up cadence. The 90° push-up may be performed on a mat.

**Test Instructions** The participant being tested assumes a prone position on the mat with hands placed under or slightly wider than the shoulders, fingers stretched out, legs straight and slightly apart, and toes tucked under. The participant pushes up off the mat with the arms until arms are straight, keeping the legs and back straight. The back should be kept in a straight line from head to toes throughout the test (photo 7.7). The participant then lowers the body using the arms until the elbows bend at a 90° angle and the upper arms are parallel to the floor (photo 7.8). This movement is repeated as many times as possible. The participant should push up and continue the movement until the arms are straight on each repetition. The rhythm should be approximately 20 90° push-ups per minute or 1 90° push-up every 3 seconds.

**When to Stop** Students are stopped when the second form correction (mistake) is made. Only one form correction is allowed.

### **Form Corrections**

- Stopping to rest or not maintaining a rhythmic pace
- Not achieving a 90° angle with the elbow on each repetition
- Not maintaining correct body position with a straight back
- Not extending arms fully

**Scoring** The score is the number of 90° push-ups performed. For ease in administration, it is permissible to count the first incorrect 90° push-up. It is important to be consistent with all of the participants when determining if you will count the first incorrect push-up.

**Suggestions for Test Administration**

- Test should be terminated if the student appears to be in extreme discomfort or pain.
- Cadence should be called or played on a prerecorded tape or CD.
- Males and females follow the same protocol.
- Find a short cone, sponge or other piece of pliable equipment that could be placed under the participant's chest. The participants must lower to the equipment in order for the 90° push-up to count. The size and height of the equipment that is used may vary depending on the age and size of your students.

**5. Laser Timed 30M Sprint Procedure:**

The 30 M sprint was conducted with a timed laser apparatus which detected first motion off a pressure sensor pad and crossing of finish line at 30 M with a laser. Participants were able to take their highest out of three attempts. The following are national norms for 16 to 19 year olds.

Gender	Excellent	Above Average	Average	Below Average	Poor
Male	<4.0	4.2 - 4.0	4.4 - 4.3	4.6 - 4.5	>4.6
Female	<4.5	4.6 - 4.5	4.8 - 4.7	5.0 - 4.9	>5.0

Table Reference: Davis B. et al; Physical Education and the Study of Sport; 2000

**6. Beep Test or Leger Test Procedure:**

The test is made up of 23 levels where each level lasts approximately one minute. Each level comprises of a series of 20m shuttles where the starting speed is 8.5km/hr and increases by 0.5km/hr at each level. On the tape/CD a single beep indicates the end of a shuttle and 3 beeps indicates the start of the next level. The test is conducted as follows:

- Measure out a 20 metres section and mark each end with a marker cone
- The athlete carries out a warm up program of jogging and dynamic stretching exercises
- The test is conducted
  - The athlete must place one foot on or beyond the 20m marker at the end of each shuttle
  - If the athlete arrives at the end of a shuttle before the beep, the athlete must wait for the beep and then resume running
  - The athlete keeps running for as long as possible until he/she can longer keep up with the speed set by the tape/CD at which point they should voluntarily withdraw
  - If the athlete fails to reach the end of the shuttle before the beep they should be allowed 2 or 3 further shuttles to attempt to regain the required pace before being withdrawn
  - Record the level and number of shuttles completed at that level by the athlete
  - At the end of the test the athletes conduct a cool down program, including static stretching exercises

**7. Vertical Jump Procedure:**

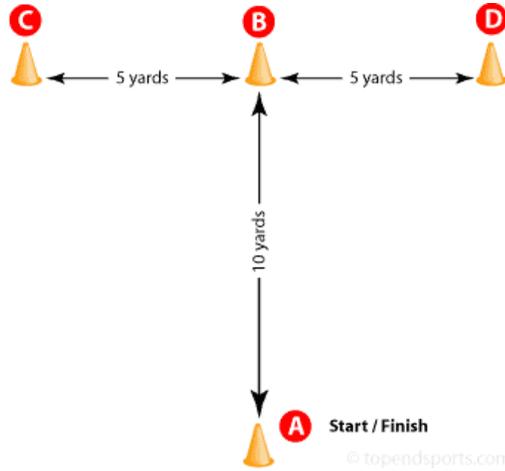
The vertical jump was measured with a digital jump pad. The jumper stands on a pad and at least one switch is deactivated by the jumper stepping thereon. The switch is initially activated by the jumper jumping upward therefrom and thereafter deactivated upon return. A time period is measured while the switch is activated. The square of the activated time period is calculated and thereafter the result is multiplied by a constant to derive vertical jump height. Finally, the resultant vertical jump height of the jump is displayed

rating	males (inches)	males (cm)	females (inches)	females (cm)
excellent	> 28	> 70	> 24	> 60
very good	24 - 28	61-70	20 - 24	51-60
above average	20 - 24	51-60	16 - 20	41-50
average	16 - 20	41-50	12 - 16	31-40
below average	12 - 16	31-40	8 - 12	21-30
poor	8 - 12	21-30	4 - 8	11-20
very poor	< 8	< 21	< 4	< 11

**8. Agility T-Test Procedure:**

**Purpose:** the T-Test is a test of agility for athletes, and includes forward, lateral, and backward running.

**Equipment required:** tape measure, marking cones, stopwatch



**Diagram:**

**Description / Procedure:** Set out four cones as illustrated in the diagram above. The subject starts at cone A. On the command of the timer, the subject sprints to cone B and touches the base of the cone with their right hand. They then turn left and shuffle sideways to cone C, and also touches its base, this time with their left hand. Then shuffling sideways to the right to cone D and touching the base with the right hand. They then shuffle back to cone B touching with the left hand, and run backwards to cone A. The stopwatch is stopped as they pass cone A.

**Scoring:** The trial will not be counted if the subject crosses one foot in front of the other while shuffling, fails to touch the base of the cones, or fails to face forward throughout the test. Take the best time of three successful trials to the nearest 0.1 seconds. The table below shows some scores for adult team sport athletes.

	<b>Males (seconds)</b>	<b>Females (seconds)</b>
Excellent	< 9.5	< 10.5
Good	9.5 to 10.5	10.5 to 11.5
Average	10.5 to 11.5	11.5 to 12.5
Poor	> 11.5	> 12.5

# Appendix B – Cowichan Tribes Ethical Guidelines for Research

Cowichan 2008 North American Indigenous Games Education  
Symposium Research Guidelines

*Prepared by Helene Demers and approved by the Cowichan 2008 North American Indigenous Games Education Symposium Research Working Group June 21, 2007*

Researchers applying to work collaboratively with the Cowichan 2008 North American Indigenous Games Education Symposium, should adhere to the research and ethics policies of their institutions or professional organizations. In addition to having institutional policies, some university and college departments have formulated and received approval of their own research and ethics policies. Copies of the relevant research and ethics policies must be submitted when applying to the Cowichan 2008 North American Indigenous Games Education Symposium Research Working Group (Cowichan 2008). Researchers not affiliated with an academic institution or a recognized professional organization with an ethical review policy, are encouraged to review the guidelines of Malaspina University-College which can be found at <http://research.mala.bc.ca/committees/crihs/CRIHSdepartmentalreview.htm>

In addition, Cowichan 2008 has established the following guidelines which researchers are expected to observe. These guidelines shall be included in all research partnerships supported by Cowichan 2008. All proposed research should benefit the host community. Cowichan 2008 promotes a collaborative approach to research which enables community representatives to participate in the planning, execution and evaluation of research results. Review of the research shall be carried out jointly by members of the host community, Cowichan 2008 and the academic community prior to publication. In applying to work collaboratively with Cowichan 2008, researchers should provide a brief description of the following:

- the benefit and impact at the local, regional and national level of their proposed research.
- methodology (including how Indigenous knowledge and ways of knowing will be incorporated).
- how protocol will be followed and respected.
- consent form to be used (please provide a copy).
- plan for review of research results with members of the community prior to publication.
- method of dissemination (as widely as possible in accessible language).
- access to research findings.
- copyright in publication of research findings.
- transfer of skills to the community.
- plan of assisting the community to act on research findings.

## **Informed Consent**

- Consent should be obtained in writing at all necessary levels. Where this is not practical, it can be recorded. Included in the written or recorded consent must be a question regarding the authority over and access to the recorded and transcribed material in case the person interviewed is no longer able to make those decisions.
- Informed consent of parents or guardians should be obtained in research involving youth. Where this is not practical, it can be recorded
- Individuals or groups participating in research must be provided with information about the purpose and nature of the research activities, including expected benefits and risks.
- Participants should be informed that they are free to withdraw from the research at any time.
- Participants should be informed they are free to not answer any question they do not wish to answer or are uncomfortable answering.
- If applicable, participants should be informed of the degree of confidentiality that will be maintained in the study.

## **Questions for those seeking to work collaboratively with Cowichan 2008**

- Are there perspectives on the subject of inquiry that are distinctly Indigenous?
- What are the specific protocols or approaches required to conduct research in the host community?
- Where will the research get published or presented?
- Does Indigenous knowledge in any way challenge assumptions on the topic you are intending to research?
- Are you incorporating or following Indigenous epistemology, methodology and theory?
- How will Indigenous knowledge or perspectives be validated?
- How will Indigenous knowledge be protected from being exploited e.g. copyright of Elders' teachings?
- What kind of honoraria will be provided for Elders?

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